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Complete List of Authors:	Roberts, Tom; Royal College of Emergency Medicine, Emergency Department; Bristol Royal Hospital for Children, Emergency Department Daniels, Jo; University of Bath Hulme, William Hirst, Robert; North Bristol NHS Trust, Department of Anaesthesia Horner , Daniel; The Royal College of Emergency Medicine; Salford Royal Hospitals NHS Trust, Department of Intensive Care Lyttle, Mark; Bristol Royal Hospital for Children, Emergency Department; University of the West of England, Faculty of Health and Applied Science Samuel, Katie; North Bristol NHS Trust, Department of Anaesthesia Graham, Blair; University of Plymouth; Plymouth Hospitals NHS Foundation Trust, Emergency Department Reynard, Charles ; The University of Manchester Barrett, Michael; Children's Health Ireland at Crumlin, Emergency Medicine; University College Dublin, School of Medicine Foley, James; University Hospital Waterford, Emergency Department Cronin, John; St Vincent's University Hospital, Emergency Department Umana, Etimbuk; Connolly Hospital Blanchardstown, Emergency Department Vinagre, Joao; College of Anaesthesiologists of Ireland Carlton, Edward; North Bristol NHS Trust, Emergency Department
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Title Page

Psychological Distress and Trauma in Doctors Providing Frontline Care During the COVID-19 Pandemic in the United Kingdom and Ireland: A Prospective Longitudinal Survey Cohort Study

Authors: Tom Roberts[1, 2], Jo Daniels [3], William Hulme [4], Robert Hirst [5], Daniel Horner [1, 6], Mark D Lyttle [2, 7], Katie Samuel [5], Blair Graham [8, 9], Charles Reynard [10], Michael J Barrett [11, 12], James Foley [13], John Cronin [14], Etimbuk Umana [15], Joao Vinagre [16] and Edward Carlton [1, 17] on behalf of The Trainee Emergency Research Network (TERN), The Paediatric Emergency Research Network UK and Ireland (PERUKI), Research and Audit Federation of Trainees (RAFT), Irish Trainee Emergency Research Network (ITERN and Trainee Research in Intensive Care (TRIC))

Affiliations:

1) The Royal College of Emergency Medicine, London, UK
2) Emergency Department, Bristol Royal Hospital for Children, UK
3) Department of Psychology, University of Bath, UK
4) Statistical Consultant, Oxford, UK
5) Department of Anaesthesia, North Bristol NHS Trust, UK
6) Emergency Department, Salford Royal Hospital NHS Foundation Trust
7) Faculty of Health and Applied Sciences, University of the West of England, Bristol
8) Faculty of Health, University of Plymouth, Plymouth, UK.
9) Emergency Department, University Hospitals Plymouth, UK
10) Department of Cardiovascular Sciences, University of Manchester
11) Department of Emergency Medicine, Children's Health Ireland at Crumlin, Ireland
12) Women's and Children's Health, School of Medicine, University College Dublin, Ireland
13) Emergency Department, University Hospital Waterford, Waterford, Ireland
14) Department of Emergency Medicine, St Vincent's University Hospital, Dublin, Ireland
15) Emergency Department, Connolly Hospital Blanchardstown, Dublin, Ireland.
16) College of Anaesthesiologists of Ireland, Dublin, Ireland
17) Emergency Department, North Bristol NHS Trust

Corresponding Author
Dr Tom Roberts
Address: 12 Hamilton Road, Bristol, BS3 1PB
Email: Tomkieranroberts@gmail.com
Telephone: 07894234121

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Objectives

The psychological impact of the COVID-19 pandemic on doctors is a significant concern. Due to the emergence of a multiple pandemic waves, longitudinal data on the impact of COVID-19 is vital to ensure an adequate psychological response. The primary aim was to assess the prevalence and degree of psychological distress and trauma in frontline doctors during the acceleration, peak and deceleration of the COVID-19 first wave. Personal and professional factors associated with psychological distress are also reported.

Design

A prospective online three-part longitudinal survey.

Setting

Acute hospitals in the UK and Ireland.

Participants

Frontline doctors working in Emergency Medicine (EM), Anaesthetics and Intensive Care Medicine (ICM) during the first wave of the COVID-19 pandemic in March 2020.

Primary outcome measures

Psychological distress and trauma measured using the General Health Questionnaire-12 and the Impact of Events-Revised.

Results

The initial acceleration survey distributed across networks generated a sample of 5440 doctors. Peak and deceleration response rates from the original sample were 71·6% (n=3896) and 56·6% (n=3079) respectively. Prevalence of psychological distress was 44·7% (n=1334) during the acceleration, 36·9% (n=1098) at peak and 31·5% (n=918) at the deceleration phase. The prevalence of trauma was 23·7% (n=647) at peak and 17·7% (n=484) at deceleration. The prevalence of probable post-traumatic stress disorder was 12·6% (n=343) at peak and 10·1% (n=276) at deceleration. Worry of family infection due to clinical work was most strongly associated with both distress (R^2 = 0·06) and trauma (R^2 =0·10).

Conclusion

Findings reflect a pattern of elevated distress at acceleration and peak, with some natural recovery. It is essential that policymakers seek to prevent future adverse effects through (a) provision of vital equipment to mitigate physical and psychological harm (b) increased awareness and recognition of signs of psychological distress and (c) the development of clear pathways to effective psychological care.

Trial Registration: ISRCTN 10666798

Strength and limitations of this study

- This paper presents key findings from a large cross-sectional longitudinal survey of practising emergency, anaesthetic and intensive care doctors in UK and Ireland during the acceleration, peak and deceleration of the first wave of the COVID-19 pandemic.
- This study provides an insight into the associated personal and professional factors associated with trauma and distress and could be utilised to identify those doctors who will most benefit from psychological interventions.
- Variation in regional peaks may have influenced accurate capturing of psychological distress and trauma rates and have not been accounted for.
- This data does not provide further long-term follow-up of participants.

Introduction

Clinicians providing frontline care have become central to the primary reception, assessment, and ongoing hospital treatment of patients with suspected Coronavirus Infectious Disease 2019 (COVID-19). These include doctors working in Emergency Medicine (EM), Anaesthetics and Intensive Care Medicine (ICM). Whilst this healthcare workforce is highly resilient and accustomed to facing traumatic situations, the COVID-19 pandemic has imposed unprecedented demands in workload intensity and personal health risk. [1–4] High infection rates have been reported in frontline clinicians, with over 150 fatalities in the UK by May 2020. [5] These factors are likely to affect psychological wellbeing, increasing the risk of traumatic stress both in the acute phase of the pandemic and at long-term follow up. [6–8] Exposure to infectious disease outbreaks and elevated psychological distress have previously been associated with increased sickness rates, absenteeism, impaired performance at work, and the development of physical health problems. [9–11] During the current COVID-19 pandemic there has been a global media focus on health and care workers with widespread public support. [12] However, there is increasing recognition amongst key opinion leaders and psychological societies that the COVID-19 pandemic will lead to an unparalleled, though as yet unquantified, impact upon the psychological wellbeing of healthcare workers. [13,14]

Studies to date evaluating psychological wellbeing in frontline clinicians during infectious disease outbreaks (including COVID-19) demonstrate negative impacts may be significant. [9,15,16] Systematic reviews and meta-analyses converge around common predictors of psychological distress following traumatic events, many of which are relevant to frontline clinicians. Key factors include preparedness, training, social and occupational support, exposure and threat to life, media use and history of mental health problems. [1,7,16–18] However, these data have largely been collected as a snapshot either during or following outbreaks or as cross-sectional surveys in highly selected or self-selecting cohorts. Longitudinal data which describe evolving and cumulative effects on the psychological wellbeing of frontline working during the COVID-19 pandemic are therefore urgently required. Such studies are essential to understand and mitigate psychological impacts of future events upon this vital workforce and inform the development of policy and interventions.

The primary aim of this study was to assess the prevalence and degree of psychological distress and trauma in doctors providing frontline care during the acceleration, peak and deceleration phases of the COVID-19 pandemic. We also sought to establish which personal and professional factors are were significantly associated with psychological distress at these time points.

Methods

Study Design and Participants

The "COVID-19 Emergency Response Assessment (CERA) Study" was a prospective online longitudinal survey of frontline doctors across the UK and Ireland undertaken during the acceleration, peak and deceleration phases of the first COVID-19 pandemic wave.[19] Doctors of all grades working in EM, Anaesthetics or ICM during the acceleration phase were invited to participate.

Procedures

This survey study is reported in line with Checklist for Reporting Results of Internet E-surveys (CHERRIES) guidelines. [20] Full details of survey distribution, design, administration, and time-points are available in the published protocol. [19] In brief, the survey was initially distributed during the acceleration phase of the first pandemic wave through existing trainee research networks, training faculties or Royal College Networks via email or instant messaging groups, coordinated by identified site/region leads. The participation link was not shared on wider social media platforms, to avoid international contamination. At completion of the acceleration phase survey, participants entered personal email addresses for direct approach at peak and deceleration phases with a unique survey link to avoid duplication. The study was registered at the ISRCTN (10666798).

The acceleration, peak and deceleration surveys were developed iteratively by the study team and underpinned by evidence, or by consensus where necessary. Psychometric tools were selected by consensus of the study team, considering validity and utility of a range of standardised measures, balanced against the feasibility of delivery and completion by individuals likely to be working at maximum capacity.

Study data were collected and managed using REDCap (Research Electronic Data Capture) hosted at University Hospitals Bristol and Weston NHS Foundation Trust.[21,22] Acceleration, peak and deceleration phases were defined a priori and adapted from the United States Centre for Disease Control "Preparedness and Response Frameworks for Influenza Pandemics". [23] For each survey, exact survey distribution dates were decided per protocol by team consensus according to available public health data on number of confirmed cases (acceleration phase; UK: 18/03/2020 – 26/03/2020, Ireland: 25/03/2020 – 02/04/2020), nationally available COVID-19 daily death rates (peak phase; UK: 21/04/2020 – 05/05/2020, Ireland: 28/04/2020 – 12/05/2020) and at 30 days after distribution of the peak phase survey (deceleration phase; UK: 03/06/2020 – 17/06/2020, Ireland: 10/06/2020 – 24/06/2020). Ethical approval was obtained from the University of Bath (UK) and Children's Health Ethics Committee (Ireland). Regulatory approval was obtained from the Health Regulation Authority (UK), Health and Care Research Wales. Participants provided electronic informed consent for each survey.

Survey Questions

Personal and professional characteristics relating to participants' current role, and their preparedness and experiences during the pandemic were collected, alongside the General Health Questionnaire-12 (GHQ-12; provided with licence fee waived by GL Assessments, London, UK) for distress, and the Impact of Events- Revised (IES-R; off licence) for trauma. Ancillary personal and professional characteristics collected are provided in full in the protocol and online supplement. [19]

Outcomes

There were two co-primary outcomes in this survey: psychological distress and trauma as defined by the GHQ-12 and the IES-R respectively.

Distress – GHQ-12

The GHQ-12 is a 12-item self-report measure devised to screen for psychological distress in the general population. [24] The measure has high specificity and sensitivity, with reliability demonstrated across a range of populations. [25,26] The GHQ-12 has been used in similar clinician-based studies measuring the psychological impact of infectious outbreaks and was chosen due to the brevity of the measure and its suitability for time-pressured medical staff. [16] The GHQ-12 assesses current state and asks the participants to compare to usual state. GHQ-12 was asked at all 3 survey phases.

Trauma – IES-R

The IES-R is a 22-item measure commonly used to measure post-traumatic stress following a pre-specified traumatic incident and has been used to evaluate the impact of infectious disease outbreaks on hospital staff. [16,27] IES-R was used at the peak and deceleration survey phases.

The secondary outcomes captured included personal and professional characteristics and their association with psychological distress and trauma.

Statistical Analysis

The statistical analysis is described in detail in the published protocol. [19] GHQ-12 items were reported using two methods. In the first method, item responses are assigned to the values 0, 0, 1, 1 (from the most positive to the most negative sentiment) and summed to form an aggregate score from zero (least distressed) to 12 (most distressed). Using this method, a score of more than 3 is indicative of case-level distress. [25] The second method assigns responses to 0, 1, 2, 3 (positive to negative sentiment) producing a score in the range 0 to 36, with zero representing the most healthy response (no psychological distress) and 36 the most unhealthy (maximal psychological distress).

IES-R responses were analysed by assigning the responses to 0, 1, 2, 3, 4 (positive to negative) producing a score in the range 0 (no trauma) to 88 (maximal trauma). A score of 24 or above indicates a clinically significant traumatic stress response, a score above 33 indicates best cut-off for a diagnosis of 'probable post-traumatic stress disorder' (PTSD). [28,29]

The change over time in the GHQ-12 (phases 1, 2, and 3) and IES-R scores (phases 2 and 3) amongst participants who responded to all three surveys was examined with a repeated measures linear mixed-effect model, with survey phase as a fixed effect and a participant-level random effect.

To identify potential modifiers of the change in GHQ-12-score or IES-R-score over time, further models each with a single additional covariate were constructed, including an interaction term with survey phase. Responses where the covariate value was missing were removed. [30] Nagakawa's marginal R^2 was used to measure the proportion of outcome variance accounted for by the model (excluding random-effects, i.e., when there is no a-priori knowledge of the expected outcome for each participant). Values vary from 0 to 1, with 1 occurring when the model perfectly predicts the outcome, and 0 occurring when the model only returns the population average.

Software

All analyses and statistical outputs were produced in the statistical programming language R and the 'tidyverse', 'lme4' and 'ggeffects' packages were used for the mixed-effects models.[31–33]

Patient and Public Involvement

The study team contains frontline doctors from all represented specialties who undertook clinical work throughout the COVID-19 pandemic. This research is in line with recent RCEM research prioritisation and research recommendations. [34,35]

Role of the funding source

The sponsor and funder had no role at any stage of this work.

Results

Distribution across networks in UK and Ireland generated 5440 responses. Follow-up responses from the peak and deceleration surveys were 3896 (71·6%) and 3079 (56·6%) respectively (figure 1). The final analysis cohort was 3079 participants, consisting of 1686 (54·8%) from EM, 1114 (36·2%) from Anaesthetics and 526 (17·1%) from ICM, with some participants working across multiple specialities.

The demographic and professional characteristics of the respondent population are summarised in Table 1. The cohort was 51·0% female, within a median age group of 36-40 years, and was representative of all professional grades. Respondents were, 63·7%, 'White British', 6·2% 'Irish' and '30·1% 'Ethnic Minority'; a full breakdown of ethnicity is provided in the online supplementary hub (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs). [36,37]

Table 1 Demographic and occupational characteristics of responders who completed all three study phases

	All (N=3079)	Emergency Medicine (N=1686)	Anaesthetics (N=1114)	Intensive Care Medicine (N=526)
Age				
20-25	111 (3·6%)	99 (5·9%)	3 (0·3%)	9 (1·7%)
26-30	737 (24·0%)	471 (28·0%)	184 (16·5%)	130 (24·8%)
31-35	682 (22·2%)	366 (21·7%)	242 (21·8%)	141 (26·9%)
36-40	497 (16·2%)	279 (16·6%)	177 (15·9%)	81 (15·5%)
41-45	406 (13·2%)	220 (13·1%)	156 (14·0%)	55 (10·5%)
46-50	282 (9·2%)	128 (7·6%)	133 (12·0%)	55 (10·5%)
51-55	203 (6·6%)	72 (4·3%)	121 (10·9%)	27 (5·2%)
56-60	107 (3·5%)	34 (2·0%)	63 (5·7%)	19 (3·6%)
>60	49 (1·6%)	14 (0·8%)	33 (3·0%)	7 (1·3%)
Missing	5	3	2	2
Gender				
Male	1455 (48·8%)	774 (47·4%)	542 (50·1%)	272 (53·8%)
Female	1522 (51·0%)	855 (52·4%)	538 (49·7%)	233 (46·0%)
Other	7 (0·2%)	4 (0·2%)	2 (0·2%)	1 (0·2%)
Missing	95	53	32	20
Seniority				
Junior Doctor	1089 (35·4%)	692 (41·0%)	276 (24·8%)	187 (35·6%)
Middle Grade Doctor	660 (21·4%)	357 (21·2%)	230 (20·6%)	129 (24·5%)
Other Senior Doctor	228 (7·4%)	156 (9·3%)	66 (5·9%)	34 (6·5%)
Senior Doctor (Consultant Grade)	1102 (35·8%)	481 (28·5%)	542 (48·7%)	176 (33·5%)
Geographical Region				
East Midlands	177 (5·7%)	78 (4·6%)	84 (7·5%)	24 (4·6%)
East of England	172 (5·6%)	87 (5·2%)	70 (6·3%)	29 (5·5%)
London	454 (14·7%)	319 (18·9%)	103 (9·2%)	42 (8·0%)
North East	132 (4·3%)	68 (4·0%)	47 (4·2%)	30 (5·7%)
North West	334 (10·8%)	149 (8·8%)	141 (12·7%)	78 (14·8%)
South East	355 (11·5%)	229 (13·6%)	105 (9·4%)	48 (9·1%)
South West	430 (14·0%)	208 (12·3%)	167 (15·0%)	76 (14·4%)
West Midlands	183 (5·9%)	89 (5·3%)	78 (7·0%)	44 (8·4%)
Yorkshire and the Humber	212 (6·9%)	90 (5·3%)	102 (9·2%)	55 (10·5%)
Northern Ireland	87 (2·8%)	41 (2·4%)	34 (3·1%)	20 (3·8%)
Scotland	253 (8·2%)	159 (9·4%)	80 (7·2%)	32 (6·1%)
Wales	92 (3·0%)	21 (1·2%)	62 (5·6%)	21 (4·0%)

Dublin	111 (3·6%)	82 (4·9%)	21 (1·9%)	16 (3·0%)
Rest of Ireland	87 (2·8%)	66 (3·9%)	20 (1·8%)	11 (2·1%)
Nation				
England	2449 (79·5%)	1317 (78·1%)	897 (80·5%)	426 (81·0%)
Northern Ireland	87 (2·8%)	41 (2·4%)	34 (3·1%)	20 (3·8%)
Republic of Ireland	198 (6·4%)	148 (8·8%)	41 (3·7%)	27 (5·1%)
Scotland	253 (8·2%)	159 (9·4%)	80 (7·2%)	32 (6·1%)
Wales	92 (3·0%)	21 (1·2%)	62 (5·6%)	21 (4·0%)
Ethnicity				
White British	1888 (63·7%)	949 (58·4%)	755 (70·3%)	338 (67·1%)
Irish	185 (6·2%)	118 (7·3%)	51 (4·7%)	33 (6·5%)
Ethnic minority	893 (30·1%)	557 (34·3%)	268 (25·0%)	133 (26·4%)
Missing	113	62	40	22
Redeployed				
Yes	249 (8·1%)	47 (2·8%)	196 (17·6%)	20 (3·8%)
No	2824 (91·9%)	1636 (97·2%)	916 (82·4%)	504 (96·2%)
Missing	6	3	2	2

Primary Outcomes

General Health Questionnaire-12

The prevalence of psychological distress, as defined by >3 on the GHQ-12 0-0-1-1 scoring method, was 44·7% (n=1334) in the acceleration survey, 36·9% (n=1098) at peak and 31·5% (n=918) during the deceleration phase. Median GHQ-12 scores were 13·0 (Q1-Q3, 10·0-17·0), 13·0 (Q1-Q3, 9·0-16·0) and 12·0 (Q1-Q3, 9·0-16·0) respectively (figure 2). Median distress scores were higher in the Anaesthetic and ICM cohorts at the acceleration phase when compared to EM but decreased in all three groups throughout the first pandemic wave.

Impact of Events Scale-Revised

The prevalence of psychological trauma, as defined by a score of >24 on the IES-R, was 23·7% (n=647) at peak and 17·7% (n=484) at deceleration. The prevalence of 'probable PTSD', as defined by a score of >33 was 12·6% (n=343) of respondents at peak and 10·1% (n=276) at deceleration. During the peak phase, prevalence of trauma (>24) was 24·9% (n=378) in EM, 21·5% (n=204) in anaesthetics and 24·9% (n=117) in ICM. Prevalence of 'probable PTSD' (>33) was highest in EM (13·9%, n=211) and ICM (13·6%, n= 64) when compared to Anaesthetics (10·8%, n=103). During the deceleration phase, prevalence of trauma (>24) decreased to 19·7% (n=93) in ICM and 18·7% (n=285) in EM. 'Probable PTSD' (>33) decreased to 11·1% (n=169) in EM, when compared to 10·8% (n=51) in ICM and 8·8% (n=85) in Anaesthetics. The median IES-R was highest in the peak survey at 13 (Q1-Q3, 5-24), and 9 (Q1-Q3, 2-19) in the deceleration survey (see table 2 and figure 3).

Table 2. GHQ-12 and IES-R Scores for participants who responded to all 3 survey phases

	All (N=3079)	Emergency Medicine (N=1686)	Anaesthetics (N=1114)	Intensive Care Medicine (N=526)
Acceleration				
GHQ-12 (0123 score)				
Mean	13·7	13·3	14·4	14·0

Median (Q1, Q3)	13·0 (10·0, 17·0)	13·0 (10·0, 16·0)	14·0 (11·0, 18·0)	14·0 (10·2, 17·0)
GHQ-12 (0011 > 3)				
> 3	1334 (44·7%)	667 (40·7%)	542 (50·2%)	253 (49·6%)
N-Missing	92	48	34	16
Peak				
GHQ-12 (0123 score)				
Mean	13·2	12·8	13·6	13·6
Median (Q1, Q3)	13·0 (9·0, 16·0)	12·0 (9·0, 16·0)	13·0 (10·0, 17·0)	13·0 (10·0, 17·0)
GHQ-12 (0011 > 3)				
> 3	1098 (36·9%)	543 (33·3%)	454 (42·3%)	211 (41·1%)
N-Missing	105	56	40	13
IES-R score				
Mean	16·3	16·7	15·8	17·2
Median (Q1, Q3)	13·0 (5·0, 24·0)	13·0 (5·0, 24·0)	13·0 (6·0, 23·0)	14·0 (6·0, 24·0)
IES-R > 24				
IES-R-0123 > 24	647 (23·7%)	378 (24·9%)	204 (21·5%)	117 (24·9%)
IES-R > 33				
IES-R-0123 > 33	343 (12·6%)	211 (13·9%)	103 (10·8%)	64 (13·6%)
N-Missing	349	165	163	57
Deceleration				
GHQ-12 (0123 score)				
Mean	12·9	12·8	13·0	13·1
Median (Q1, Q3)	12·0 (9·0, 16·0)	12·0 (9·0, 16·0)	12·0 (9·0, 16·0)	12·0 (9·0, 17·0)
GHQ-12 (0011 > 3)				
> 3	918 (31·5%)	486 (30·2%)	340 (32·6%)	172 (34·6%)
N-Missing	165	78	71	29
IES-R score				
Mean	13·2	13·6	12·6	14·2
Median (Q1, Q3)	9·0 (2·0, 19·0)	9·0 (2·0, 20·0)	8·0 (2·0, 18·0)	9·0 (3·0, 20·0)
IES-R > 24				
IES-R-0123 > 24	484 (17·7%)	285 (18·7%)	159 (16·5%)	93 (19·7%)
IES-R > 33				
IES-R-0123 > 33	276 (10·1%)	169 (11·1%)	85 (8·8%)	51 (10·8%)
N-Missing	344	164	153	53

Secondary Outcomes

Risk Factors for Psychological Distress (GHQ-12) and Trauma (IES-R)

The overall strength of the relationship between participant factors and the two outcome measures, psychological distress and trauma, is summarised using Nagakawa's marginal R^2 (figures 4+5). The form of these univariable relationships is described graphically for the five variables with the highest R^2 values in figures 6 a-f. Graphs for the remaining variables are reported in online supplementary hub (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs).

Personal and Professional variables predicting distress (GHQ-12)

Worry of infecting family members due to clinical work (R^2 = 0·06) and worry of personal infection (R^2 = 0·05) were the two variables most strongly associated with distress. Figures 6a and 6b report the mean GHQ-12-score for the levels within this variable. Those that were 'extremely worried' about infecting family had a mean GHQ-12-modelled score of 15·3 (95% CI, 15·0, 15·6), 15·1 (95% CI,14·8, 15·5) and

14·6 (95% CI,14·3, 15·0) during the acceleration, peak and deceleration respectively, compared with mean scores of 13·7, 13·2 and 12·9 respectively for all participants. For those who were 'extremely worried' about personal infection, the mean GHQ-12 modelled score was 16·6 (95% CI, 16·1, 17·1) during the acceleration period, compared with 10·9 (95% CI, 9·7, 12·1) for those who were 'not worried at all' about being infected. For the mean GHQ-12 modelled score for each of the other variables see the online link for the figures and values (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs).

Personal and Professional variables predicting trauma (IES-R)

For trauma, worry of infection of family members due to clinical role had the highest R^2 value (R^2 =0·10). Mean IES-R modelled score for those who were 'extremely worried' about infecting family was 23·0 (95% CI, 22·2, 23·8) during the peak compared to 10·0 (95% CI, 7·8, 12·2) for those who were 'not worried at all' during the peak (Fig 6c). This is significantly higher than the reported mean IES-R overall of 16·3.

Concern that COVID-19 would exacerbate symptoms of an established mental health condition (R^2 = 0·06) had the second highest R^2 value. Peak IES-R mean modelled scores were 23·3 (95% CI, 22·1, 24·4) in those who agreed with this statement compared to 15·2 (95% CI, 14·7, 15·7) in those who disagreed. Deceleration mean IES-R modelled scores remained high for those who agreed, 22·3 (95% CI, 21·1, 23·6). (Figure 6d)

Worry relating to personal infection due to clinical role (R^2 = 0·06) was again strongly associated with trauma. Figure 6e displays the mean IES-R modelled scores and demonstrates the peak (24·0 (95% CI, 22·5, 25·4)) and deceleration (20·3 (95% CI, 18·7, 21·8)) outcomes in participants who were 'extremely worried' compared to those who were 'not worried at all' during the peak (11·3 (95% CI 8·6, 14·0)) and deceleration (10·0 (95% CI 8·0, 12·0)).

Whilst ethnicity was not strongly associated with distress, it was a stronger predictor of trauma (R^2 = 0·03). Mean modelled trauma scores for 'Ethnic Minority' participants at peak was 18·8 (95% CI, 17·8, 19·8), compared to 'White British' participants of 15·1 (95% CI, 14·5, 15·8). (Figure 6f) For the mean IES-R modelled scores for each of the other variables see online link for the figures and values. (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs)

Incidence of self-reported COVID-19 infection and isolation

By the deceleration phase of the pandemic 6·9% (n=212) of respondents had received a positive diagnosis of COVID-19 and 0·4% (n=12) had been admitted to hospital. A positive diagnosis did not have a significant effect in prediction of trauma (R^2=0·014).

Regional and national variation of psychological distress and trauma

The region in which participants worked was more valuable for predicting trauma (R^2 = 0·034), than for distress (R^2 = 0·016). The mean modelled score of the different regions within the UK and Republic of Ireland on IES-R is demonstrated in figure 7.

Drop-out by GHQ-12 and IES-R

Response rate for the peak and deceleration surveys was 69·2% and 54·9% respectively. There was no significant difference in either the GHQ-12 or IES-R scores between those who dropped out and those who remained in the study (see online supplement).

Discussion

In this prospective longitudinal survey of 5440 frontline doctors, the prevalence of psychological distress and trauma peaked at 44·7% and 23·7% respectively - these figures were substantially higher than for the general population. [38] For psychological distress, rates declined through peak and deceleration phases of the first wave to a level comparable to pre-pandemic levels. [39] Prevalence of 'probable PTSD' was 12·6% at peak and 10·1% at deceleration, demonstrating a degree of natural recovery. [40,41] However, just less than a quarter experienced sub-threshold post-trauma symptoms 30 days following the pandemic peak.

Personal factors were the most powerful predictors of both psychological distress and trauma. The most significant predictors relate to familial safety; personal safety and established mental health conditions. These findings support aggregated data in recent reviews and meta-analyses on the key predictors of psychological distress in disaster or infectious outbreak settings. [1,7,16–18] However, it cannot be ignored that the psychological harm associated with both familial and personal safety may potentially be explained by the perceived (and reported) inadequate provision of PPE to frontline workers. [42,43] This is an area where improvements must be made in order to mitigate against future physical and psychological harms that novel pathogens present.

While most findings are consistent with existing research, our study also identifies ethnicity as a novel, key predictor of trauma. [44–46] This is unsurprising given higher rates of reported mortality in ethnic minority groups with this particular pandemic. [47] However the nature and direction of relationship between these risk factors and poorer outcomes is undoubtedly complex. Ongoing work continues to seek further understanding in this area. [48]

Rates of trauma were high across all three specialty groups. One in four doctors met clinical threshold, with the highest rates seen in EM and ICM. This is likely explained by their clinical roles during the pandemic, in which they were exposed to a higher volume of COVID-19 positive patients compared to Anaesthetic colleagues. However, it is important to note that the rate of trauma seen in Anaesthetics was also of concern. At the deceleration phase, EM doctors had higher rates of 'probable PTSD' (IES-R >33), whereas ICM doctors had a higher prevalence of trauma (IES-R >24). This may reflect the later

peak in ICUs when compared to EM [49] or the potential impact of downstream mortality and further work should explore longer term outcomes in all cohorts.

It is evident from the longitudinal data that vulnerability to poorer psychological outcomes may be predicted by certain characteristics and therefore potentially mitigated through targeted intervention. Studies examining psychiatric outcomes in SARS reflect that psychological distress is likely to persist; identification and intervention must begin now. [8,9,50,51] Without appropriate support and intervention doctors are likely to experience long-term effects on mental health, resulting in increased sickness rates, absenteeism, impaired performance at work, and the development of physical health problems. [8,9,11,52,53] Therefore the early identification of ongoing psychological distress will be pivotal in influencing the longer-term mental health of frontline workers. Based on research from COVID-19 and other pandemics, we can be certain that rates and severity of distress will rise following this second wave of the pandemic. We now know that doctors are working on the frontline while carrying the heavy burden of fear of infecting themselves, or critically, family members, while some continue to battle high levels of psychological distress. This distress was evident in the lead up to the first peak, but sustained well beyond this time point. Doctors are continuing to work in very high pressured, high risk environments with a significant proportion doing so despite clinical levels of distress. Policymakers and professional bodies should urgently seek to develop an overarching 'best practice' pathway to support healthcare staff in these environments.

While various interventions are recommended specifically for frontline workers there is common agreement in the necessity for basic psychosocial interventions (i.e. sleep hygiene, exercise, health behaviour) to facilitate return to equilibrium [54–57], yet these measures are not always sufficient to ameliorate persistent distress. It is crucial that an overarching 'best practice' pathway and package of care is implemented to help support staff now and for the future. This must be multilevel, evidence-based, and should include (a) mobilisation of formal peer & organisational support structures, (b) mechanisms for recognising and monitoring distress, and (c) offer clear referral pathways to evidence-based interventions. Access to appropriate psychological support is imperative; cognitive behavioural therapy is recommended by the National Institute for health and Care Excellence (NICE) to ameliorate anxiety, depression and PTSD [58,59] however further work is needed to ensure these interventions this are suitably tailored to the practicalities of shift work and the unique experiences faced by frontline clinicians. With this, there is a responsibility to ensure equality in the provision of care and pathways to access, for this is likely to be necessary for many.

Strengths and Weaknesses

This is a large-scale longitudinal study examining prevalence of psychological distress in doctors in the UK and Ireland, offering a robust and reliable measure of the impact of COVID-19 on the mental health of frontline doctors, and allows comparison with other pandemic mental health trajectories. Due to the three-phase prospective design and extent of data collected, findings from this study can be reliably

used to inform the development of preparations and interventions to mitigate the impact of COVID-19 and future infectious disease outbreaks on mental health in frontline doctors.

While the protocol was closely adhered to, variation in regional peaks may have influenced accurate capturing of psychological distress and trauma rates. It is noted that whilst the acceleration phase is study 'baseline', as the pandemic was present and proliferating in the UK at the acceleration phase, it more accurately represents the initial stress associated with a rapidly spreading highly infectious virus of unknown pathogenic origins and no effective treatment; a reasonable response to the context. Finally, further follow up of frontline doctors would allow insight into whether mental health trajectories are similar to other infectious disease pandemics.

Conclusion

Our findings reflect a pattern of elevated distress during the acceleration and peak phase of the current pandemic, some degree of natural recovery and a significant minority continuing to experience residual ongoing distress. It is essential that policymakers and professional bodies seek to prevent future adverse effects through provision of vital equipment to mitigate both physical and psychological harm and the development of clear pathways to effective psychological care. Moving forward, it is essential the COVID-19 pandemic serves as a foundation for significant development and growth in all of these areas.

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Author Contributions

The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. Tom Roberts (TR) conceived the idea for the study. TR, Edd Carlton (EC), Jo Daniels (JD), Mark Lyttle (ML), and Blair Graham (BG) were responsible for the initial study design, which was refined with the help of Katie Samuel (KS), Charles Reynard (CR), Robert Hirst (RH), Michael Barrett (MB) and William Hulme (WH). Expert advice on psychological assessment scores was provided by JD. WH provided the statistical plan. TR lead the dissemination of the study in UK Adult Emergency Departments (ED), ML lead the dissemination of the study in UK and Ireland Paediatric EDs, KS lead the dissemination of the study in UK Anaesthetic and ICU Departments, MB lead the dissemination of the study in Ireland EDs, along with John Cronin, James Foley and Etimbuk Umana. Joao Vinagre lead the dissemination in Ireland ICUs and Anaesthetic Departments. TR coordinated study set-up, finalisation of the study surveys and finalisations of study protocols. All authors contributed to the final study design and protocol development, critically revised successive drafts of the manuscript and approved the final version. The study management group is responsible for the conduct of the study.

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Competing interests

Many of the authors have been working as frontline clinicians during the COVID-19 pandemic. They have no competing interests to declare.

Data Sharing

Deidentified participant data will be made available for 2 years post publication. Requests for access will require HRA and ethical approval and decisions regarding data sharing will be made after discussion with the study senior authors. Statistical code and study figures are available directly from: https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs.

Trainee Emergency Research Network (TERN) Collaborators:

L	Kane	Aberdeen Royal Infirmary	R	Hannah	Royal Alexandra Children's Hospital
L	Mackenzie	Addenbrooke's Hospital, Cambridge	A	Corfield	Royal Alexandra Hospital, Scotland
S	Sharma Hajela	Addenbrooke's Hospital, Cambridge	J	Maney	Royal Belfast Hospital for Sick Children
J	Phizacklea	Addenbrooke's Hospital, Cambridge	D	Metcalfe	Royal Berkshire Hospital
K	Malik	Addenbrooke's Hospital, Cambridge	S	Timmis	Royal Berkshire Hospital
N	Mathai	Aintree University Hospital	C	Williams	Royal Bolton Hospital
A	Sattout	Aintree University Hospital	R	Newport	Royal Bolton Hospital
S	Messahel	Alder Hey Children's Hospital, Liverpool	D	Bawden	Royal Cornwall Hospital
E	Fadden	Alder Hey Children's Hospital, Liverpool	A	Tabner	Royal Derby Hospital
R	McQuillan	Altnagelvin Area Hospital, N. Ireland	H	Malik	Royal Devon and Exeter Hospital
B	O'Hare	Antrim Area Hospital, N. Ireland	C	Roe	Royal Devon and Exeter Hospital
P	Turton	Arrowe Park Hospital, Merseyside	D	McConnell	Royal Devon and Exeter Hospital
S	Lewis	Arrowe Park Hospital, Merseyside	F	Taylor	Royal Free London
D	Bewick	Barnsley Hospital	R	Ellis	Royal Glamorgam Hospital, Wales
R	Taylor	Bath Royal United Hospital	S	Morgan	Royal Gwent Hospital, Wales
I	Hancock	Bath Royal United Hospital	L	Barnicott	Royal Hampshire County Hospital
D	Manthalapo Ramesh Babu	Bedford Hospital, Bedfordshire	S	Foster	Royal Hospital for Children, Glasgow
S	Hartshorn	Birmingham Children's Hospital	J	Browning	Royal Hospital for Sick Children
M	Williams	Birmingham Children's Hospital	L	McCrae	Royal Hospital for Sick Children, Edinburgh
A	Charlton	Bradford Royal Infirmary	E	Godden	Royal Infirmary Hospital, Edinburgh
L	Somerset	Bristol Royal Hospital for Children	A	Saunders	Royal Infirmary Hospital, Edinburgh
C	Munday	Bristol Royal Hospital for Children	A	Lawrence-Ball	Royal Liverpool University Hospital
A	Turner	Bristol Royal Hospital for Children	R	House	Royal Liverpool University Hospital
R	Sainsbury	Bristol Royal Infirmary	J	Muller	Royal London Hospital
E	Williams	Bristol Royal Infirmary	I	Skene	Royal London Hospital
S	Patil	Chelsea & Westminster Hospital	M	Lim	Royal London Hospital
R	Stewart	Chelsea & Westminster Hospital	H	Millar	Royal Manchester Children's Hospital
M	Winstanley	Chelsea & Westminster Hospital	A	Rai	Royal Manchester Children's Hospital
N	Tambe	Chesterfield Royal hospital	K	Challen	Royal Preston Hospital
C	Magee	City Hospital, Birmingham	S	Currie	Royal Preston Hospital
D	Raffo	Craigavon Area Hospital, N. Ireland	M	Elkanzi	Royal Stoke University Hospital
D	Mawhinney	Craigavon Area Hospital, N. Ireland	T	Perry	Royal Surrey County Hospital
B	Taylor	Cumberland Infirmary, Cumbria	W	Kan	Royal Surrey County Hospital

T	Hussan	Darlington Memorial Hospital
G	Pells	Darlington Memorial Hospital
F	Barham	Derriford Hospital, Plymouth
F	Wood	Derriford Hospital, Plymouth
C	Szekeres	East Surrey Hospital
R	Greenhalgh	East Surrey Hospital
S	Marimuthu	Eastbourne Hospital
R	Macfarlane	Epsom and St Helier Hospitals
M	Alex	Evelina Children's Hospital, London
B	Shrestha	Frimley Park Hospital
L	Stanley	Gloucester Royal Hospital
J	Gumley	Gloucester Royal Hospital
K	Thomas	Gloucester Royal Hospital
M	Anderson	Great North Children's, Newcastle
C	Weegenaar	Great Western Hospital, Swindon
J	Lockwood	Harrogate Hospital
T	Mohamed	Heartlands's Hospital, Birmingham
S	Ramraj	Hillingdon Hospital, London
M	Mackenzie	Homerton Hospital, London
A	Robertson	Homerton Hospital, London
W	Niven	Homerton Hospital, London
M	Patel	Homerton Hospital, London
S	Subramaniam	Horton General Hospital, Banbury
C	Holmes	Huddersfield Royal Infirmary
S	Bongale	Inverclyde Royal Hospital
U	Bait	Ipswich Hospital
S	Nagendran	Ipswich Hospital
S	Rao	Ipswich Hospital
F	Mendes	James Paget Hospital
P	Singh	John Radcliffe Hospital, Oxford
S	Subramaniam	John Radcliffe Hospital, Oxford
T	Baron	John Radcliffe Hospital, Oxford
C	Ponmani	King George Hospital
M	Depante	King's College Hospital, London
R	Sneep	King's College Hospital, London
A	Brookes	King's College Hospital, London
S	Williams	King's College Hospital, London
A	Rainey	King's College Hospital, London
J	Brown	Kingston Hospital, London
N	Marriage	Kingston Hospital, London
S	Manou	Leeds General Infirmary
S	Hart	Leeds General Infirmary
M	Elsheikh	Leeds General Infirmary
L	Cocker	Leicester Royal Infirmary
MH	Elwan	Leicester Royal Infirmary
K L	Vincent	Leicester Royal Infirmary
L	Brown	Royal Sussex County Hospital
M	Cheema	Royal Sussex County Hospital
A	Clarey	Royal Victoria Hospital
A	Gulati	Royal Victoria Infirmary
K	Webster	Royal Victoria Infirmary
A	Howson	Salford Royal NHS Foundation Trust
R	Doonan	Salford Royal NHS Foundation Trust
C	Magee	Sandwell Hospital
A	Trimble	Sheffield Children's Hospital
C	O'Connell	Sheffield Children's Hospital
R	Wright	Southampton General
E	Colley	Southmead Hospital, Bristol
C	Rimmer	Southport Hospital, Merseyside
S	Pintus	Southport Hospital, Merseyside
H	Jarman	St George's Hospital, London
V	Worsnop	St George's Hospital, London
S	Collins	St Helier Hospital
M	Colmar	St John's Hospital, Livingston
N	Masood	St John's Hospital, Livingston
R	McLatchie	St John's Hospital, Livingston
A	Peasley	Stepping Hill Hospital
S	Rahman	Stoke Mandeville Hospital
N	Mullen	South Tyneside and Sunderland NHS Trust
L	Armstrong	The Royal Berkshire Hospital, Reading
A	Hay	The Whittington Hospital, London
R	Mills	The Whittington Hospital, London
J	Lowe	Torbay Hospital, Devon
H	Raybould	Torbay Hospital, Devon
A	Ali	Torbay Hospital, Devon
P	Cuthbert	Ulster Hospital Dundonald, N. Ireland
S	Taylor	University College London Hospital
V	Talwar	University College London Hospital
Z	Al-Janabi	University Hospital Ayr, Scotland
C	Leech	University Hospital Coventry
J	Turner	University Hospital Coventry
L	McKechnie	University Hospital Crosshouse, Scotland
B	Mallon	University Hospital Crosshouse, Scotland
J	McLaren	University Hospital Crosshouse, Scotland
Y	Moulds	University Hospital Crosshouse, Scotland
L	Dunlop	University Hospital Hairmyres, Scotland
FM	Burton	University Hospital Hairmyres, Scotland
S	Keers	University Hospital Lewisham, London
L	Robertson	University Hospital Lewisham, London
D	Craver	University Hospital Lewisham, London
N	Moultrie	University Hospital Monklands, Scotland
O	Williams	University Hospital of North Tees

C	Nunn	Leicester Royal Infirmary
N	Sarja	Lister Hospital, Stevenage
M	Viegas	Luton & Dunstable Hospital
E	Wooffinden	Manchester Royal Infirmary
C	Reynard	Manchester Royal Infirmary
N	Cherian	Manchester Royal Infirmary
A	Da-Costa	Medway NHS Foundation Trust
S	Duckitt	Medway NHS Foundation Trust
J	Bailey	Milton Keynes University Hospital
L	How	Milton Keynes University Hospital
T	Hine	Milton Keynes University Hospital
F	Ihsan	Milton Keynes University Hospital
H	Abdullah	Milton Keynes University Hospital
K	Bader	Milton Keynes University Hospital
S	Pradhan	Milton Keynes University Hospital
M	Manoharan	Milton Keynes University Hospital
C	Battle	Morriston Hospital, Wales
L	Kehler	Wolverhampton NHS Trust
R	Muswell	Newham University Hospital, London
M	Bonsano	Newham University Hospital, London
J	Evans	Norfolk and Norwich Hospitals
E	Christmas	North Hampshire Hospital, Basingstoke
K	Knight	North Middlesex Hospital, London
L	O'Rourke	North Tees Hospital, Stockton on Tees
K	Adeboye	North Tees Hospital, Stockton on Tees
K	Iftikhar	Northern General Hospital, Sheffield
R	Evans	Northern General Hospital, Sheffield
R	Darke	Northumbria Specialist Emergency Hospital
R	Freeman	Northumbria Specialist Emergency Hospital
E	Grocholski	Northwick Park Hospital, London
K	Kaur	Peterborough City Hospital
H	Cooper	Peterborough City Hospital
M	Mohammad	Princess Royal Hospital, London
L	Harwood	Princess Royal Hospital, London
K	Lines	Queen Alexandra Hospital, Portsmouth
C	Thomas	Queen Alexandra Hospital, Portsmouth
D	Ranasinghe	Queen Alexandra Hospital, Portsmouth
S	Hall	Queen Elizabeth Hospital
J	Wright	Queen Elizabeth Hospital
S	Hall	Queen Elizabeth Hospital
N	Ali	Queen Elizabeth Hospital
J	Hunt	Queen Elizabeth Hospital, Birmingham
H	Ahmad	Queen Elizabeth Queen's Mother, Margate
C	Ward	Queen Elizabeth Hospital, Glasgow
M	Khan	Queens Medical Centre, Nottingham
K	Holzman	Redhill Hospital, Surrey
S	Purvis	University Hospital of North Tees
M	Clark	University Hospital of North Tees
C	Davies	University Hospital of Wales, Cardiff
S	Foreman	University Hospital of Wales, Cardiff
C	Ngua	University Hospital of Wales, Cardiff
D	George	University Hospital of Wales, Cardiff
J	Morgan	University Hospital of Wales, Cardiff
D	George	University Hospital of Wales, Cardiff
N	Hoskins	University Hospital of Wales, Cardiff
J	Fryer	University Hospital Southampton
R	Wright	University Hospital Southampton
L	Frost	University Hospital Southampton
P	Ellis	University Hospital Southampton
A	Mackay	University Hospital Wishaw, Scotland
K	Gray	Victoria Hospital, Kirkcaldy, Scotland
M	Jacobs	Watford General Hospital
I	Musliam Veettil Asif	West Middlesex university hospital
P	Amiri	West Middlesex university hospital
S	Shrivastava	West Middlesex university hospital
F	Raza	West Middlesex university hospital
S	Wilson	Wexham Park Hospital
M	Riyat	Wexham Park Hospital
H	Knott	Wexham Park Hospital
M	Ramazany	Whiston Hospital, Merseyside
S	Langston	Whiston Hospital, Merseyside
N	Abela	Whiston Hospital, Merseyside
L	Robinson	Whittington Hospital, London
D	Maasdorp	Whittington Hospital, London
H	Murphy	Whittington Hospital, London
H	Edmundson	Whittington Hospital, London
R	Das	Whittington Hospital, London
C	Orjioke	Whittington Hospital, London
D	Worley	Whittington Hospital, London
W	Collier	Whittington Hospital, London
J	Everson	Whittington Hospital, London
N	Maleki	Whittington Hospital, London
A	Stafford	Whittington Hospital, London
S	Gokani	Whittington Hospital, London
M	Charalambos	Whittington Hospital, London
A	Olajide	Whittington Hospital, London
C	Bi	Whittington Hospital, London
J	Ng	Whittington Hospital, London
S	Naeem	William Harvey Hospital, Kent
J	Anandarajah	Wrexham Maelor Hospital, Wales
A	Hill	Wythenshawe Hospital, Manchester
C	Boulind	Yeovil District Hospital

J	Ritchie	Rotherham Hospital
A	Hormis	Rotherham Hospital

Ireland Trainee Emergency Research Network (I-TERN) Collaborators:

R	O'Sullivan	Bon Secours Hospital Cork, Ireland
S	Gilmartin	Children's Health Ireland at Crumlin, Ireland
S	Uí Bhroin	Children's Health Ireland at Tallaght, Ireland
P	Fitzpatrick	Children's Health Ireland at Temple Street, Ireland
A	Patton	Cork University Hospital, Ireland
M	Jee Poh Hock	Galway Hospital, Ireland
S	Graham	Mater Misericordiae University Hospital, Ireland
S	Kukaswadia	Mercy University Hospital, Ireland
C	Prendergast	Midlands Regional Hospital Tullamore, Ireland
A	Ahmed	Sligo University Hospital, Ireland
C	Dalla Vecchia	St Vincent's University Hospital, Ireland
J	Lynch	Tallaght University Hospital, Ireland
M	Grummell	Tallaght University Hospital, Ireland
I	Grossi	University Hospital Limerick, Ireland
B	MacManus	University Hospital Waterford, Ireland

Research and Audit Federation of Trainees (RAFT), Trainee Research in Intensive Care (TRIC) and Specialist Anaesthesia Trainee led Audit and Research Network (SATURN) Collaborators:

K	Samuel	North Bristol NHS Trust
A	Boyle	Royal Victoria Hospital, Belfast
A	Waite	Royal Liverpool University Hospital
B	Johnson	University of Liverpool
J	Vinagre	Children's Health Ireland at Temple Street

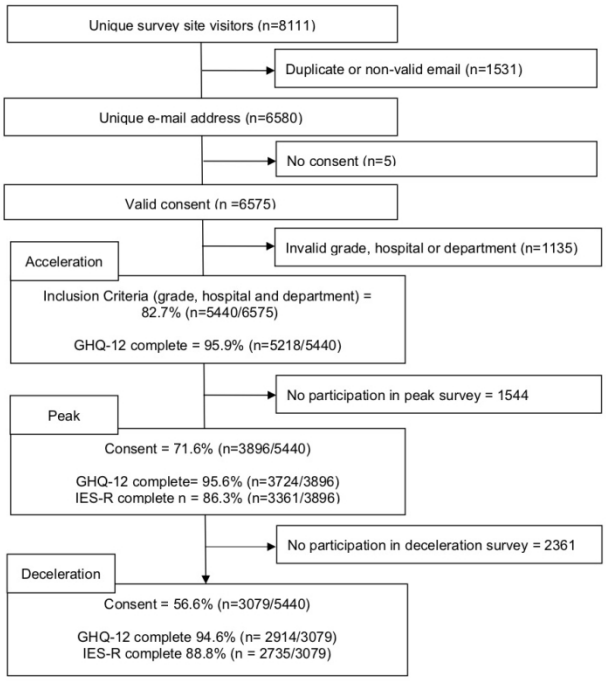

Figure 1. Participant flowchart

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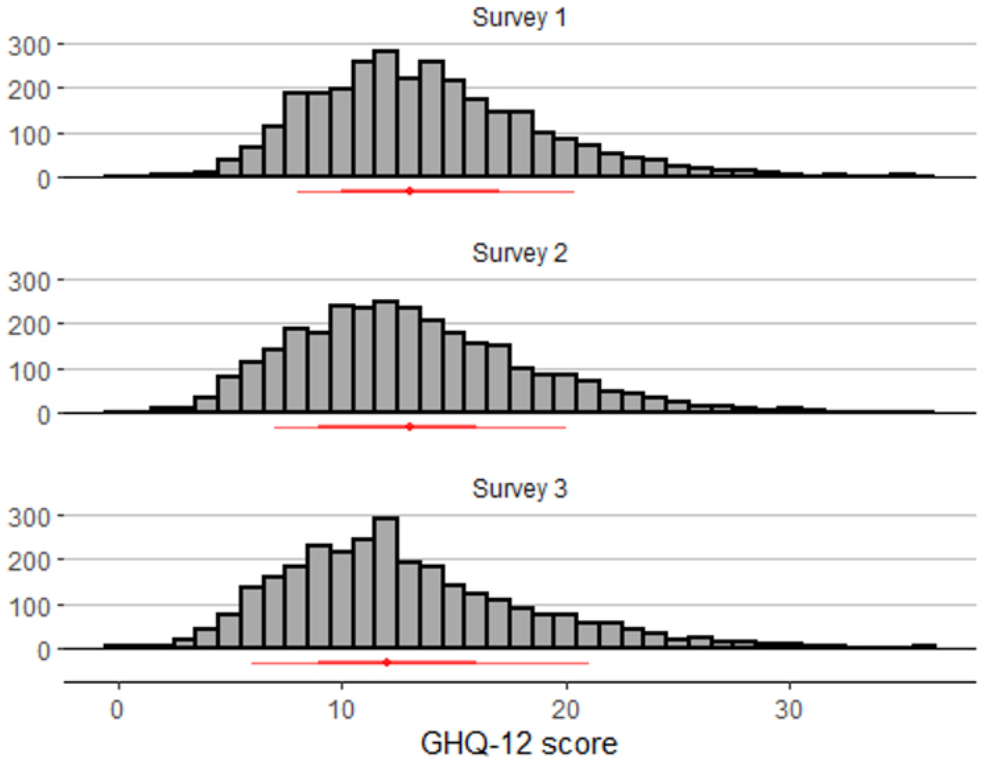


Figure 2. GHQ-12 Scores

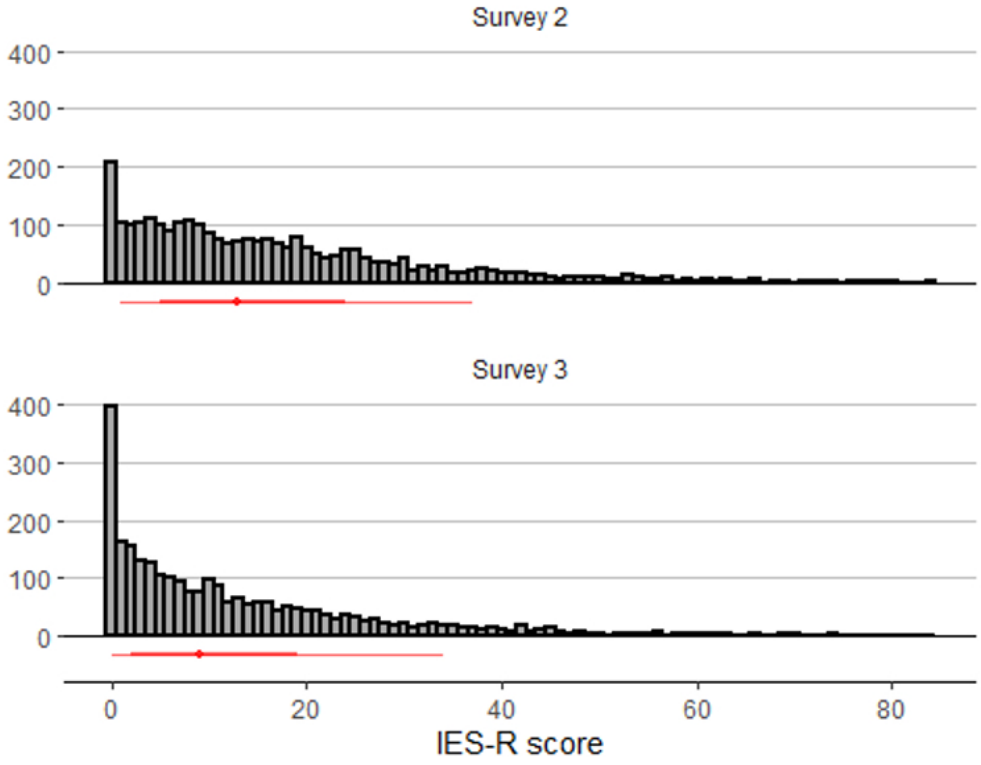


Figure 3. IES-R Scores

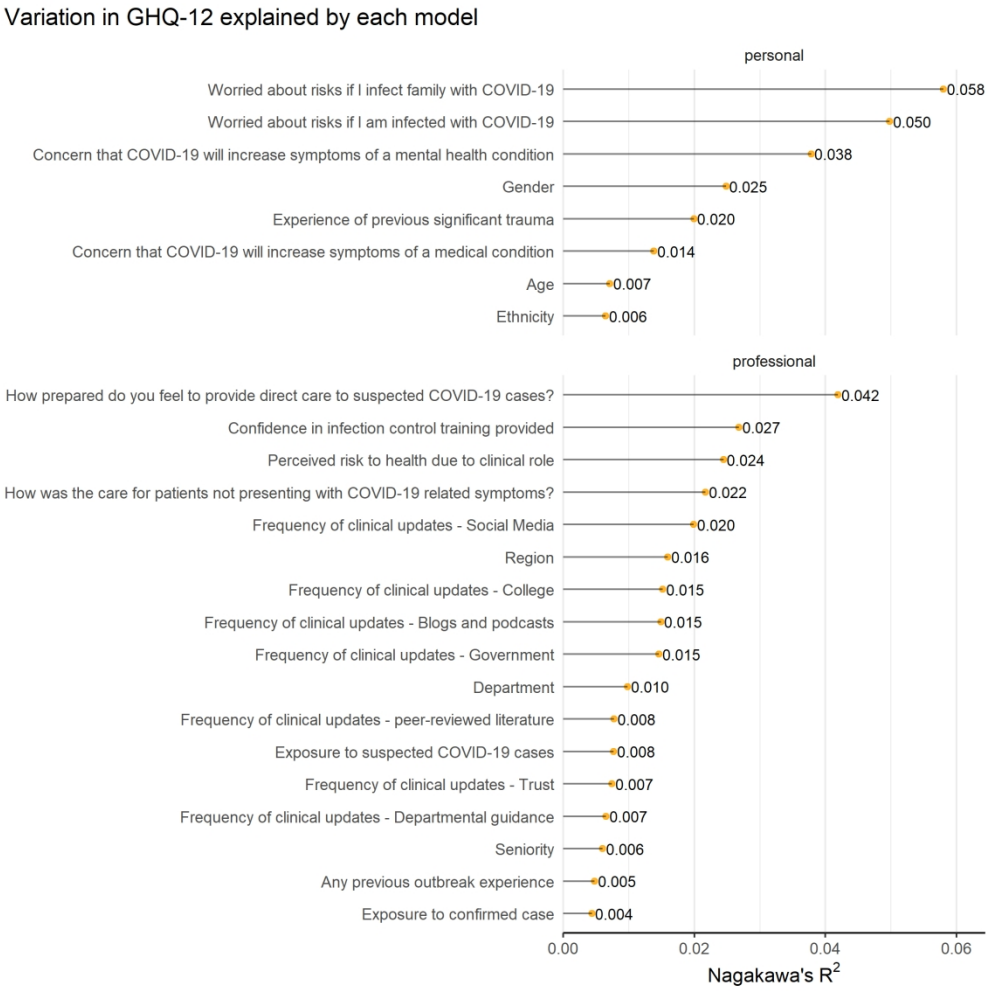


Figure 4. GHQ-12 variance explained model

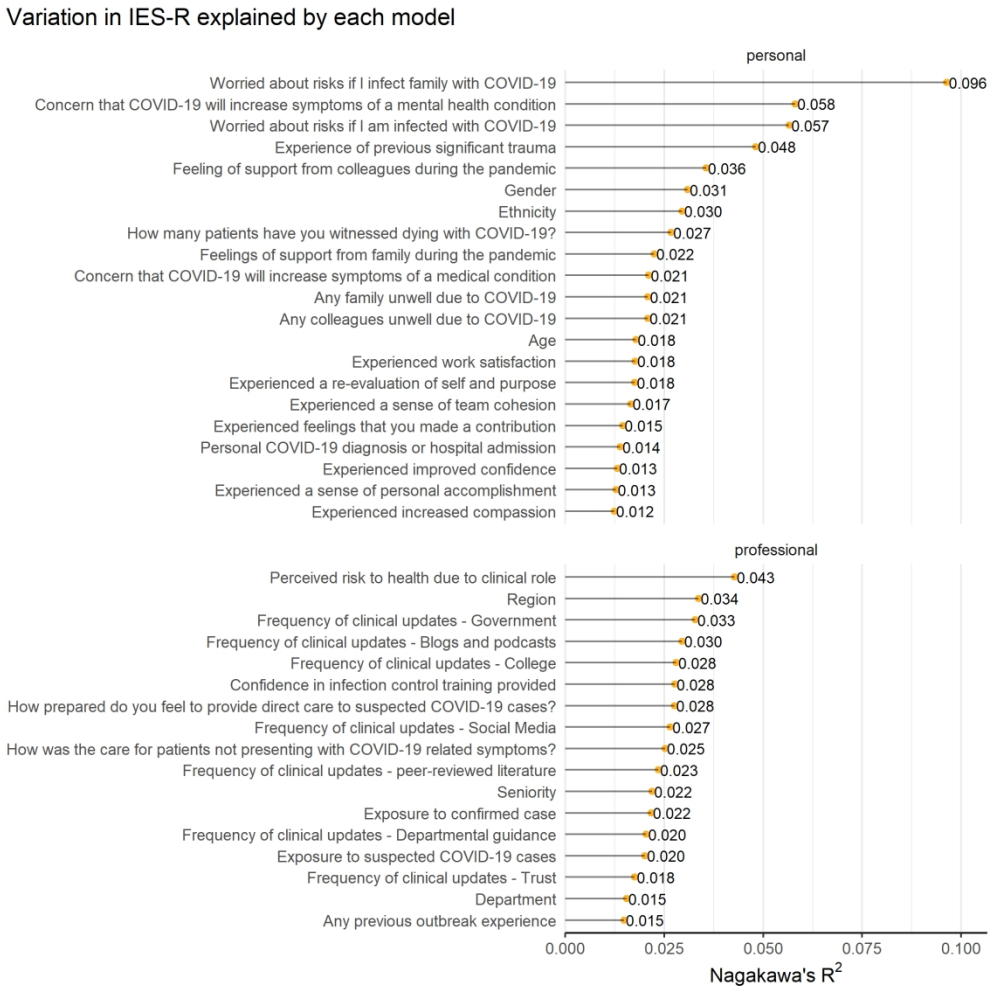


Figure 5. IES-R variance explained model

Figure 6a. GHQ-12 outcome - worried about risks if I infect family

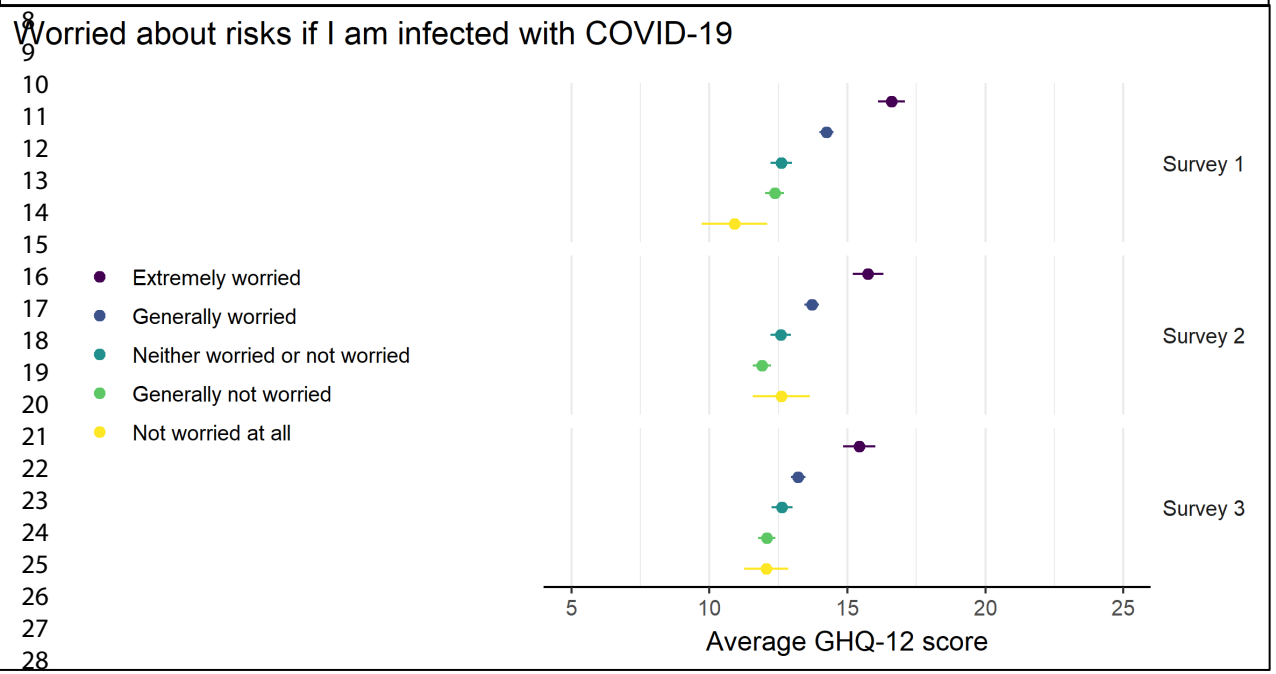


Figure 6b. GHQ-12 outcome - worried about risks if am infected

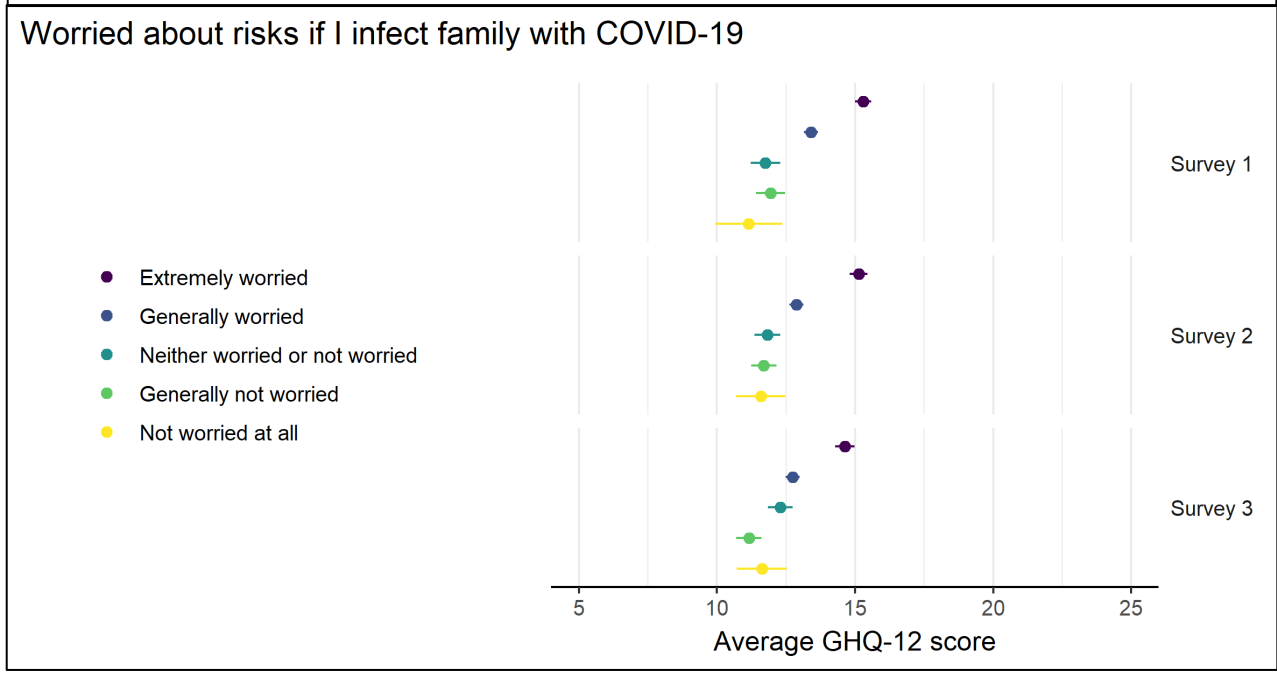


Figure 6c IES-R outcome - worried about risks if I infect family

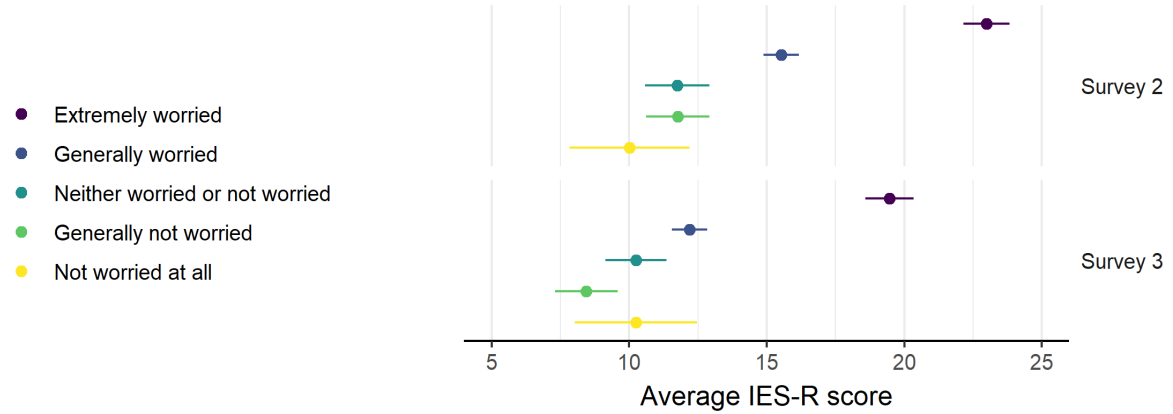


Figure 6d IES-R outcome - concern that COVID-19 will exacerbate established mental health condition

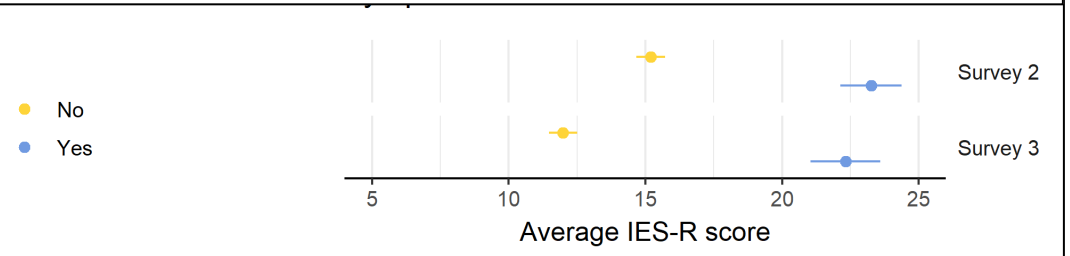


Figure 6e IES-R outcome - worried about risks if am infected

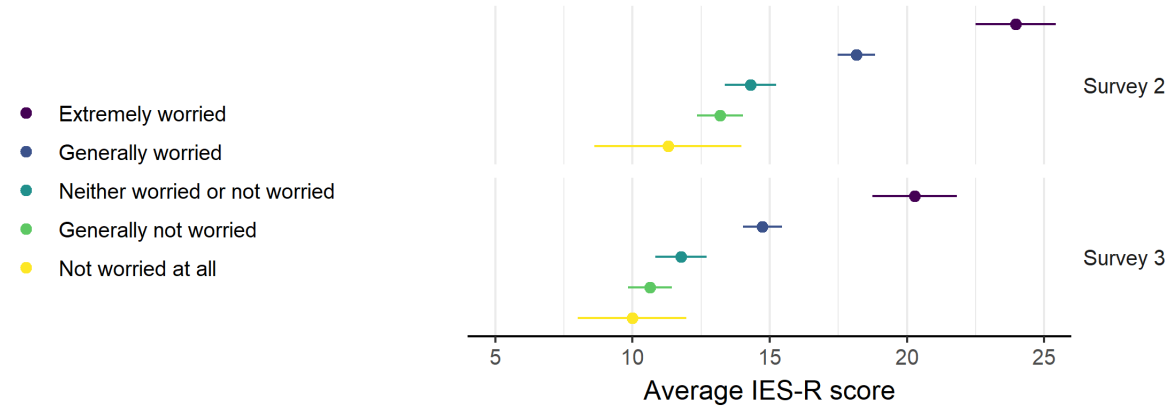
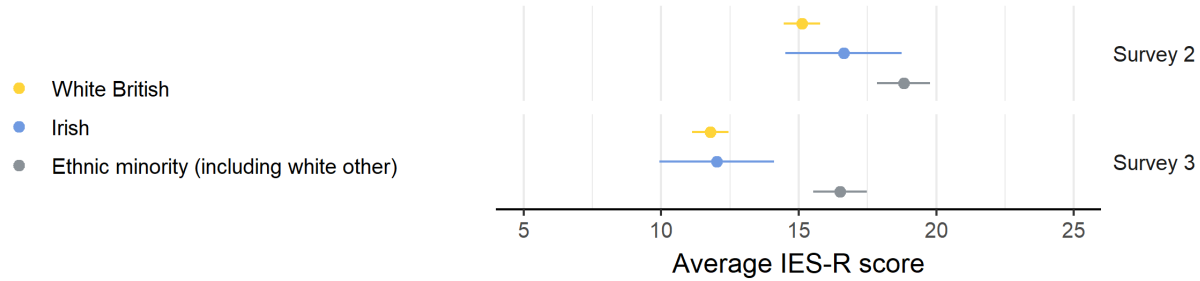


Figure 6f IES-R outcome - ethnicity



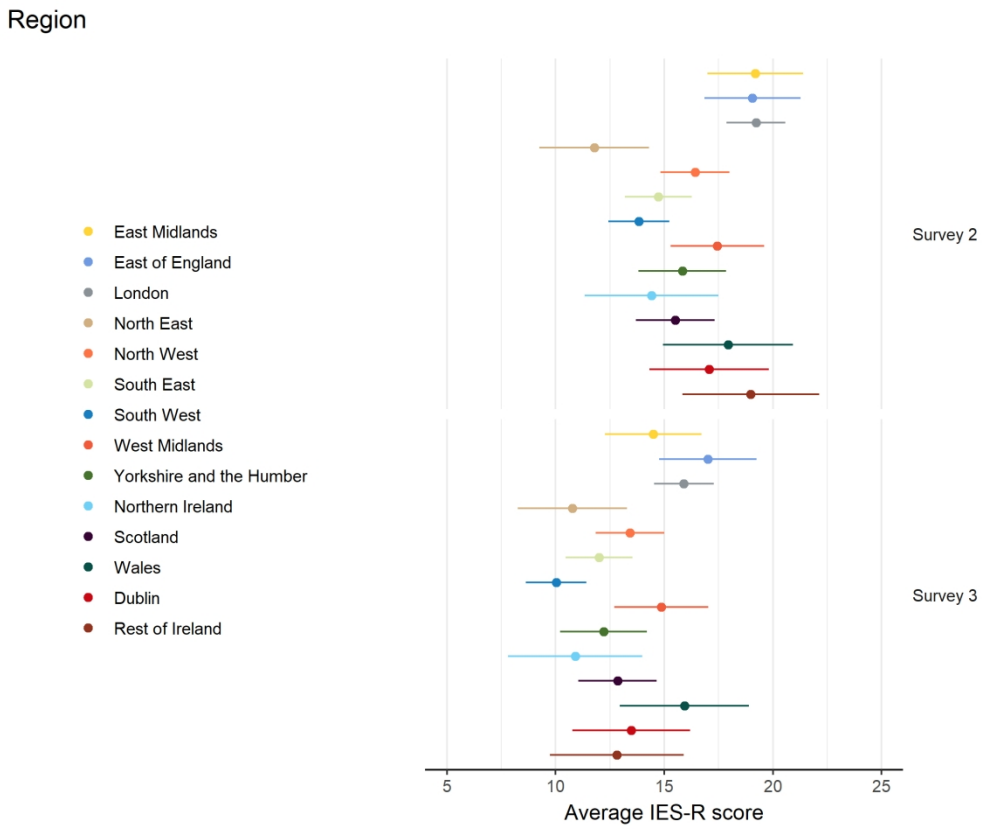
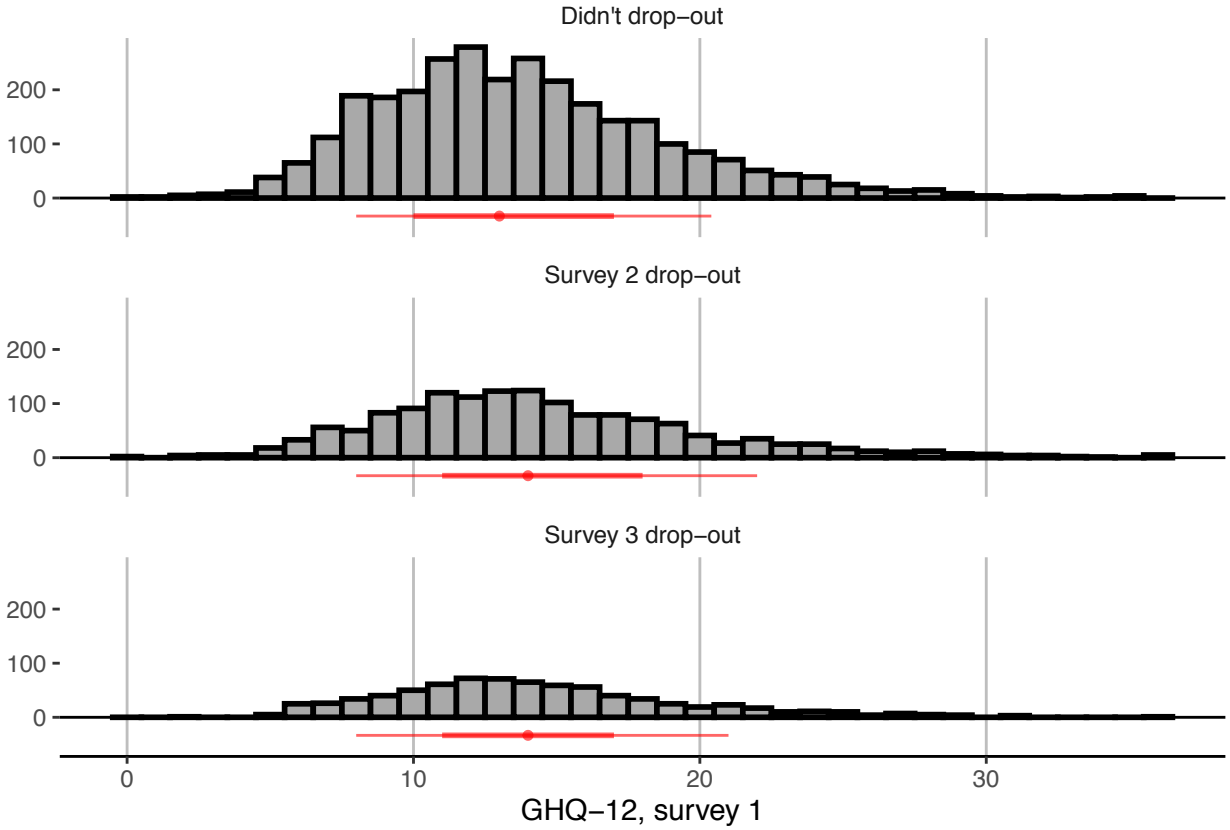


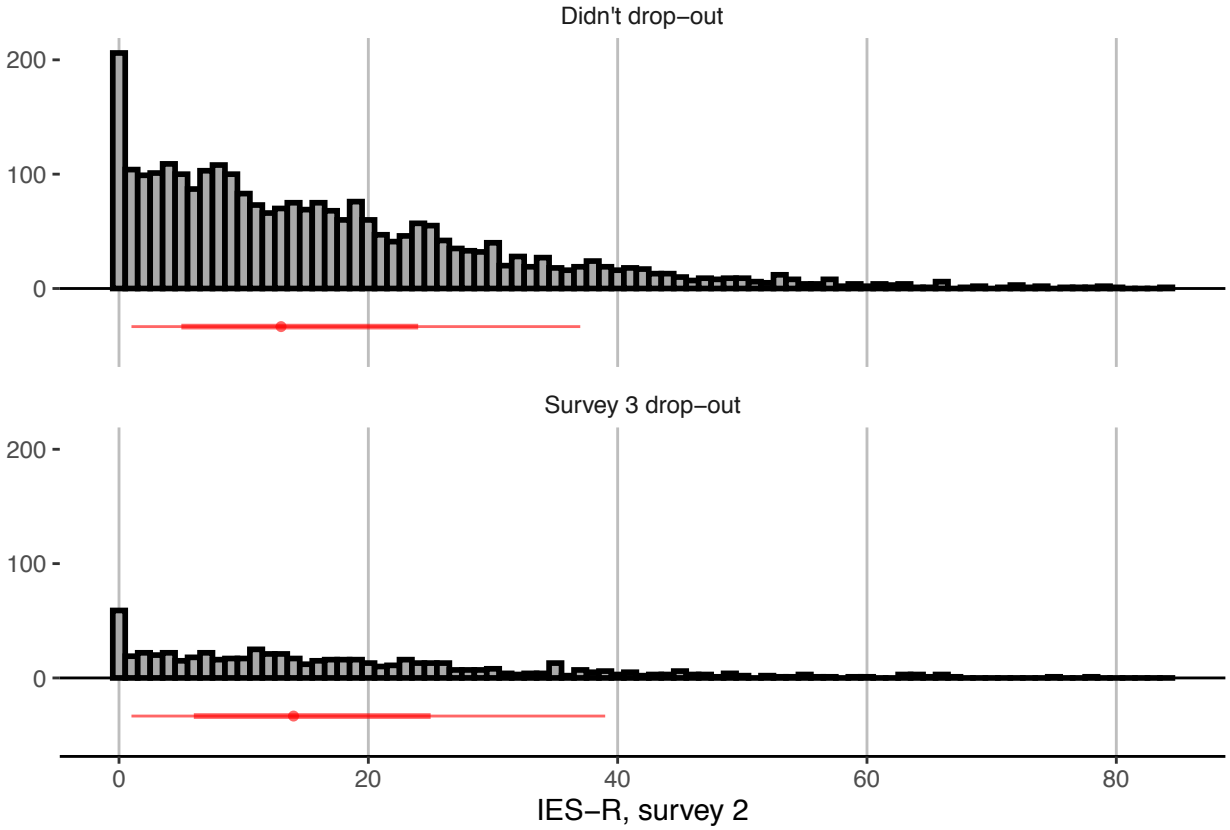
Figure 7. IES-R Outcome - Region

CERA Online Supplement - Content

Drop out rate for surveys 2 and 3 by survey 1 GHQ-12 score



Drop out rate for survey 3 by survey 2 IES-R score



CERA Survey

Thank you for taking the time to answer these questions. This survey will take less than 4 minutes.

Thank you for taking the time to consider taking part in the COVID-19 Emergency Response Assessment (CERA Study).

It is important that you read this information, so that you understand the purpose of the study and how we will treat your data.

What is the CERA study?
The CERA study consists of three questionnaires that will be conducted during the current COVID-19 outbreak. The CERA study will assess how you are feeling about your general health, anxiety levels, and mood at three points in time. Separate questionnaires will be issued before, during, and after the peak of the current COVID-19 outbreak.

What is the purpose of the CERA study?
This study will provide information regarding how staff working in Emergency care settings are feeling whilst working during the current COVID-19 outbreak. Full analysis of data will help identify how emergency staff can be better supported during future disease outbreaks.

Who has organised the CERA study?
The CERA study is led by the Trainee Emergency Research Network (TERN), in association with the Paediatric Emergency Research in the UK and Ireland (PERUKI) and Research and Audit Federation of Trainees (RAFT).
The CERA study is supported by the UK Royal College of Emergency Medicine (RCEM).

Has the CERA study received external approval?
Yes, the CERA study has received University Ethics Approval from the University of Bath (Ref: 4421). The CERA study has been approved by the Health Research Authority (HRA).

What will happen if I take part?
There will be three separate e-surveys to complete, including this one. Each survey is completed online, and will take between about 3 and 5 minutes. Surveys will be issued at different times.

You be required to submit your email address as part of this survey, which will allow us to invite you to participate in the other two surveys. You are not required to submit any additional personal identifiable information. We will remove your email address from data, prior to analysis.

Are there any potential risks?
Some of the issues explored will be sensitive, and we understand that this may be a challenging time for you. We have included some information about sources that you might wish to contact within this survey.

How will you protect my data and ensure confidentiality?
North Bristol NHS Trust is supporting this study and will be responsible for looking after your information and using it properly. The data collected will be stored for 5 years after the study has finished.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. We will collect only personal identifiable information possible.

This study is also compliant with the General Data Protection Regulations (GDPR).

Do I have to take part?
You are under no obligation to take part, and you may withdraw at any point without giving a reason.

What will happen to my data if I withdraw my involvement?
If you choose to withdraw your involvement in the study, any results that you have submitted will be kept for analysis. However, you will not be required to input further into the study.We will need to use information from you for this research project. This information will include your email address. People will use this information to do the research or to check your records to make sure that the research is being done properly. Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

What are your choices about how your information is used?
You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have.

Where can you find out more about how your information is used?
You can find out more about how we use your information
• at www.hra.nhs.uk/information-about-patients/

• our leaflet available from www.nbt.nhs.uk/PatientResearchdata
• by asking one of the research team
• by contacting Helen Williamson (Head of Information Governance) at helen.e.williamson@nbt.nhs.uk, or by ringing 0117 41 44767.

Who can I contact if I have any questions?
Please contact Dr Tom Roberts (Chief Investigator) at tern@rcem.ac.uk if you have any questions.

What to do if you need support about wellbeing
The following organisations can help provide advice and support with regards to your wellbeing.

-Your occupational health department (contact details available via your employer)
-Your general practitioner
- https://anaesthetists.org/Home/Wellbeing-support
-BMA Counselling Service (24 Hours). Telephone 0330 123 1245. (Note that you do not have to be a member of the BMA to access this service)
-The Samaritans (24 Hours). Telephone 116 123.

For the attention of Irish Clinicians:
The following organisations can help provide advice and support with regards to your wellbeing in the Republic of Ireland.

-HSE Workplace Health and Wellbeing Unit - Contact Dr Lynda Sisson HR.wellbeing@hse.ie

-The Employee Assistance and Counselling Service (EAC)

-Pieta House www.pieta.ie or call 188 247 247

-Your Mental Health www.yourmentalhealth.ie

-Practitioner Health (Ireland). Telephone 01 297 0356

Specific Consent statement for the Republic of Ireland

I consent to the processing of my personal data as set out in the information leaflet for the research purposes that are part of the CERA study - Consent using the button in the next question.

Do you want to read the participant information sheet now?	◯ Yes ◯ No

If you would like to download the patient information sheet to read later, please download the link below.

[Attachment: "CERA PIS V 1.1.docx"]

Consent and Identifiers

By checking this box, I certify that I am at least 18 years old and that I give my consent freely to participate in this study.	☐ I consent
What is your e-mail address? (This will only be used for the delivery of survey 2 + 3, which you will receive over the coming months)	_____

About you

What is the name of the hospital where you currently work?
Please type and your hospital should appear, if not present select "other"

- ◯ Aberdeen Royal Infirmary
- ◯ Addenbrooke's Cambridge University Hospital
- ◯ Aintree University Hospital
- ◯ Airedale NHS Foundation Trust
- ◯ Alder Hey Children's Hospital NHS Foundation Trust
- ◯ Altnagelvin Area Hospital
- ◯ Aneurin Bevan Health Board
- ◯ Ayr University Hospital Ayr. NHS A&A
- ◯ Havering & Redbridge University Hospitals NHS Trust
- ◯ Barnsley hospital NHS foundation trust
- ◯ Basingstoke (Hampshire Hospitals NHS Foundation Trust)
- ◯ Bedford hospital NHS trust
- ◯ Betsi Cadwaladr University Health Board
- ◯ Birmingham Children's Hospital
- ◯ Bon secours Hospital
- ◯ Bradford Teaching Hospitals Foundation Trust
- ◯ Brighton and Sussex University Hospitals NHS Trust
- ◯ Bristol Royal Hospital for Children
- ◯ Bristol Royal Infirmary
- ◯ Calderdale Hospital
- ◯ Central Manchester NHS trust
- ◯ Chelsea & Westminster Hospital
- ◯ Children's Health Ireland at Crumlin
- ◯ Children's Health Ireland at Tallaght
- ◯ Children's Health Ireland at Temple Street
- ◯ City Hospitals Sunderland NHS Foundation Trust
- ◯ Connolly Blanchardstown Hospital
- ◯ Conquest and Easborne Hospitals
- ◯ Cork University Hospital
- ◯ Countess of Chester NHS Foundation Trust
- ◯ County Durham & Darlington NHS Foundation Trust
- ◯ Craigavon Hospital
- ◯ Croydon
- ◯ Cumberland Infirmary
- ◯ Daisy Hill Hospital
- ◯ Derriford Hospital
- ◯ East and North Hertfordshire NHS Trust
- ◯ East Lancashire NHS Hospital Trust
- ◯ East Sussex Healthcare NHS Trust
- ◯ Epsom and St Helier Hospitals
- ◯ Evelina London Children's Hospital
- ◯ Fairfield
- ◯ Forth Valley Hospital
- ◯ Frimley Park Hospital
- ◯ Galway
- ◯ Gateshead Health NHS Foundation Trust
- ◯ Gloucestershire Hospitals NHS Foundation Trust
- ◯ Good Hope
- ◯ Great North Children's Hospital, Newcastle Upon Tyne
- ◯ Great Western Hospital, Swindon
- ◯ Guy's & St Thomas NHS Foundation Trust
- ◯ Harrogate & District NHS Foundation Trust
- ◯ Heartlands's Hospital
- ◯ Hillingdon Hospital
- ◯ Homerton University Hospital
- ◯ HSE Ireland - Cork University Hospital
- ◯ Huddersfield Royal Infirmary and Calderdale Royal Hospital
- ◯ Hull University Hospital
- ◯ Inverclyde Royal Hospital
- ◯ Ipswich Hospital
- ◯ James Cook University Hospital
- ◯ James Paget Hospital and NHS Trust Gorleston
- ◯ John Radcliffe Hospital
- ◯ King's College Hospital
- ◯ Kingston University Hospital and NHS Foundation Trust

- ◯ Lancashire Teaching Hospitals (Royal Preston Hospital)
- ◯ Leeds teaching hospitals NHS Trust
- ◯ Leicester Royal Infirmary
- ◯ Leighton (mid cheshire)
- ◯ Lister Hospital
- ◯ Liverpool University Hospitals NHS Trust
- ◯ Luton and Dunstable University Hospital
- ◯ Macclesfield Hospital
- ◯ Maidstone and Tunbridge Wells NHS Trust
- ◯ Manchester Univeristy NHS Foundation Trust
- ◯ Mater Misericordiae University Hospital
- ◯ Medway NHS Foundation Trust
- ◯ Mid Cheshire Hospitals NHS Foundation Trust
- ◯ Milton Keynes University Hospital
- ◯ Morriston Hospital
- ◯ Musgrove Park Hospital, Taunton
- ◯ Newcastle upon Tyne Hospitals NHS Foundation Trust
- ◯ Newham University Hospital
- ◯ Norfolk & Norwich University Hospital
- ◯ Southmead Hospital, North Bristol NHS Trust
- ◯ North Hampshire Hospital, Basingstoke
- ◯ North Manchester General Hospital
- ◯ North Middlesex Hospital
- ◯ North Tees and Hartlepool Hospitals NHS Foundation Trust
- ◯ Northern Devon Healthcare NHS Trust
- ◯ Northern general, Sheffield
- ◯ Northumbria Healthcare NHS Trust
- ◯ Northwick Park Hospital
- ◯ Nottingham University Hospitals NHS Trust
- ◯ Oldham
- ◯ Ormskirk & District General Hospital
- ◯ Peterborough City Hospital
- ◯ Portsmouth Hospitals Trust
- ◯ Princess Royal Univeristy Hospital
- ◯ Queen Alexandra Hospital
- ◯ Queen Elizabeth Hospital, Birmingham
- ◯ Queen Elizabeth Hospital, Woolwich
- ◯ Queen Elizabeth Queen's mother hospital Margate
- ◯ Queen Elizabeth University Hospital Glasgow
- ◯ Queens Medical Centre (Nottingham)
- ◯ Rotherham
- ◯ Royal Aberdeen Children's Hospital
- ◯ Royal Alexandra Children's Hospital, Brighton
- ◯ Royal Alexandra Hospital, Paisley
- ◯ Royal Belfast Hospital for Sick Children
- ◯ Royal Berkshire Hospital NHS Foundation Trust
- ◯ Royal Bolton Foundation Trust
- ◯ Royal Cornwall NHS Trust
- ◯ Royal Devon & Exeter Hospital
- ◯ Royal Free Hospital
- ◯ Royal Gwent hospital
- ◯ Royal Hampshire County Hospital
- ◯ Royal Hospital for Children, Glasgow
- ◯ Royal Hospital for Sick Children, Edinburgh
- ◯ Royal Infirmary of Edinburgh
- ◯ Royal Liverpool
- ◯ Royal London Hospital
- ◯ Royal Manchester Children's Hospital
- ◯ Royal Preston Hospital
- ◯ Royal Stoke University Hospital
- ◯ Royal Surrey County Hospital
- ◯ Royal Surrey NHS Foundation Trust
- ◯ Royal Sussex county hospital
- ◯ Royal United Hospital, Bath
- ◯ Royal Victoria Hospital, Belfast
- ◯ Royal Victoria Infirmary, Newcastle
- ◯ Royal Wolverhampton NHS Trust
- ◯ Salford Royal NHS Foundation Trust
- ◯ Salisbury NHS Foundation Trust

- ◯ Sandwell and West Birmingham NHS Foundation Trust
- ◯ Scarborough Hospital
- ◯ Sheffield Children's Hospital
- ◯ Sheffield Teaching Hospitals Foundation NHS Trust
- ◯ South Eastern Health and Social Care Trust
- ◯ Southampton Children's Hospital
- ◯ Southport
- ◯ Southport & Ormskirk Hospital
- ◯ St George's Hospital London
- ◯ St Helen's and Knowsley NHS trust
- ◯ St John's Hospital, Livingston
- ◯ St Mary's Hospital
- ◯ Stockport NHS Trust
- ◯ Stoke Mandeville Hospital
- ◯ Sunderland and South Tyneside NHS Foundation Trust
- ◯ Surrey and Sussex Healthcare NHS Trust
- ◯ Torbay and South Devon NHS Trust
- ◯ Tunbridge Wells NHS Trust
- ◯ Ulster Hospital Dundonald
- ◯ University College London Hospitals NHS Trust
- ◯ University Hospital Ayr
- ◯ University Hospital Coventry
- ◯ University Hospital Crosshouse
- ◯ University Hospital Lewisham
- ◯ University Hospital Monklands
- ◯ University Hospital of Wales, Cardiff
- ◯ University hospital Southampton
- ◯ University Hospital Waterford
- ◯ University Hospital Wishaw
- ◯ University Hospitals Birmingham
- ◯ University Hospitals Coventry & Warwickshire NHS
- ◯ University Hospitals Derby and Burton NHS Foundation
- ◯ University Hospitals of Leicester NHS Trust
- ◯ University Hospitals of North Midlands
- ◯ University Hospitals Plymouth
- ◯ Warwick Hospital
- ◯ Watford General Hospital (West Herts NHS Trust)
- ◯ West Middlesex
- ◯ Western Sussex Hospitals NHS Trust
- ◯ Wexham Park Hospital
- ◯ Whipp's Cross Hospital
- ◯ Whiston Hospital
- ◯ Whittington Health NHS Trust
- ◯ William Harvey Hospital
- ◯ Wrexham Maelor Hospital
- ◯ Yeovil District Hospital NHS Foundation Trust
- ◯ York Teaching Hospital NHSFT
- ◯ Other
- ◯ Wythenshawe Hospital
- ◯ Antrim Area Hospital
- ◯ Arrowe park hospital
- ◯ St Peter's Hospital
- ◯ Balfour Hospital, Orkney
- ◯ Barking havering and redbridge university hospitals NHS foundation trust
- ◯ Barnet Hospital
- ◯ Basildon
- ◯ Belfast City Hospital
- ◯ Blackpool Victoria Hospital
- ◯ BMI Sarum Rd Winchester
- ◯ Broomfield Hospital
- ◯ Causeway hospital
- ◯ Charing Cross Hospital, London
- ◯ Chesterfield Royal Hospital
- ◯ Colchester General Hospital
- ◯ Darent Valley Hospital
- ◯ Dartford and Gravesham NHS Trust
- ◯ Diana Princess of Wales, Grimsby
- ◯ Doncaster Royal Infirmary
- ◯ Dorset County Hospital

- ◯ Dudley Group NHS Foundation Trust
- ◯ Dumfries and Galloway Royal Infirmary
- ◯ Ealing
- ◯ East Surrey Hospital
- ◯ Freeman Hospital, Newcastle
- ◯ Galngwili General Hospital
- ◯ George Eliot Hospital Nuneaton
- ◯ Glan Clwyd hospital
- ◯ Glangwili General Hospital Carmarthen Wales
- ◯ Glasgow Royal Infirmary
- ◯ Glen field Leicester
- ◯ GP Woodlands primary care sidcup
- ◯ Great Ormond Street Hospital
- ◯ Grimsby hospital.
- ◯ Hammersmith Hospital London
- ◯ Harefield
- ◯ Hereford County Hospital
- ◯ HMS Raleigh
- ◯ Horton General Hospital Banbury
- ◯ Hull University Teaching hospitals NHS Trust
- ◯ Kent and Canterbury Hospital
- ◯ Kettering General Hospital
- ◯ Kings Mill Hospital
- ◯ Lincoln county hospital
- ◯ Liverpool Heart and Chest Hospital
- ◯ Liverpool Women's Hospital
- ◯ Mid Essex NHS Trust
- ◯ Mid yorkshire hospital
- ◯ Moorfields Eye Hospital
- ◯ National Hospital for Neurology and Neurosurgery
- ◯ Nevill Hall Hospital
- ◯ New Cross Hospital
- ◯ Ninewells Hospital, Dundee
- ◯ Northampton General Hsopital
- ◯ Northern Lincolnshire and Goole NHS Foundation Trust
- ◯ Oxford University Hospital
- ◯ Perth Royal Infirmary
- ◯ Pilgrim Hospital Boston Lincolnshire
- ◯ Pinderfields general Hospital, Wakefield
- ◯ Poole
- ◯ Prince Charles Hospital
- ◯ Princess of Wales Hospital, Bridgend
- ◯ Princess Royal Hospital, Shrewsbury and Telford Hospitals NHS Trust
- ◯ Queen Charlotte's and Chelsea Hospital
- ◯ Queen Elizabeth Hospital Gateshead
- ◯ Queen Elizabeth Hospital King's Lynn
- ◯ Queen Victoria Hospital, East Grinstead
- ◯ Queens Hospital - Romford
- ◯ Raigmore Hospital
- ◯ Raigmore Hospital, Inverness
- ◯ Robert Jones & Agnes Hunt Orthopaedic Hospital
- ◯ Royal Blackburn
- ◯ Royal Bournemouth NHS Trust
- ◯ Royal Brompton
- ◯ Royal Glamorgan Hospital
- ◯ Royal Lancaster Infimary
- ◯ Royal Marsden hospital
- ◯ Royal National Orthopaedic Hospital
- ◯ Royal Orthopaedic Hospital Birmingham
- ◯ Royal Papworth Hospital
- ◯ Royal Shrewsbury Hospital
- ◯ Russells Hall Hospital, Dudley
- ◯ Scunthorpe General Hospital
- ◯ Sherwood Forest nhs trust
- ◯ Southend University Hospital
- ◯ St Bartholomew's Hospital London
- ◯ St Peter's, Chertsey (Ashford and St Peter's Trust)
- ◯ St. Bartholomew's Hospital
- ◯ St. Mary's Hospital, Imperial College Healthcare

NHS Trust
- ◯ Tameside and Glossop
- ◯ The Balfour , Orkney
- ◯ The Horton General Hospital
- ◯ The Porch Surgery
- ◯ The Queen Elizabeth Hospital, King's Lynn
- ◯ The Royal Oldham Hospital
- ◯ University Hospitals of Morecambe Bay Foundation trust
- ◯ Walton centre
- ◯ Warrington and Halton Teaching Hospitals NHS Foundation Trust
- ◯ Wasall Manor Hospital
- ◯ West cumberland hospital
- ◯ West Middlesex University Hospital
- ◯ West Suffolk hospital
- ◯ Western General Hospital Edinburgh
- ◯ Wirral University Teaching Hospital
- ◯ Worcestershire Royal Hospital
- ◯ Worthing Hospital
- ◯ Wrightington Wigan and Leigh NHS Foundation Trust
- ◯ Wycombe Hospital Buckinghamshire NHS Trust
- ◯ Ysbyty Gwynedd
- ◯ University Hospital Hairmyres

You have selected other, please specify.

_____

What is your professional grade?

- ◯ GP Trainee
- ◯ ST1
- ◯ ST2
- ◯ ST3
- ◯ ST4
- ◯ ST5
- ◯ ST6
- ◯ ST7
- ◯ ST8
- ◯ F1
- ◯ F2
- ◯ Clinical Fellow (F2-ST3 Level)
- ◯ Clinical Fellow (>=ST4 Level)
- ◯ Consultant
- ◯ Associate Specialist
- ◯ Staff Grade
- ◯ CESR Doctor
- ◯ GP
- ◯ Other

You have selected other, please specify.

_____

What is your gender?

- ◯ Male
- ◯ Female
- ◯ Other
- ◯ Prefer not to say

How old are you?	◯ 20-25 ◯ 26-30 ◯ 31-35 ◯ 36-40 ◯ 41-45 ◯ 46-50 ◯ 51-55 ◯ 56-60 ◯ 61-65 ◯ 66-70 ◯ >70
What is your 'parent speciality'?	◯ Emergency Medicine ◯ Anaesthetics ◯ Intensive Care Medicine ◯ Paediatrics ◯ General Practice ◯ Surgery ◯ Foundation Programme ◯ Acute Internal Medicine ◯ Other
What is your 'parent speciality'?	☐ Emergency Medicine ☐ Anaesthetics ☐ Intensive Care Medicine ☐ Paediatrics ☐ General Practice ☐ Surgery ☐ Foundation Programme ☐ Acute Internal Medicine ☐ Other
You have selected other, please specify.	_____
In what Department were you working as of March 1st 2020?	◯ Emergency Department (adult or paediatric) ◯ Anaesthetic Department (adult or paediatric) ◯ Intensive Care Department (adult or paediatric) ◯ Acute Medical Unit ◯ Hospital ward (adult or paediatric) ◯ Other
In what Department were you working as of March 1st 2020? Select all that apply	☐ Emergency Department (adult or paediatric) ☐ Anaesthetic Department (adult or paediatric) ☐ Intensive Care Department (adult or paediatric) ☐ Acute Medical Unit ☐ Hospital ward (adult or paediatric) ☐ Other
You selected other, in which Department where you working as of March 1st 2020?	_____
Have you been deployed to a different clinical area as a result of the COVID-19 outbreak?	◯ Yes ◯ No

Where have you been redeployed to?	◯ Emergency Department (adult or paediatric) ◯ Anaesthetic Department (adult or paediatric) ◯ Intensive Care Department (adult or paediatric) ◯ Acute Medical Unit ◯ Hospital ward (adult or paediatric) ◯ Other
You have selected other, please specify.	_____
How satisfied are you with this redeployment?	◯ Very dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Very satisfied
Have you previously provided direct clinical care to any patients affected by these infectious disease outbreaks? (please select all that apply)	☐ None of the below ☐ Ebola virus ☐ MERS-CoV ☐ SARS ☐ Chikungunya ☐ Cholera ☐ Influenza (swine, avian, zoonotic) ☐ Zika virus ☐ Other
You have selected other, please specify.	_____

Personal Protective Equipment (PPE) and General Training

What training have you received in regards to personal protective equipment (PPE) since the COVID-19 outbreak was declared? (select all that apply)

	No training	Formal instructional video	Written instruction	Simulation training	Departmental guidance	Other
Donning and doffing (gloves, gown, facemask, eye protection)	☐	☐	☐	☐	☐	☐
Formal fit testing for mask	☐	☐	☐	☐	☐	☐
PPE training for exposure to aerosol generating procedure (e.g. intubation)	☐	☐	☐	☐	☐	☐

Other. Please specify. _____

If you have had any further PPE training please specify _____

What practical education have you received in regards to the clinical care of patients presenting with suspected/diagnosed COVID-19?

- ☐ None
- ☐ Simulation training of a possible case
- ☐ Simulation training of a case requiring aerosol procedure
- ☐ Other

You selected other. Please specify. _____

How frequently do you access the following sources of information regarding policy and clinical aspects of COVID-19?

	Hourly	Up to twice a day	Daily	Several times a week	Weekly	Less than weekly	Never
Government Guidance	◯	◯	◯	◯	◯	◯	◯
College Guidance	◯	◯	◯	◯	◯	◯	◯
Trust Guidance	◯	◯	◯	◯	◯	◯	◯
Departmental guidance	◯	◯	◯	◯	◯	◯	◯
Social Media	◯	◯	◯	◯	◯	◯	◯
Online blogs and podcasts	◯	◯	◯	◯	◯	◯	◯
Peer review literature	◯	◯	◯	◯	◯	◯	◯

How confident do you feel in the infection control training that has been provided to you?

◯ Not confident at all
◯ Somewhat not confident
◯ Neither not confident or confident
◯ Somewhat confident
◯ Very confident

How prepared do you feel to provide direct care to suspected cases?

◯ Completely unprepared
◯ Somewhat unprepared
◯ Neither unprepared or prepared
◯ Somewhat prepared
◯ Very prepared

How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?

◯ Significantly worse than before Covid-19
◯ Slightly worse than before Covid-19
◯ The same as before Covid-19
◯ Slightly better than before Covid-19
◯ Significantly better than before Covid-19

How many suspected cases of COVID-19 have you had direct clinical contact with since March 1st 2020?

◯ 0
◯ 1-5
◯ 6-10
◯ 11-15
◯ 16-20
◯ 21-25
◯ 26-30
◯ 31-35
◯ > 36

As far as you are aware, how many of these suspected cases have turned out to be confirmed cases of COVID-19?

◯ 0
◯ 1-5
◯ 6-10
◯ 11-15
◯ 16-20
◯ 21-25
◯ 26-30
◯ 31-35
◯ > 36

Personal Factors	
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established medical health conditions?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established medical condition
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established mental health conditions?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established mental health condition
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree
How worried are you about the potential risks if you were to become infected with COVID-19?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
How worried are you about the potential risks to your family. loved ones or others due to your clinical role in the COVID-19 outbreak?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all

PERA Questions: Self-isolate

Have you had to self-isolate?	◯ Yes ◯ No
For what reason did you have to self-isolate?	☐ Personal symptoms ☐ Personal diagnosis of COVID-19 ☐ Symptoms of a member of the household ☐ Exposure to a positive case of COVID-19 in the work environment ☐ Exposure to a positive case of COVID-19 in your personal environment ☐ Other (eg return from travel to high risk area)
Other - please specify	_____
How many clinical shifts in your rota have you missed due to self-isolation?	◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5-7 ◯ 8-10 ◯ >10
Date survey completed	_____

CERA Survey 2

Thank you for taking the time to complete the CERA survey part 2.

This is part 2 of the CERA study. Thank you for taking the time to fill out the questions below. It will take between 5 to 7 minutes.

We recommend using either a tablet or computer screen but the questions are accessible via mobile phones.

The Impact of Events Scale - Revised (page 3) should be answered in reference to the COVID-19 peak and your feelings over the last 7 days. All other questions should be answered in reference to the COVID-19 peak and your feelings over the past few weeks.

The definition of COVID-19 "peak", for the purpose of this study, uses nationally reported hospital death figures. This has been estimated between April 10th - April 15th. It is understood this will vary regionally.

Finally, we understand that throughout the COVID-19 pandemic many of you may have experienced very challenging events both in your personal and professional lives. We thank you for taking the time to complete this study and hope it offers an anonymised opportunity to report the psychological impact of this pandemic. If you need any further support there are details highlighted in the participant information leaflet that can be downloaded below.

If you want to download the participant information leaflet, which outlines the study and available support, please download below.

[Attachment: "CERA PIS V 1.1.docx"]

I consent to taking part in CERA survey 2.

- ◯ Yes
- ◯ No

What is your ethnicity?

- ◯ English / Welsh / Scottish / Northern Irish / British
- ◯ Irish
- ◯ Gypsy or Irish Traveller
- ◯ Any other White background
- ◯ White and Black Caribbean
- ◯ White and Black African
- ◯ White and Asian
- ◯ Any other Mixed / Multiple ethnic background
- ◯ Indian
- ◯ Pakistani
- ◯ Bangladeshi
- ◯ Chinese
- ◯ Any other Asian background
- ◯ African
- ◯ Caribbean
- ◯ Any other Black / African / Caribbean background
- ◯ Arab
- ◯ Any other ethnic group
- ◯ Prefer not to disclose

Impact of Events Scale - Revised

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 PANDEMIC PEAK.

How much have you been distressed or bothered by these difficulties?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it	○	○	○	○	○
I had trouble staying asleep	○	○	○	○	○
Other things kept me thinking about it	○	○	○	○	○
I felt irritable and angry	○	○	○	○	○
I avoided letting myself get upset when I thought about it or was reminded of it	○	○	○	○	○
I thought about it when I didn't mean to	○	○	○	○	○
I felt as if it hadn't happened or wasn't real	○	○	○	○	○
I stayed away from reminders of it	○	○	○	○	○
Pictures about it popped into my head	○	○	○	○	○
I was jumpy and easily startled	○	○	○	○	○
I tried not to think about it	○	○	○	○	○
I was aware that I still had a lot of feelings about it, but I didn't deal with them	○	○	○	○	○
My feelings about it were kind of numb	○	○	○	○	○
I found myself acting or feeling like I was back at that time	○	○	○	○	○
I had trouble falling asleep	○	○	○	○	○
I had waves of strong feelings about it	○	○	○	○	○
I tried to remove it from my memory	○	○	○	○	○
I had trouble concentrating	○	○	○	○	○
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or a pounding heart	○	○	○	○	○

I had dreams about it	○	○	○	○	○
I felt watchful and on-guard	○	○	○	○	○
I tried not to talk about it	○	○	○	○	○

Personal Protective Equipment (PPE) and General Training

What training have you received in regards to personal protective equipment (PPE) since the COVID-19 outbreak was declared? (select all that apply)

	No training	Formal instructional video	Written instruction	Simulation training	Departmental guidance	Other
Donning and doffing (gloves, gown, facemask, eye protection)	☐	☐	☐	☐	☐	☐
Formal fit testing for mask	☐	☐	☐	☐	☐	☐
PPE training for exposure to aerosol generating procedure (e.g. intubation)	☐	☐	☐	☐	☐	☐

What practical education have you received in regards to the clinical care of patients presenting with suspected/diagnosed COVID-19? (select all that apply)

- ☐ None
- ☐ Simulation training of a possible case
- ☐ Simulation training of a case requiring aerosol generating procedure
- ☐ Other

You have selected other, please specify.

_____

How confident do you feel in the infection control training that has been provided to you?

- ◯ Not confident at all
- ◯ Somewhat not confident
- ◯ Neither not confident or confident
- ◯ Somewhat confident
- ◯ Very confident

How prepared do you feel to provide direct care to suspected cases?

- ◯ Completely unprepared
- ◯ Somewhat unprepared
- ◯ Neither unprepared or prepared
- ◯ Somewhat prepared
- ◯ Very prepared

How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?

- ◯ Significantly worse than before Covid-19
- ◯ Slightly worse than before Covid-19
- ◯ The same as before Covid-19
- ◯ Slightly better than before Covid-19
- ◯ Significantly better than before Covid-19

Have you been deployed to a different clinical area as a result of the COVID-19 outbreak?

- ◯ Yes
- ◯ No

Where have you been redeployed to?

- ◯ Emergency Department (adult or paediatric)
- ◯ Anaesthetic Department (adult or paediatric)
- ◯ Intensive Care Department (adult or paediatric)
- ◯ Acute Medical Unit
- ◯ Hospital ward (adult or paediatric)
- ◯ Other

You have selected other, please specify.

_____

How satisfied are you with this redeployment?	◯ Very dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Very satisfied
In survey 1, you stated you had been re-deployed. How satisfied are you with this redeployment now?	◯ Very dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Very satisfied ◯ I am no longer re-deployed
How many suspected cases of COVID-19 have you had direct clinical contact with since March 1st 2020?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
As far as you are aware, how many of these suspected cases have turned out to be confirmed cases of COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
How many patients have you witnessed dying with COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36

Personal Factors

Do you have a pre-existing physical health condition(s) that may increase your chances of suffering more severe COVID-19 disease?	◯ Yes ◯ No ◯ Prefer not to disclose
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established mental health conditions?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established mental health condition
Over the course of your life prior to the recent pandemic, have you experienced what you would characterise as a significant trauma?	◯ Yes ◯ No
During the COVID-19 pandemic, have you felt at high risk of dying/death?	◯ Yes ◯ No
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree
How worried are you about the potential risks if you were to become infected with COVID-19?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
How worried are you about the potential risks to your family, loved ones or others due to your clinical role in the COVID-19 outbreak?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
Have any of your family, friends or loved ones become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required ward level/HDU hospital treatment ☐ Unwell and required ICU treatment ☐ Died ☐ None of the above
Have any of your colleagues become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required ward level/HDU hospital treatment ☐ Unwell and required ICU treatment ☐ Died ☐ None of the above
In the last 2 weeks I have felt well supported by friends and family	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

In the last 2 weeks I have felt well supported by the senior clinical leadership team	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

Personal Coronavirus

Have you received a positive diagnosis of Coronavirus during this pandemic?	◯ Yes ◯ No
Have you been admitted to hospital due to your diagnosis of Coronavirus?	◯ Yes ◯ No
Have you had to self-isolate?	◯ Yes ◯ No
For what reason did you have to self-isolate? (select all that apply)	☐ Personal symptoms ☐ Personal diagnosis of COVID-19 ☐ Symptoms of a member of the household ☐ Exposure to a positive case of COVID-19 in the work environment ☐ Exposure to a positive case of COVID-19 in your personal environment ☐ Other (eg return from travel to high risk area)
How many clinical shifts in your rota have you missed due to self-isolation?	◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5-7 ◯ 8-10 ◯ >10
Have you been offered any of the following psychological interventions via your current place of work? (Select all that apply)	☐ Structured individual therapy with a therapist (in person/on telephone) ☐ Advice line / helpline ☐ Internet based psychological intervention ☐ Well-being app / website ☐ Brief TRiM / "safe space" session (trauma risk management) ☐ Other please state
Other, please specify	_____
During your time working in the COVID-19 pandemic have you experienced any of the following? (Select all that apply)	☐ Feelings that you made a contribution ☐ A sense of personal accomplishment ☐ Improved confidence and self esteem ☐ Increased compassion ☐ Re-evaluation of self and purpose ☐ Work satisfaction ☐ A sense of team cohesion
Would you be happy to be contacted about any further COVID-19 related research focusing on the psychological impact on Doctors?	◯ Yes ◯ No

CERA Survey 3

Please complete the survey below.

Thank you!

This is part 3 of the CERA study. Thank you for taking the time to fill out the questions below. It will take between 5 to 7 minutes.

We recommend using either a tablet or computer screen but the questions are accessible via mobile phones.

All questions should be answered in reference to the COVID-19 pandemic. The Impact of Events Scale - Revised, should be answered in reference to your feelings over the last 7 days and all other questions should be answered in reference to your feelings over the past few weeks.

Finally, we understand that throughout the COVID-19 pandemic many of you may have experienced very challenging events both in your personal and professional lives. We thank you for taking the time to complete this study and hope it offers an anonymised opportunity to report the psychological impact of this pandemic. If you need any further support there are details highlighted in the participant information leaflet that can be downloaded below.

If you want to download the participant information leaflet, which outlines the study and available support, please download below.

[Attachment: "CERA PIS V 1.1.docx"]

I consent to taking part in CERA survey 3.

◯ Yes
◯ No

Impact of Events Scale - Revised

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 PANDEMIC.

How much have you been distressed or bothered by these difficulties?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it	○	○	○	○	○
I had trouble staying asleep	○	○	○	○	○
Other things kept me thinking about it	○	○	○	○	○
I felt irritable and angry	○	○	○	○	○
I avoided letting myself get upset when I thought about it or was reminded of it	○	○	○	○	○
I thought about it when I didn't mean to	○	○	○	○	○
I felt as if it hadn't happened or wasn't real	○	○	○	○	○
I stayed away from reminders of it	○	○	○	○	○
Pictures about it popped into my head	○	○	○	○	○
I was jumpy and easily startled	○	○	○	○	○
I tried not to think about it	○	○	○	○	○
I was aware that I still had a lot of feelings about it, but I didn't deal with them	○	○	○	○	○
My feelings about it were kind of numb	○	○	○	○	○
I found myself acting or feeling like I was back at that time	○	○	○	○	○
I had trouble falling asleep	○	○	○	○	○
I had waves of strong feelings about it	○	○	○	○	○
I tried to remove it from my memory	○	○	○	○	○
I had trouble concentrating	○	○	○	○	○
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or a pounding heart	○	○	○	○	○

I had dreams about it	○	○	○	○	○
I felt watchful and on-guard	○	○	○	○	○
I tried not to talk about it	○	○	○	○	○

Occupational Factors

How confident do you feel in the infection control training that has been provided to you?	◯ Not confident at all ◯ Somewhat not confident ◯ Neither not confident or confident ◯ Somewhat confident ◯ Very confident
How prepared do you feel to provide direct care to suspected cases?	◯ Completely unprepared ◯ Somewhat unprepared ◯ Neither unprepared or prepared ◯ Somewhat prepared ◯ Very prepared
How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?	◯ Significantly worse than before Covid-19 ◯ Slightly worse than before Covid-19 ◯ The same as before Covid-19 ◯ Slightly better than before Covid-19 ◯ Significantly better than before Covid-19
Have you been deployed back to your usual clinical area after re-deployment?	◯ Yes ◯ No
How many suspected cases of COVID-19 have you had direct clinical contact with since March 1st 2020?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
As far as you are aware, how many of these suspected cases have turned out to be confirmed cases of COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
How many patients have you witnessed dying with COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36

Personal Factors

Do you feel exposure to the COVID-19 pandemic has increased symptoms of any established mental health condition(s) you have personally?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established mental health condition
Do you feel exposure to the COVID-19 pandemic has increased symptoms of any established physical health condition(s) you have personally?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established physical health condition
During the COVID-19 pandemic, have you felt at high risk of dying/death?	◯ Yes ◯ No
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree
How worried are you about the potential risks if you were to become infected with COVID-19?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
How worried are you about the potential risks to your family, loved ones or others due to your clinical role in the COVID-19 outbreak?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
Have any of your family, friends, or loved ones become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required non-ICU hospital treatment ☐ Unwell and required ICU treatment ☐ Died
Have any of your colleagues become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required non-ICU hospital treatment ☐ Unwell and required ICU treatment ☐ Died
In the last 2 weeks I have felt well supported by friends and family	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

In the last 2 weeks I have felt well supported by the senior clinical leadership team	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

Personal Coronavirus

Have you received a positive diagnosis of Coronavirus during this pandemic?	◯ Yes ◯ No
Have you been admitted to hospital due to your diagnosis of Coronavirus?	◯ Yes ◯ No
Have you had to self-isolate?	◯ Yes ◯ No
For what reason did you have to self-isolate? (select all that apply)	☐ Personal symptoms ☐ Personal diagnosis of COVID-19 ☐ Symptoms of a member of the household ☐ Exposure to a positive case of COVID-19 in the work environment ☐ Exposure to a positive case of COVID-19 in your personal environment ☐ Other (eg return from travel to high risk area)
How many clinical shifts in your rota have you missed due to self-isolation?	◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5-7 ◯ 8-10 ◯ >10
Have you had a COVID-19 antibody test?	◯ Yes ◯ No ◯ Prefer not to disclose
What was the result of your COVID-19 antibody test	◯ Positive ◯ Negative ◯ I have not yet received the result ◯ Prefer not to disclose
Have you been offered any of the following psychological interventions via your current place of work? (Select all that apply)	☐ Structured individual therapy with a therapist (in person/on telephone) ☐ Advice line / helpline ☐ Internet based psychological intervention ☐ Well-being app / website ☐ Brief TRiM / "safe space" session (trauma risk management) ☐ Other please state
Other, please specify	_____
During your time working in the COVID-19 pandemic have you experienced any of the following? (Select all that apply)	☐ Feelings that you made a contribution ☐ A sense of personal accomplishment ☐ Improved confidence and self esteem ☐ Increased compassion ☐ Re-evaluation of self and purpose ☐ Work satisfaction ☐ A sense of team cohesion

Have you experienced any other factors during the COVID-19 pandemic that have made a positive impact on your psychological health? _____

The last 3 questions are optional and not related to the CERA study but will inform future planning for psychological interventions.

We would like to know more about the type of psychological support doctors prefer. If you needed psychological support in relation to the impact from the COVID-19 pandemic, what would your preferences be in relation to:

a) Format	◯ Face to face individual ◯ Face to face group therapy ◯ Individual online therapy ◯ Online support groups ◯ Self help ◯ Guided self help
b) Timing	◯ Immediate support during the COVID-19 pandemic ◯ Immediately after the COVID-19 pandemic ◯ After the COVID-19 pandemic following a period of rest and recuperation
c) Mode of therapy	◯ Structured therapy e.g. CBT ◯ Counselling ◯ Peer support ◯ Other
Please specify	_____

Psychological distress during the acceleration phase of the COVID-19 pandemic: a survey of doctors practising in Emergency Medicine, Anaesthesia and Intensive Care Medicine in the United Kingdom and Republic of Ireland

Research Checklist: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

CHERRIES CHECKLIST ADAPTED FROM: Eysenbach, Gunther. "Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES)." *Journal of medical Internet research* vol. 6,3 e34. 29 Sep. 2004, doi:10.2196/jmir.6.3.e34			
Item Category	***Checklist Item***	***Explanation***	***Checklist Response***
Design	Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	***Outlined in 'Methods'***
IRB (Institutional Review Board) approval and informed consent process	IRB approval	Mention whether the study has been approved by an IRB.	***Outlined in 'Procedures'***
	Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	***Outlined in 'Participants and Procedures'***
	Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	***Outlined in 'Procedures'***
Development and pre-testing	Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	**Available in the published protocol** (Roberts T, Daniels J, Hulme W, et al. COVID-19 emergency response assessment study: a prospective longitudinal survey of frontline doctors in the UK and Ireland: study protocol. BMJ Open Published Online First: 2020. doi:10.1136/bmjopen-2020-039851)
Recruitment process and description of the sample having access to the questionnaire	Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	***Outlined in 'Procedures' + protocol***
	Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	***Outlined in 'Procedures' + protocol***
	Advertising the survey	How/where was the survey announced or advertised? Some examples are	***Outlined in 'Procedures' + protocol***

		offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	
Survey administration	Web/E-mail	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	***Outlined in* 'Procedures' + *protocol***
	Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	***Outlined in* 'Procedures' + *protocol***
	Mandatory/voluntary	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	- ***Outlined in* 'Procedures' + *protocol*** - ***voluntary***
	Incentives	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	***No***
	Time/Date	In what timeframe were the data collected?	***Outlined in* 'Procedures' + *protocol + Protocol***
	Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	***Not done due to maximise completion of the GHQ-12***
	Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions	***Outlined in protocol but yes ' branching logic' was used where appropriate***
	Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	***Outlined in 'online supplementary 2,3,4'***
	Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	***Outlined in 'online supplementary 2,3,4''***
	Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted.	***There were no completeness checks. The only mandatory items***

		Was this done, and if "yes", how (usually JAVAScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as "not applicable" or "rather not say", and selection of one response option should be enforced.	***were consent and email address. The decision not to include mandatory items and/or completeness checks was made due to a concern that mandatory items would increase rates of non-completion***
	Review step	State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	***This was possible but has not been included in the manuscript***
Response rates			
	Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	***Outlined in 'Figure 1'. Each access to the 1st survey page 1 was identified as a new unique visit, this was not limited by IP address or cookies***
	View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary	***Survey site contains first page of survey therefore N/A***
	Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called "recruitment" rate.	***Outlined in 'Figure 1'***
	Completion rate (Ratio of users who finished the survey/users who agreed to participate)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that "completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	***Outlined in 'Figure 1'***
Preventing multiple entries from the same individual	Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user	***Not used***

		ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	
	IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	***Not used due to survey being completed on multi-user/single log-in computers***
	Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	***Not done***
	Registration	In "closed" (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	***N/A***
Analysis	Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	***Outlined in* 'Statistical Analysis'** ***+ Protocol***
	Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined	***All questionnaires have timestamp of completion.***
	Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	***Outlined in* 'Statistical Analysis'** ***+ Protocol***

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Psychological Distress and Trauma in Doctors Providing Frontline Care During the COVID-19 Pandemic in the United Kingdom and Ireland: A Prospective Longitudinal Survey Cohort Study

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Title Page

Psychological Distress and Trauma in Doctors Providing Frontline Care During the COVID-19 Pandemic in the United Kingdom and Ireland: A Prospective Longitudinal Survey Cohort Study

Authors: Tom Roberts[1, 2], Jo Daniels [3], William Hulme [4], Robert Hirst [5], Daniel Horner [1, 6], Mark D Lyttle [2, 7], Katie Samuel [5], Blair Graham [8, 9], Charles Reynard [10], Michael J Barrett [11, 12], James Foley [13], John Cronin [14], Etimbuk Umana [15], Joao Vinagre [16] and Edward Carlton [1, 17] on behalf of The Trainee Emergency Research Network (TERN), Paediatric Emergency Research in the UK and Ireland (PERUKI), Research and Audit Federation of Trainees (RAFT), Irish Trainee Emergency Research Network (ITERN and Trainee Research in Intensive Care (TRIC))

Affiliations:

1) The Royal College of Emergency Medicine, London, UK
2) Emergency Department, Bristol Royal Hospital for Children, UK
3) Department of Psychology, University of Bath, UK
4) Statistical Consultant, Oxford, UK
5) Department of Anaesthesia, North Bristol NHS Trust, UK
6) Emergency Department, Salford Royal Hospital NHS Foundation Trust
7) Faculty of Health and Applied Sciences, University of the West of England, Bristol
8) Faculty of Health, University of Plymouth, Plymouth, UK.
9) Emergency Department, University Hospitals Plymouth, UK
10) Department of Cardiovascular Sciences, University of Manchester
11) Department of Emergency Medicine, Children's Health Ireland at Crumlin, Ireland
12) Women's and Children's Health, School of Medicine, University College Dublin, Ireland
13) Emergency Department, University Hospital Waterford, Waterford, Ireland
14) Department of Emergency Medicine, St Vincent's University Hospital, Dublin, Ireland
15) Emergency Department, Connolly Hospital Blanchardstown, Dublin, Ireland.
16) College of Anaesthesiologists of Ireland, Dublin, Ireland
17) Emergency Department, North Bristol NHS Trust

Corresponding Author
Dr Tom Roberts
Address: 12 Hamilton Road, Bristol, BS3 1PB
Email: Tomkieranroberts@gmail.com
Telephone: 07894234121

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Objectives

The psychological impact of the COVID-19 pandemic on doctors is a significant concern. Due to the emergence of multiple pandemic waves, longitudinal data on the impact of COVID-19 is vital to ensure an adequate psychological care response. The primary aim was to assess the prevalence and degree of psychological distress and trauma in frontline doctors during the acceleration, peak and deceleration of the COVID-19 first wave. Personal and professional factors associated with psychological distress are also reported.

Design

A prospective online three-part longitudinal survey.

Setting

Acute hospitals in the UK and Ireland.

Participants

Frontline doctors working in Emergency Medicine (EM), Anaesthetics and Intensive Care Medicine (ICM) during the first wave of the COVID-19 pandemic in March 2020.

Primary outcome measures

Psychological distress and trauma measured using the General Health Questionnaire-12 and the Impact of Events-Revised.

Results

The initial acceleration survey distributed across networks generated a sample of 5440 doctors. Peak and deceleration response rates from the original sample were 71·6% (n=3896) and 56·6% (n=3079) respectively. Prevalence of psychological distress was 44·7% (n=1334) during the acceleration, 36·9% (n=1098) at peak and 31·5% (n=918) at the deceleration phase. The prevalence of trauma was 23·7% (n=647) at peak and 17·7% (n=484) at deceleration. The prevalence of probable post-traumatic stress disorder was 12·6% (n=343) at peak and 10·1% (n=276) at deceleration. Worry of family infection due to clinical work was the factor most strongly associated with both distress (R^2 = 0·06) and trauma (R^2 =0·10).

Conclusion

Findings reflect a pattern of elevated distress at acceleration and peak, with some natural recovery. It is essential that policymakers seek to prevent future adverse effects through (a) provision of vital equipment to mitigate physical and psychological harm (b) increased awareness and recognition of signs of psychological distress and (c) the development of clear pathways to effective psychological care.

Trial Registration: ISRCTN 10666798

Strength and limitations of this study

- This paper presents key findings from a large cross-sectional longitudinal survey of practising emergency, anaesthetic and intensive care doctors in UK and Ireland during the acceleration, peak and deceleration of the first wave of the COVID-19 pandemic.
- This study provides an insight into the associated personal and professional factors associated with trauma and distress and could be utilised to identify those doctors who will most benefit from psychological interventions.
- Variation in regional peaks may have influenced accurate capturing of psychological distress and trauma rates and have not been accounted for.
- The findings cannot be extrapolated to longer-term psychological impact, and future work is planned to capture this.

Introduction

Clinicians providing frontline care have become central to the primary reception, assessment, and ongoing hospital treatment of patients with suspected Coronavirus Infectious Disease 2019 (COVID-19). These include doctors working in Emergency Medicine (EM), Anaesthetics and Intensive Care Medicine (ICM). Whilst this healthcare workforce is highly resilient and accustomed to facing traumatic situations, the COVID-19 pandemic has imposed unprecedented demands in workload intensity and personal health risk. [1–4] High infection rates have been reported in frontline clinicians, with over 150 fatalities in the UK by May 2020. [5] These factors are likely to affect psychological wellbeing, increasing the risk of traumatic stress both in the acute phase of the pandemic and at long-term follow up. [6–9] Exposure to infectious disease outbreaks and elevated psychological distress have previously been associated with increased sickness rates, absenteeism, impaired performance at work, and the development of physical health problems. [10–12] There is also an emerging evidence base from around the world of the psychological impact on healthcare workers. [13–16] During the current COVID-19 pandemic there has been a global media focus on health and care workers with widespread public support. [17] However, there is increasing recognition amongst key opinion leaders and psychological societies that this pandemic will lead to an unparalleled, though as yet unquantified, impact upon the psychological wellbeing of healthcare workers. [18,19]

Studies evaluating psychological wellbeing in frontline clinicians during infectious disease outbreaks (including COVID-19) have demonstrated negative impacts may be significant. [10,20,21] Systematic reviews and meta-analyses converge around common predictors of psychological distress following traumatic events, many of which are relevant to frontline clinicians. Key factors include preparedness, training, social and occupational support, exposure and threat to life, media use and history of mental health problems. [1,7,21–23] However, these data have largely been collected as a snapshot either during or following outbreaks or as cross-sectional surveys in highly selected or self-selecting cohorts. Longitudinal data which describe evolving and cumulative effects on the psychological wellbeing of frontline working during the COVID-19 pandemic are therefore urgently required. Such studies are essential to understand and mitigate psychological impacts of future events upon this vital workforce and inform the development of policy and interventions.

The primary aim of this study was to assess the prevalence and degree of psychological distress and trauma in doctors providing frontline care during the acceleration, peak and deceleration phases of the COVID-19 pandemic. We also sought to establish which personal and professional factors were significantly associated with psychological distress at these time points.

Methods

Study Design and Participants

The "COVID-19 Emergency Response Assessment (CERA) Study" was a prospective online longitudinal survey of frontline doctors across the UK and Ireland undertaken during the acceleration, peak and deceleration phases of the first COVID-19 pandemic wave.[24] Doctors of all grades working in EM, Anaesthetics or ICM during the acceleration phase were invited to participate.

Procedures

This survey study is reported in line with Checklist for Reporting Results of Internet E-surveys (CHERRIES) guidelines. [25] Full details of survey distribution, design, administration, and time-points are available in the published protocol. [24] In brief, the survey was initially distributed during the acceleration phase of the first pandemic wave through research networks, training faculties or Royal College Networks via email or instant messaging groups, coordinated by identified site/region leads. The participation link was not shared on wider social media platforms, to avoid international contamination. At completion of the acceleration phase survey, participants entered personal email addresses for direct approach at peak and deceleration phases with a unique survey link to avoid duplication. The study was registered at the ISRCTN (10666798).

The acceleration, peak and deceleration surveys were developed iteratively by the study team and underpinned by evidence, or by consensus where necessary. Psychometric tools were selected by consensus of the study team, considering validity and utility of a range of standardised measures, balanced against the feasibility of delivery and completion by individuals likely to be working at maximum capacity.

Study data were collected and managed using REDCap (Research Electronic Data Capture) hosted at University Hospitals Bristol and Weston NHS Foundation Trust.[26,27] Acceleration, peak and deceleration phases were defined a priori and adapted from the United States Centre for Disease Control "Preparedness and Response Frameworks for Influenza Pandemics". [28] For each survey, exact survey distribution dates were decided per protocol by team consensus according to available public health data on number of confirmed cases (acceleration phase; UK: 18/03/2020 – 26/03/2020, Ireland: 25/03/2020 – 02/04/2020), nationally available COVID-19 daily death rates (peak phase; UK: 21/04/2020 – 05/05/2020, Ireland: 28/04/2020 – 12/05/2020) and at 30 days after distribution of the peak phase survey (deceleration phase; UK: 03/06/2020 – 17/06/2020, Ireland: 10/06/2020 – 24/06/2020). Ethical approval was obtained from the University of Bath (UK) and Children's Health Ethics Committee (Ireland). Regulatory approval was obtained from the Health Regulation Authority (UK), Health and Care Research Wales. Participants provided electronic informed consent for each survey.

Survey Questions

Survey questions collected data for both the primary and secondary outcomes. Items included the General Health Questionnaire-12 (GHQ-12; provided with licence fee waived by GL Assessments, London, UK) for distress, and the Impact of Events Scale- Revised (IES-R; off licence) for trauma. Personal and professional characteristics relating to participants' current role, and their preparedness and experiences during the pandemic were collected. These were used as secondary outcome measures and are provided in full in the protocol and online supplement. [24]

Outcomes

There were two co-primary outcomes in this survey: psychological distress, and trauma, as defined by the GHQ-12 and the IES-R respectively.

Distress – GHQ-12

The GHQ-12 is a 12-item self-report measure devised to screen for psychological distress in the general population. [29] The measure has high specificity and sensitivity, with reliability demonstrated across a range of populations. [30,31] The GHQ-12 has been used in similar clinician-based studies measuring the psychological impact of infectious outbreaks and was chosen due to the brevity of the measure and its suitability for time-pressured medical staff. [21] The GHQ-12 assesses current state and asks the participants to compare to usual state. GHQ-12 was asked at all 3 survey phases. Case level distress is defined as a score of more than 3. [30]

Trauma – IES-R

The IES-R is a 22-item measure commonly used to measure post-traumatic stress following a pre-specified traumatic incident and has been used to evaluate the impact of infectious disease outbreaks on hospital staff. [21,32] It contains 8 items that focus on 'intrusion', 8 items on 'avoidance' and 6 items on 'hyperarousal'. The IES-R was used at the peak and deceleration survey phases. A score of 24 or above indicates a clinically significant traumatic stress response, a score above 33 indicates best cut-off for a diagnosis of 'probable post-traumatic stress disorder' (PTSD). [33,34]

The secondary outcomes captured included personal and professional characteristics and their association with psychological distress and trauma. These personal and professional factors were identified through rapid literature review of high-quality systematic reviews and meta-analysis by experts in pandemic research. [1,21–23] All factors identified as predictors of outcome were retained. This was supplemented by factors deemed of specific or emerging interest by the expert study steering committee. These were defined a priori in the study protocol, with the exception of ethnicity which was added during the peak survey due to the specific emergence of ethnicity as a potential marker of poor physical health outcomes. [24]

Statistical Analysis

The statistical analysis is described in detail in the published protocol. [24] GHQ-12 items were reported using two methods. In the first method, item responses are assigned to the values 0, 0, 1, 1 (from the

most positive to the most negative sentiment) and summed to form an aggregate score from zero (least distressed) to 12 (most distressed). Using this method, a score of more than 3 is indicative of case-level distress. [30] The second method assigns responses to 0, 1, 2, 3 (positive to negative sentiment) producing a score in the range 0 to 36, with zero representing the most healthy response (no psychological distress) and 36 the most unhealthy (maximal psychological distress). By presenting the two different scoring methods, we can both report the prevalence of case level distress across the sample (0-0-1-1 scoring method) and more sensitively detect changes within the sample over the three phases of the pandemic (0-1-2-3 scoring method).

IES-R responses were analysed by assigning the responses to 0, 1, 2, 3, 4 (positive to negative) producing a score in the range 0 (no trauma) to 88 (maximal trauma). A score of 24 or above indicates a clinically significant traumatic stress response, a score above 33 indicates best cut-off for a diagnosis of 'probable post-traumatic stress disorder' (PTSD). [33,34]

The change over time in the GHQ-12 (phases 1, 2, and 3) and IES-R scores (phases 2 and 3) amongst participants who responded to all three surveys was examined with repeated measures linear mixed-effect models, with survey phase as the single fixed effect and a participant-level random effect. These model describe the association between pandemic phase and psychological distress (GHQ-12) and trauma (IES-R).

To identify potential modifiers of the change in GHQ-12-score or IES-R-score over time, further models were constructed for each of the measured personal and professional variables. Each model included the single variable of interest, survey phase, their interaction (to allow for a change in the association between the outcome and the variable over time), and a participant-level random effect as before.. Responses where the variable value was missing were removed. [35] Nagakawa's marginal R^2 was used to measure the proportion of outcome variance accounted for by the model (excluding random-effects, i.e., when there is no a-priori knowledge of the expected outcome for each participant). Values vary from 0 to 1, with 1 occurring when the model perfectly predicts the outcome, and 0 occurring when the model only returns the population average.

Finally, a comparison analysis done to compare distress and trauma outcomes in those who completed all 3 surveys against those who dropped out.

Software

All analyses and statistical outputs were produced in the statistical programming language R and the 'tidyverse', 'lme4' and 'ggeffects' packages were used for the mixed-effects models.[36–38]

Patient and Public Involvement

The study team contains frontline doctors from all represented specialties who undertook clinical work throughout the COVID-19 pandemic. This research is in line with recent RCEM research prioritisation and research recommendations. [39,40]

Role of the funding source

The sponsor and funder had no role at any stage of this work.

Results

Distribution across networks in the UK and Ireland generated 5440 responses. Follow-up responses from the peak and deceleration surveys were 3896 (71·6%) and 3079 (56·6%) respectively (figure 1). The final analysis cohort was 3079 participants, consisting of 1686 (54·8%) from EM, 1114 (36·2%) from Anaesthetics and 526 (17·1%) from ICM, with some participants working across multiple specialities.

The demographic and professional characteristics of the respondent population are summarised in Table 1. The cohort was 51·0% female, with a median age group of 36-40 years, and was representative of all professional grades. Respondents were 63·7% 'White British', 6·2% 'Irish', and '30·1% 'Ethnic Minority'; a full breakdown of ethnicity is provided in the online supplementary hub (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs). [41,42]

Table 1 Demographic and occupational characteristics of responders who completed all three study phases

	All (N=3079)	Emergency Medicine (N=1686)	Anaesthetics (N=1114)	Intensive Care Medicine (N=526)
Age				
20-25	111 (3·6%)	99 (5·9%)	3 (0·3%)	9 (1·7%)
26-30	737 (24·0%)	471 (28·0%)	184 (16·5%)	130 (24·8%)
31-35	682 (22·2%)	366 (21·7%)	242 (21·8%)	141 (26·9%)
36-40	497 (16·2%)	279 (16·6%)	177 (15·9%)	81 (15·5%)
41-45	406 (13·2%)	220 (13·1%)	156 (14·0%)	55 (10·5%)
46-50	282 (9·2%)	128 (7·6%)	133 (12·0%)	55 (10·5%)
51-55	203 (6·6%)	72 (4·3%)	121 (10·9%)	27 (5·2%)
56-60	107 (3·5%)	34 (2·0%)	63 (5·7%)	19 (3·6%)
>60	49 (1·6%)	14 (0·8%)	33 (3·0%)	7 (1·3%)
Missing	5	3	2	2
Gender				
Male	1455 (48·8%)	774 (47·4%)	542 (50·1%)	272 (53·8%)
Female	1522 (51·0%)	855 (52·4%)	538 (49·7%)	233 (46·0%)
Other	7 (0·2%)	4 (0·2%)	2 (0·2%)	1 (0·2%)
Missing	95	53	32	20
Seniority				
Junior Doctor	1089 (35·4%)	692 (41·0%)	276 (24·8%)	187 (35·6%)
Middle Grade Doctor	660 (21·4%)	357 (21·2%)	230 (20·6%)	129 (24·5%)
Other Senior Doctor	228 (7·4%)	156 (9·3%)	66 (5·9%)	34 (6·5%)
Senior Doctor (Consultant Grade)	1102 (35·8%)	481 (28·5%)	542 (48·7%)	176 (33·5%)
Geographical Region				
East Midlands	177 (5·7%)	78 (4·6%)	84 (7·5%)	24 (4·6%)
East of England	172 (5·6%)	87 (5·2%)	70 (6·3%)	29 (5·5%)
London	454 (14·7%)	319 (18·9%)	103 (9·2%)	42 (8·0%)
North East	132 (4·3%)	68 (4·0%)	47 (4·2%)	30 (5·7%)
North West	334 (10·8%)	149 (8·8%)	141 (12·7%)	78 (14·8%)
South East	355 (11·5%)	229 (13·6%)	105 (9·4%)	48 (9·1%)
South West	430 (14·0%)	208 (12·3%)	167 (15·0%)	76 (14·4%)
West Midlands	183 (5·9%)	89 (5·3%)	78 (7·0%)	44 (8·4%)
Yorkshire and the Humber	212 (6·9%)	90 (5·3%)	102 (9·2%)	55 (10·5%)
Northern Ireland	87 (2·8%)	41 (2·4%)	34 (3·1%)	20 (3·8%)
Scotland	253 (8·2%)	159 (9·4%)	80 (7·2%)	32 (6·1%)

Wales	92 (3·0%)	21 (1·2%)	62 (5·6%)	21 (4·0%)
Dublin	111 (3·6%)	82 (4·9%)	21 (1·9%)	16 (3·0%)
Rest of Ireland	87 (2·8%)	66 (3·9%)	20 (1·8%)	11 (2·1%)
Nation				
England	2449 (79·5%)	1317 (78·1%)	897 (80·5%)	426 (81·0%)
Northern Ireland	87 (2·8%)	41 (2·4%)	34 (3·1%)	20 (3·8%)
Republic of Ireland	198 (6·4%)	148 (8·8%)	41 (3·7%)	27 (5·1%)
Scotland	253 (8·2%)	159 (9·4%)	80 (7·2%)	32 (6·1%)
Wales	92 (3·0%)	21 (1·2%)	62 (5·6%)	21 (4·0%)
Ethnicity				
White British	1888 (63·7%)	949 (58·4%)	755 (70·3%)	338 (67·1%)
Irish	185 (6·2%)	118 (7·3%)	51 (4·7%)	33 (6·5%)
Ethnic minority	893 (30·1%)	557 (34·3%)	268 (25·0%)	133 (26·4%)
Missing	113	62	40	22
Redeployed				
Yes	249 (8·1%)	47 (2·8%)	196 (17·6%)	20 (3·8%)
No	2824 (91·9%)	1636 (97·2%)	916 (82·4%)	504 (96·2%)
Missing	6	3	2	2

Primary Outcomes

General Health Questionnaire-12

The prevalence of psychological distress, as defined by scores >3 on the GHQ-12 0-0-1-1 scoring method, was 44·7% (n=1334) in the acceleration survey, 36·9% (n=1098) at peak and 31·5% (n=918) during the deceleration phase. Median GHQ-12 scores were 13·0 (Q1-Q3, 10·0-17·0), 13·0 (Q1-Q3, 9·0-16·0) and 12·0 (Q1-Q3, 9·0-16·0) respectively (figure 2), and mean scores were 13·7, 13·2 and 12·9 across the acceleration, peak and deceleration surveys. Median distress scores were higher in the Anaesthetic and ICM cohorts at the acceleration phase when compared to EM, but these decreased in all three groups throughout the first pandemic wave.

Impact of Events Scale-Revised

The prevalence of psychological trauma, as defined by a score of >24 on the IES-R, was 23·7% (n=647) at peak and 17·7% (n=484) at deceleration. The prevalence of 'probable PTSD', as defined by a score of >33 was 12·6% (n=343) at peak and 10·1% (n=276) at deceleration. During the peak phase, prevalence of trauma (>24) was 24·9% (n=378) in EM, 21·5% (n=204) in anaesthetics and 24·9% (n=117) in ICM. Prevalence of 'probable PTSD' (>33) was higher in EM (13·9%, n=211) and ICM (13·6%, n= 64) when compared to Anaesthetics (10·8%, n=103). During the deceleration phase, prevalence of trauma (>24) decreased to 19·7% (n=93) in ICM and 18·7% (n=285) in EM. 'Probable PTSD' (>33) decreased to 11·1% (n=169) in EM, compared to 10·8% (n=51) in ICM and 8·8% (n=85) in Anaesthetics. The median IES-R was highest in the peak survey at 13 (Q1-Q3, 5-24), and 9 (Q1-Q3, 2-19) in the deceleration survey (see table 2 and figure 3).

Table 2. GHQ-12 and IES-R Scores for participants who responded to all 3 survey phases

	All (N=3079)	Emergency Medicine (N=1686)	Anaesthetics (N=1114)	Intensive Care Medicine (N=526)
Acceleration				

GHQ-12 (0123 score)				
Mean	13·7	13·3	14·4	14·0
Median (Q1, Q3)	13·0 (10·0, 17·0)	13·0 (10·0, 16·0)	14·0 (11·0, 18·0)	14·0 (10·2, 17·0)
GHQ-12 (0011 > 3)				
> 3	1334 (44·7%)	667 (40·7%)	542 (50·2%)	253 (49·6%)
N-Missing	92	48	34	16
Peak				
GHQ-12 (0123 score)				
Mean	13·2	12·8	13·6	13·6
Median (Q1, Q3)	13·0 (9·0, 16·0)	12·0 (9·0, 16·0)	13·0 (10·0, 17·0)	13·0 (10·0, 17·0)
GHQ-12 (0011 > 3)				
> 3	1098 (36·9%)	543 (33·3%)	454 (42·3%)	211 (41·1%)
N-Missing	105	56	40	13
IES-R score				
Mean	16·3	16·7	15·8	17·2
Median (Q1, Q3)	13·0 (5·0, 24·0)	13·0 (5·0, 24·0)	13·0 (6·0, 23·0)	14·0 (6·0, 24·0)
IES-R > 24				
IES-R-0123 > 24	647 (23·7%)	378 (24·9%)	204 (21·5%)	117 (24·9%)
IES-R > 33				
IES-R-0123 > 33	343 (12·6%)	211 (13·9%)	103 (10·8%)	64 (13·6%)
N-Missing	349	165	163	57
Deceleration				
GHQ-12 (0123 score)				
Mean	12·9	12·8	13·0	13·1
Median (Q1, Q3)	12·0 (9·0, 16·0)	12·0 (9·0, 16·0)	12·0 (9·0, 16·0)	12·0 (9·0, 17·0)
GHQ-12 (0011 > 3)				
> 3	918 (31·5%)	486 (30·2%)	340 (32·6%)	172 (34·6%)
N-Missing	165	78	71	29
IES-R score				
Mean	13·2	13·6	12·6	14·2
Median (Q1, Q3)	9·0 (2·0, 19·0)	9·0 (2·0, 20·0)	8·0 (2·0, 18·0)	9·0 (3·0, 20·0)
IES-R > 24				
IES-R-0123 > 24	484 (17·7%)	285 (18·7%)	159 (16·5%)	93 (19·7%)
IES-R > 33				
IES-R-0123 > 33	276 (10·1%)	169 (11·1%)	85 (8·8%)	51 (10·8%)
N-Missing	344	164	153	53

Secondary Outcomes

Risk Factors for Psychological Distress (GHQ-12) and Trauma (IES-R)

The overall strength of the relationship between participant factors and the two outcome measures, psychological distress and trauma, is summarised using Nagakawa's marginal R^2 (figures 4+5). The form of these univariable relationships is described graphically for the five variables with the highest R^2 values in figures 6 a-f. Graphs for the remaining variables are reported in online supplementary hub (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs).

Personal and Professional variables predicting distress (GHQ-12)

Worry of infecting family members due to clinical work (R^2 = 0·06) and worry of personal infection (R^2 = 0·05) were the two variables most strongly associated with distress. Figures 6a and 6b report the mean

GHQ-12-score for the levels within this variable. Those that were 'extremely worried' about infecting family had a mean GHQ-12-modelled score of 15·3 (95% CI, 15·0, 15·6), 15·1 (95% CI,14·8, 15·5) and 14·6 (95% CI,14·3, 15·0) during the acceleration, peak and deceleration respectively, compared with mean scores of 13·7, 13·2 and 12·9 respectively for all participants. For those who were 'extremely worried' about personal infection, the mean GHQ-12 modelled score was 16·6 (95% CI, 16·1, 17·1) during the acceleration period, compared with 10·9 (95% CI, 9·7, 12·1) for those who were 'not worried at all' about being infected. For the mean GHQ-12 modelled score for each of the other variables see the online link for the figures and values (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs).

Personal and Professional variables predicting trauma (IES-R)

For trauma, worry of infection of family members due to clinical role had the highest R^2 value (R^2 =0·10). Mean IES-R modelled score for those who were 'extremely worried' about infecting family was 23·0 (95% CI, 22·2, 23·8) during the peak compared to 10·0 (95% CI, 7·8, 12·2) for those who were 'not worried at all' during the peak (Fig 6c). This is significantly higher than the reported mean IES-R overall of 16·3.

Concern that COVID-19 would exacerbate symptoms of an established mental health condition (R^2 = 0·06) had the second highest R^2 value. Peak IES-R mean modelled scores were 23·3 (95% CI, 22·1, 24·4) in those who agreed with this statement compared to 15·2 (95% CI, 14·7, 15·7) in those who disagreed. Deceleration mean IES-R modelled scores remained high for those who agreed, 22·3 (95% CI, 21·1, 23·6). (Figure 6d)

Worry relating to personal infection due to clinical role (R^2 = 0·06) was again strongly associated with trauma. Figure 6e displays the mean IES-R modelled scores and demonstrates the peak (24·0 (95% CI, 22·5, 25·4)) and deceleration (20·3 (95% CI, 18·7, 21·8)) outcomes in participants who were 'extremely worried' compared to those who were 'not worried at all' during the peak (11·3 (95% CI 8·6, 14·0)) and deceleration (10·0 (95% CI 8·0, 12·0)).

Whilst ethnicity was not strongly associated with distress, it was a stronger predictor of trauma (R^2 = 0·03). Mean modelled trauma scores for 'Ethnic Minority' participants at peak was 18·8 (95% CI, 17·8, 19·8), compared to 'White British' participants of 15·1 (95% CI, 14·5, 15·8). (Figure 6f) For the mean IES-R modelled scores for each of the other variables see online link for the figures and values. (https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs)

Incidence of self-reported COVID-19 infection and isolation

By the deceleration phase of the pandemic 6·9% (n=212) of respondents had received a positive diagnosis of COVID-19 and 0·4% (n=12) had been admitted to hospital. A positive diagnosis did not have a significant effect in prediction of trauma (R^2=0·014).

Regional and national variation of psychological distress and trauma

The region in which participants worked was more valuable for predicting trauma (R^2 = 0·034), than for distress (R^2 = 0·016). The mean modelled score of the different regions within the UK and Republic of Ireland on IES-R is demonstrated in figure 7.

Drop-out by GHQ-12 and IES-R

Response rate for the peak and deceleration surveys was 71.6% and 56·6% respectively. There was no significant difference in either the GHQ-12 or IES-R scores between those who dropped out and those who remained in the study (see online supplement).

Discussion

In this prospective longitudinal survey of 3079 frontline doctors, the prevalence of psychological distress reached 44·7% during the acceleration phase, and reached 23·7% for trauma during the peak phase - these figures were substantially higher than for the general population. [43] For psychological distress, rates declined through peak and deceleration phases of the first wave to a level comparable to pre-pandemic levels. [44] Prevalence of 'probable PTSD' was 12·6% at peak and 10·1% at deceleration, demonstrating a degree of natural recovery. [45,46] However, just less than a quarter experienced sub-threshold post-trauma symptoms 30 days following the pandemic peak.

Personal factors were the most powerful predictors of both psychological distress and trauma. The most significant predictors relate to familial safety, personal safety, and established mental health conditions. These findings support aggregated data in recent reviews and meta-analyses on the key predictors of psychological distress in disaster or infectious outbreak settings. [1,7,21–23] However, it cannot be ignored that the psychological harm associated with both familial and personal safety may potentially be explained by the perceived (and reported) inadequate provision of PPE to frontline workers. [47,48] This is an area where improvements must be made in order to mitigate against future physical and psychological harms that novel pathogens present.

While most findings are consistent with existing research, our study also identifies ethnicity as a novel, key predictor of trauma. [49–51] This is unsurprising given higher rates of reported mortality in ethnic minority groups with this particular pandemic. [52] However the nature and direction of relationship between these risk factors and poorer outcomes is undoubtedly complex. Ongoing work continues to seek further understanding in this area. [53]

Rates of trauma were high across all three specialty groups. One in four doctors met the clinical threshold, with the highest rates seen in EM and ICM. This is likely explained by their clinical roles during the pandemic, in which they were exposed to a higher volume of COVID-19 positive patients compared to Anaesthetic colleagues. However, it is important to note that the rate of trauma seen in Anaesthetics was also of concern. At the deceleration phase, EM doctors had higher rates of 'probable PTSD' (IES-R >33), whereas ICM doctors had a higher prevalence of trauma (IES-R >24). This may

reflect the later peak in ICUs when compared to EM [54] or the potential impact of downstream mortality. Further work should explore longer term outcomes in all cohorts.

It is evident from our longitudinal data that vulnerability to poorer psychological outcomes may be predicted by certain characteristics and therefore potentially mitigated through targeted intervention. Studies examining psychiatric outcomes in SARS reflect that psychological distress is likely to persist. Identification of those likely to experience adversity, and interventions to mitigate these, must begin now. [8,10,55,56] Without appropriate support and intervention doctors are likely to experience long-term effects on mental health, resulting in increased sickness rates, absenteeism, impaired performance at work, and the development of physical health problems. [8,10,12,57,58] Therefore the early identification of ongoing psychological distress will be pivotal in influencing the longer-term mental health of frontline workers. Based on research from COVID-19 and other pandemics, we can be certain that rates and severity of distress will rise following this second wave of the pandemic. We now know that doctors are working on the frontline while carrying the heavy burden of fear of infecting themselves, or critically, family members, while some continue to battle high levels of psychological distress. This distress was evident in the lead up to the first peak, but sustained well beyond this time point. Doctors are continuing to work in very highly pressured, high risk environments with a significant proportion doing so despite clinical levels of distress. Policymakers and professional bodies should urgently seek to develop an overarching 'best practice' pathway to support all healthcare staff in these environments.

While various interventions are recommended specifically for frontline workers there is common agreement in the necessity for basic psychosocial interventions (i.e. sleep hygiene, exercise, health behaviour) to facilitate return to equilibrium [59–62], yet these measures are not always sufficient to ameliorate persistent distress. It is crucial that an overarching 'best practice' pathway and package of care is implemented to help support staff now and for the future. This must be evidence-based, multilevel, starting with the 'individual' level and moving though to 'organisational' level intervention, including (a) mobilisation of formal peer & organisational support structures, (b) mechanisms for recognising and monitoring distress, and (c) offer clear referral pathways to evidence-based interventions. Access to appropriate psychological support is imperative; cognitive behavioural therapy is recommended by the National Institute for health and Care Excellence (NICE) to ameliorate anxiety, depression and PTSD [63,64] however further work is needed to ensure these interventions this are suitably tailored to the practicalities of shift work and the unique experiences faced by frontline clinicians. With this, there is a responsibility to ensure equality in the provision of care and pathways to access, for this is likely to be necessary for many.

Strengths and Weaknesses

This is a large-scale longitudinal study examining prevalence of psychological distress in doctors in the UK and Ireland, offering a robust and reliable measure of the impact of COVID-19 on the mental health of frontline doctors, and allows comparison with other pandemic mental health trajectories. Due to the three-phase prospective design and extent of data collected, findings from this study can be reliably

used to inform the development of preparations and interventions to mitigate the impact of COVID-19 and future infectious disease outbreaks on mental health in frontline doctors.

However, there are limitations that may influence our findings. The reported rates of distress and trauma do not take account of any pre-existing psychiatric morbidity or historical factors that may predispose doctors to developing mental health difficulties in these circumstances. [40,65–67] Data was gathered with regards to historical trauma, one of the most significant predictors of mental health difficulties long-term. Furthermore, whilst the sample size is large, any self-reporting measure is open to selection bias. This may have resulted in a biased sample with particularly high or low levels of distress and trauma. However, in the follow-up surveys (peak and deceleration) there was no difference in acceleration distress or trauma scores between those who dropped out and those who continued; yet we are unable to comment on those who declined to participate. Whilst the two primary outcome measures, GHQ-12 and IES-R, have good psychometric properties, there is a concern that survey data may overstate the prevalence of cases when compared to formal diagnostic interviews such as the SCID (The Structured Clinical **Interview** for DSM-IV Axis I Disorders); this is difficult to implement in such large samples, thus we cautiously avoid inference of definite diagnosis.

While the protocol was closely adhered to, variation in regional peaks may have influenced accurate capturing of psychological distress and trauma rates. It is noted that whilst the acceleration phase is study 'baseline', as the pandemic was present and proliferating in the UK at the acceleration phase, it more accurately represents the initial stress associated with a rapidly spreading highly infectious virus of unknown pathogenic origins and no effective treatment; a reasonable response to the context. Future research should continue to follow frontline doctors through the pandemic and beyond, to assess whether the mental health trajectories are similar to other infectious disease pandemics.

Conclusion

Our findings reflect a pattern of elevated distress during the acceleration and peak phase of the current pandemic, some degree of natural recovery and a significant minority continuing to experience residual ongoing distress. It is essential that policymakers and professional bodies seek to prevent future adverse effects through provision of vital equipment to mitigate both physical and psychological harm and the development of clear pathways to effective psychological care. Moving forward, it is essential the COVID-19 pandemic serves as a foundation for significant development and growth in all of these areas and that there is ongoing assessment of the psychological health of healthcare workers both during the pandemic and beyond.

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Author Contributions

The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. Tom Roberts (TR) conceived the idea for the study. TR, Edd Carlton (EC), Jo Daniels (JD), Mark Lyttle (ML), and Blair Graham (BG) were responsible for the initial study design, which was refined with the help of Katie Samuel (KS), Charles Reynard (CR), Robert Hirst (RH), Michael Barrett (MB), Daniel Horner (DH) and William Hulme (WH). Expert advice on psychological assessment scores was provided by JD. WH provided the statistical plan. TR and DH lead the dissemination of the study in UK Adult Emergency Departments (ED), ML lead the dissemination of the study in UK and Ireland Paediatric EDs, KS lead the dissemination of the study in UK Anaesthetic and ICU Departments, MB lead the dissemination of the study in Ireland EDs, along with John Cronin, James Foley and Etimbuk Umana. Joao Vinagre lead the dissemination in Ireland ICUs and Anaesthetic Departments. TR coordinated study set-up, finalisation of the study surveys and finalisations of study protocols. All authors contributed to the final study design and protocol development, critically revised successive drafts of the manuscript and approved the final version. The study management group is responsible for the conduct of the study.

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Competing interests

Many of the authors have been working as frontline clinicians during the COVID-19 pandemic. They have no competing interests to declare.

Data Sharing

Deidentified participant data will be made available for 2 years post publication. Requests for access will require HRA and ethical approval and decisions regarding data sharing will be made after discussion with the study senior authors. Statistical code and study figures are available directly from: https://github.com/wjchulme/TERN-CERA-study/tree/main/outputs.

Trainee Emergency Research Network (TERN) Collaborators:

L	Kane	Aberdeen Royal Infirmary	R	Hannah	Royal Alexandra Children's Hospital
L	Mackenzie	Addenbrooke's Hospital, Cambridge	A	Corfield	Royal Alexandra Hospital, Scotland
S	Sharma Hajela	Addenbrooke's Hospital, Cambridge	J	Maney	Royal Belfast Hospital for Sick Children
J	Phizacklea	Addenbrooke's Hospital, Cambridge	D	Metcalfe	Royal Berkshire Hospital
K	Malik	Addenbrooke's Hospital, Cambridge	S	Timmis	Royal Berkshire Hospital
N	Mathai	Aintree University Hospital	C	Williams	Royal Bolton Hospital
A	Sattout	Aintree University Hospital	R	Newport	Royal Bolton Hospital
S	Messahel	Alder Hey Children's Hospital, Liverpool	D	Bawden	Royal Cornwall Hospital
E	Fadden	Alder Hey Children's Hospital, Liverpool	A	Tabner	Royal Derby Hospital
R	McQuillan	Altnagelvin Area Hospital, N. Ireland	H	Malik	Royal Devon and Exeter Hospital
B	O'Hare	Antrim Area Hospital, N. Ireland	C	Roe	Royal Devon and Exeter Hospital
P	Turton	Arrowe Park Hospital, Merseyside	D	McConnell	Royal Devon and Exeter Hospital
S	Lewis	Arrowe Park Hospital, Merseyside	F	Taylor	Royal Free London
D	Bewick	Barnsley Hospital	R	Ellis	Royal Glamorgam Hospital, Wales
R	Taylor	Bath Royal United Hospital	S	Morgan	Royal Gwent Hospital, Wales
I	Hancock	Bath Royal United Hospital	L	Barnicott	Royal Hampshire County Hospital
D	Manthalapo Ramesh Babu	Bedford Hospital, Bedfordshire	S	Foster	Royal Hospital for Children, Glasgow
S	Hartshorn	Birmingham Children's Hospital	J	Browning	Royal Hospital for Sick Children
M	Williams	Birmingham Children's Hospital	L	McCrae	Royal Hospital for Sick Children, Edinburgh
A	Charlton	Bradford Royal Infirmary	E	Godden	Royal Infirmary Hospital, Edinburgh
L	Somerset	Bristol Royal Hospital for Children	A	Saunders	Royal Infirmary Hospital, Edinburgh
C	Munday	Bristol Royal Hospital for Children	A	Lawrence-Ball	Royal Liverpool University Hospital
A	Turner	Bristol Royal Hospital for Children	R	House	Royal Liverpool University Hospital
R	Sainsbury	Bristol Royal Infirmary	J	Muller	Royal London Hospital
E	Williams	Bristol Royal Infirmary	I	Skene	Royal London Hospital
S	Patil	Chelsea & Westminster Hospital	M	Lim	Royal London Hospital
R	Stewart	Chelsea & Westminster Hospital	H	Millar	Royal Manchester Children's Hospital
M	Winstanley	Chelsea & Westminster Hospital	A	Rai	Royal Manchester Children's Hospital
N	Tambe	Chesterfield Royal hospital	K	Challen	Royal Preston Hospital
C	Magee	City Hospital, Birmingham	S	Currie	Royal Preston Hospital
D	Raffo	Craigavon Area Hospital, N. Ireland	M	Elkanzi	Royal Stoke University Hospital
D	Mawhinney	Craigavon Area Hospital, N. Ireland	T	Perry	Royal Surrey County Hospital
B	Taylor	Cumberland Infirmary, Cumbria	W	Kan	Royal Surrey County Hospital
T	Hussan	Darlington Memorial Hospital	L	Brown	Royal Sussex County Hospital
G	Pells	Darlington Memorial Hospital	M	Cheema	Royal Sussex County Hospital
F	Barham	Derriford Hospital, Plymouth	A	Clarey	Royal Victoria Hospital
F	Wood	Derriford Hospital, Plymouth	A	Gulati	Royal Victoria Infirmary
C	Szekeres	East Surrey Hospital	K	Webster	Royal Victoria Infirmary
R	Greenhalgh	East Surrey Hospital	A	Howson	Salford Royal NHS Foundation Trust

S	Marimuthu	Eastbourne Hospital
R	Macfarlane	Epsom and St Helier Hospitals
M	Alex	Evelina Children's Hospital, London
B	Shrestha	Frimley Park Hospital
L	Stanley	Gloucester Royal Hospital
J	Gumley	Gloucester Royal Hospital
K	Thomas	Gloucester Royal Hospital
M	Anderson	Great North Children's, Newcastle
C	Weegenaar	Great Western Hospital, Swindon
J	Lockwood	Harrogate Hospital
T	Mohamed	Heartlands's Hospital, Birmingham
S	Ramraj	Hillingdon Hospital, London
M	Mackenzie	Homerton Hospital, London
A	Robertson	Homerton Hospital, London
W	Niven	Homerton Hospital, London
M	Patel	Homerton Hospital, London
S	Subramaniam	Horton General Hospital, Banbury
C	Holmes	Huddersfield Royal Infirmary
S	Bongale	Inverclyde Royal Hospital
U	Bait	Ipswich Hospital
S	Nagendran	Ipswich Hospital
S	Rao	Ipswich Hospital
F	Mendes	James Paget Hospital
P	Singh	John Radcliffe Hospital, Oxford
S	Subramaniam	John Radcliffe Hospital, Oxford
T	Baron	John Radcliffe Hospital, Oxford
C	Ponmani	King George Hospital
M	Depante	King's College Hospital, London
R	Sneep	King's College Hospital, London
A	Brookes	King's College Hospital, London
S	Williams	King's College Hospital, London
A	Rainey	King's College Hospital, London
J	Brown	Kingston Hospital, London
N	Marriage	Kingston Hospital, London
S	Manou	Leeds General Infirmary
S	Hart	Leeds General Infirmary
M	Elsheikh	Leeds General Infirmary
L	Cocker	Leicester Royal Infirmary
MH	Elwan	Leicester Royal Infirmary
K L	Vincent	Leicester Royal Infirmary
C	Nunn	Leicester Royal Infirmary
N	Sarja	Lister Hospital, Stevenage
M	Viegas	Luton & Dunstable Hospital
E	Wooffinden	Manchester Royal Infirmary
C	Reynard	Manchester Royal Infirmary
N	Cherian	Manchester Royal Infirmary
R	Doonan	Salford Royal NHS Foundation Trust
C	Magee	Sandwell Hospital
A	Trimble	Sheffield Children's Hospital
C	O'Connell	Sheffield Children's Hospital
R	Wright	Southampton General
E	Colley	Southmead Hospital, Bristol
C	Rimmer	Southport Hospital, Merseyside
S	Pintus	Southport Hospital, Merseyside
H	Jarman	St George's Hospital, London
V	Worsnop	St George's Hospital, London
S	Collins	St Helier Hospital
M	Colmar	St John's Hospital, Livingston
N	Masood	St John's Hospital, Livingston
R	McLatchie	St John's Hospital, Livingston
A	Peasley	Stepping Hill Hospital
S	Rahman	Stoke Mandeville Hospital
N	Mullen	South Tyneside and Sunderland NHS Trust
L	Armstrong	The Royal Berkshire Hospital, Reading
A	Hay	The Whittington Hospital, London
R	Mills	The Whittington Hospital, London
J	Lowe	Torbay Hospital, Devon
H	Raybould	Torbay Hospital, Devon
A	Ali	Torbay Hospital, Devon
P	Cuthbert	Ulster Hospital Dundonald, N. Ireland
S	Taylor	University College London Hospital
V	Talwar	University College London Hospital
Z	Al-Janabi	University Hospital Ayr, Scotland
C	Leech	University Hospital Coventry
J	Turner	University Hospital Coventry
L	McKechnie	University Hospital Crosshouse, Scotland
B	Mallon	University Hospital Crosshouse, Scotland
J	McLaren	University Hospital Crosshouse, Scotland
Y	Moulds	University Hospital Crosshouse, Scotland
L	Dunlop	University Hospital Hairmyres, Scotland
FM	Burton	University Hospital Hairmyres, Scotland
S	Keers	University Hospital Lewisham, London
L	Robertson	University Hospital Lewisham, London
D	Craver	University Hospital Lewisham, London
N	Moultrie	University Hospital Monklands, Scotland
O	Williams	University Hospital of North Tees
S	Purvis	University Hospital of North Tees
M	Clark	University Hospital of North Tees
C	Davies	University Hospital of Wales, Cardiff
S	Foreman	University Hospital of Wales, Cardiff
C	Ngua	University Hospital of Wales, Cardiff
D	George	University Hospital of Wales, Cardiff

A	Da-Costa	Medway NHS Foundation Trust
S	Duckitt	Medway NHS Foundation Trust
J	Bailey	Milton Keynes University Hospital
L	How	Milton Keynes University Hospital
T	Hine	Milton Keynes University Hospital
F	Ihsan	Milton Keynes University Hospital
H	Abdullah	Milton Keynes University Hospital
K	Bader	Milton Keynes University Hospital
S	Pradhan	Milton Keynes University Hospital
M	Manoharan	Milton Keynes University Hospital
C	Battle	Morriston Hospital, Wales
L	Kehler	Wolverhampton NHS Trust
R	Muswell	Newham University Hospital, London
M	Bonsano	Newham University Hospital, London
J	Evans	Norfolk and Norwich Hospitals
E	Christmas	North Hampshire Hospital, Basingstoke
K	Knight	North Middlesex Hospital, London
L	O'Rourke	North Tees Hospital, Stockton on Tees
K	Adeboye	North Tees Hospital, Stockton on Tees
K	Iftikhar	Northern General Hospital, Sheffield
R	Evans	Northern General Hospital, Sheffield
R	Darke	Northumbria Specialist Emergency Hospital
R	Freeman	Northumbria Specialist Emergency Hospital
E	Grocholski	Northwick Park Hospital, London
K	Kaur	Peterborough City Hospital
H	Cooper	Peterborough City Hospital
M	Mohammad	Princess Royal Hospital, London
L	Harwood	Princess Royal Hospital, London
K	Lines	Queen Alexandra Hospital, Portsmouth
C	Thomas	Queen Alexandra Hospital, Portsmouth
D	Ranasinghe	Queen Alexandra Hospital, Portsmouth
S	Hall	Queen Elizabeth Hospital
J	Wright	Queen Elizabeth Hospital
S	Hall	Queen Elizabeth Hospital
N	Ali	Queen Elizabeth Hospital
J	Hunt	Queen Elizabeth Hospital, Birmingham
H	Ahmad	Queen Elizabeth Queen's Mother, Margate
C	Ward	Queen Elizabeth Hospital, Glasgow
M	Khan	Queens Medical Centre, Nottingham
K	Holzman	Redhill Hospital, Surrey
J	Ritchie	Rotherham Hospital
A	Hormis	Rotherham Hospital
J	Morgan	University Hospital of Wales, Cardiff
D	George	University Hospital of Wales, Cardiff
N	Hoskins	University Hospital of Wales, Cardiff
J	Fryer	University Hospital Southampton
R	Wright	University Hospital Southampton
L	Frost	University Hospital Southampton
P	Ellis	University Hospital Southampton
A	Mackay	University Hospital Wishaw, Scotland
K	Gray	Victoria Hospital, Kirkcaldy, Scotland
M	Jacobs	Watford General Hospital
I	Musliam Veettil Asif	West Middlesex university hospital
P	Amiri	West Middlesex university hospital
S	Shrivastava	West Middlesex university hospital
F	Raza	West Middlesex university hospital
S	Wilson	Wexham Park Hospital
M	Riyat	Wexham Park Hospital
H	Knott	Wexham Park Hospital
M	Ramazany	Whiston Hospital, Merseyside
S	Langston	Whiston Hospital, Merseyside
N	Abela	Whiston Hospital, Merseyside
L	Robinson	Whittington Hospital, London
D	Maasdorp	Whittington Hospital, London
H	Murphy	Whittington Hospital, London
H	Edmundson	Whittington Hospital, London
R	Das	Whittington Hospital, London
C	Orjioke	Whittington Hospital, London
D	Worley	Whittington Hospital, London
W	Collier	Whittington Hospital, London
J	Everson	Whittington Hospital, London
N	Maleki	Whittington Hospital, London
A	Stafford	Whittington Hospital, London
S	Gokani	Whittington Hospital, London
M	Charalambos	Whittington Hospital, London
A	Olajide	Whittington Hospital, London
C	Bi	Whittington Hospital, London
J	Ng	Whittington Hospital, London
S	Naeem	William Harvey Hospital, Kent
J	Anandarajah	Wrexham Maelor Hospital, Wales
A	Hill	Wythenshawe Hospital, Manchester
C	Boulind	Yeovil District Hospital

Ireland Trainee Emergency Research Network (I-TERN) Collaborators:

R	O'Sullivan	Bon Secours Hospital Cork, Ireland
S	Gilmartin	Children's Health Ireland at Crumlin, Ireland

S	Uí Bhroin	Children's Health Ireland at Tallaght, Ireland
P	Fitzpatrick	Children's Health Ireland at Temple Street, Ireland
A	Patton	Cork University Hospital, Ireland
M	Jee Poh Hock	Galway Hospital, Ireland
S	Graham	Mater Misericordiae University Hospital, Ireland
S	Kukaswadia	Mercy University Hospital, Ireland
C	Prendergast	Midlands Regional Hospital Tullamore, Ireland
A	Ahmed	Sligo University Hospital, Ireland
C	Dalla Vecchia	St Vincent's University Hospital, Ireland
J	Lynch	Tallaght University Hospital, Ireland
M	Grummell	Tallaght University Hospital, Ireland
I	Grossi	University Hospital Limerick, Ireland
B	MacManus	University Hospital Waterford, Ireland

Research and Audit Federation of Trainees (RAFT), Trainee Research in Intensive Care (TRIC) and Specialist Anaesthesia Trainee led Audit and Research Network (SATURN) Collaborators:

K	Samuel	North Bristol NHS Trust
A	Boyle	Royal Victoria Hospital, Belfast
A	Waite	Royal Liverpool University Hospital
B	Johnson	University of Liverpool
J	Vinagre	Children's Health Ireland at Temple Street

Figure Legend

Figure 1 Participant Flowchart
Figure 2 GHQ-12 Scores
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Figure 4 GHQ-12 Variance Explained Model
Figure 5 IES-R Variance Explained Model
Figure 6a-f GHQ-12 and IES-R Modelled Outcomes
Figure 7 IES-R Outcome – Region

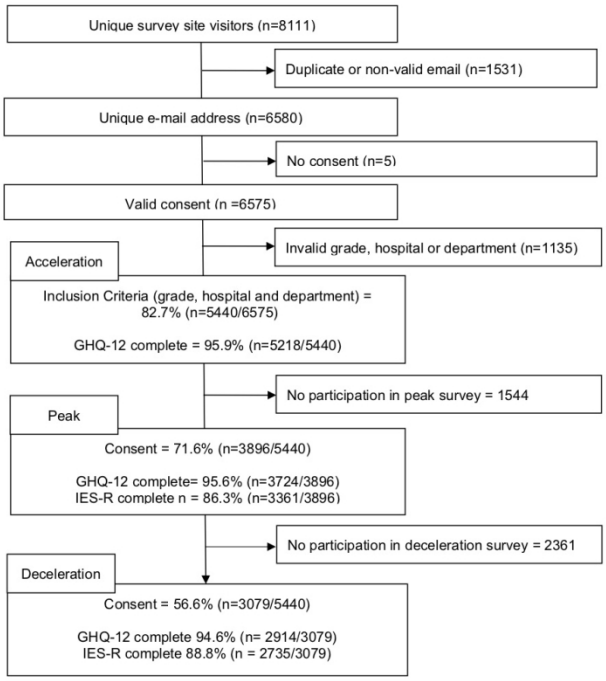

Figure 1. Participant flowchart

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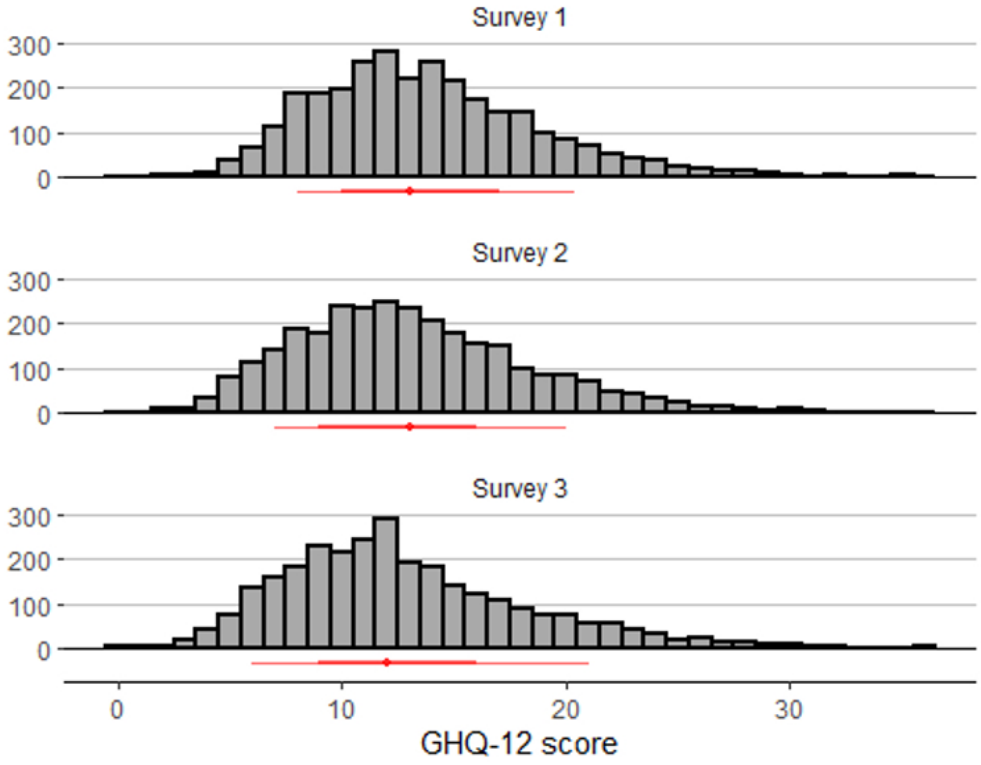


Figure 2. GHQ-12 Scores

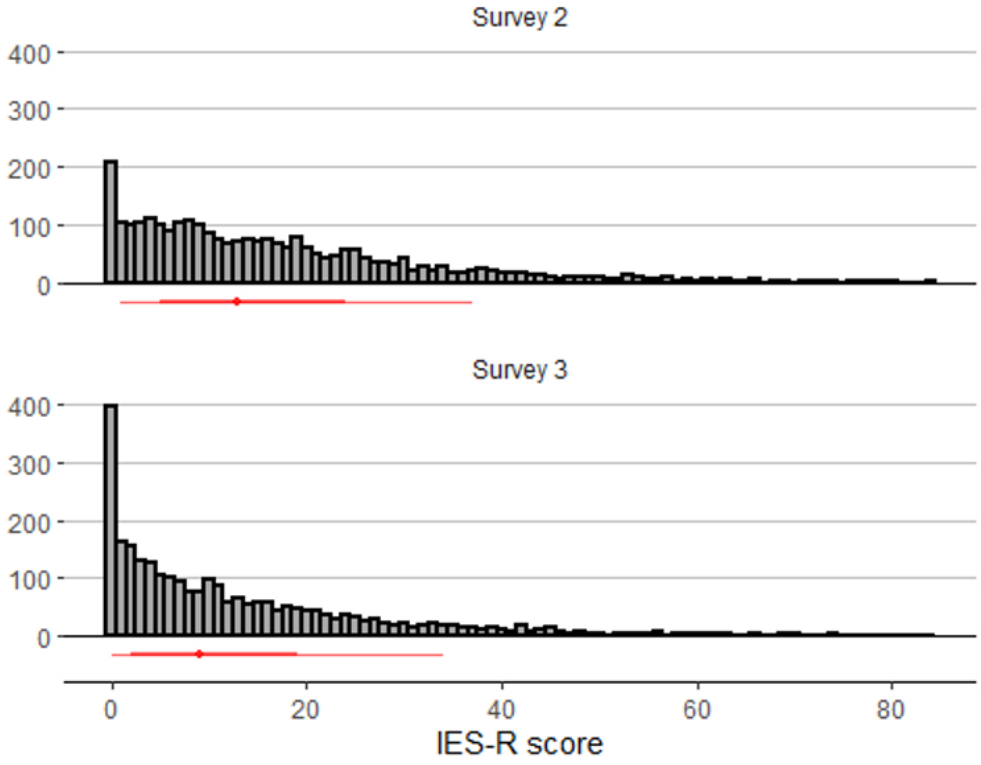


Figure 3. IES-R Scores

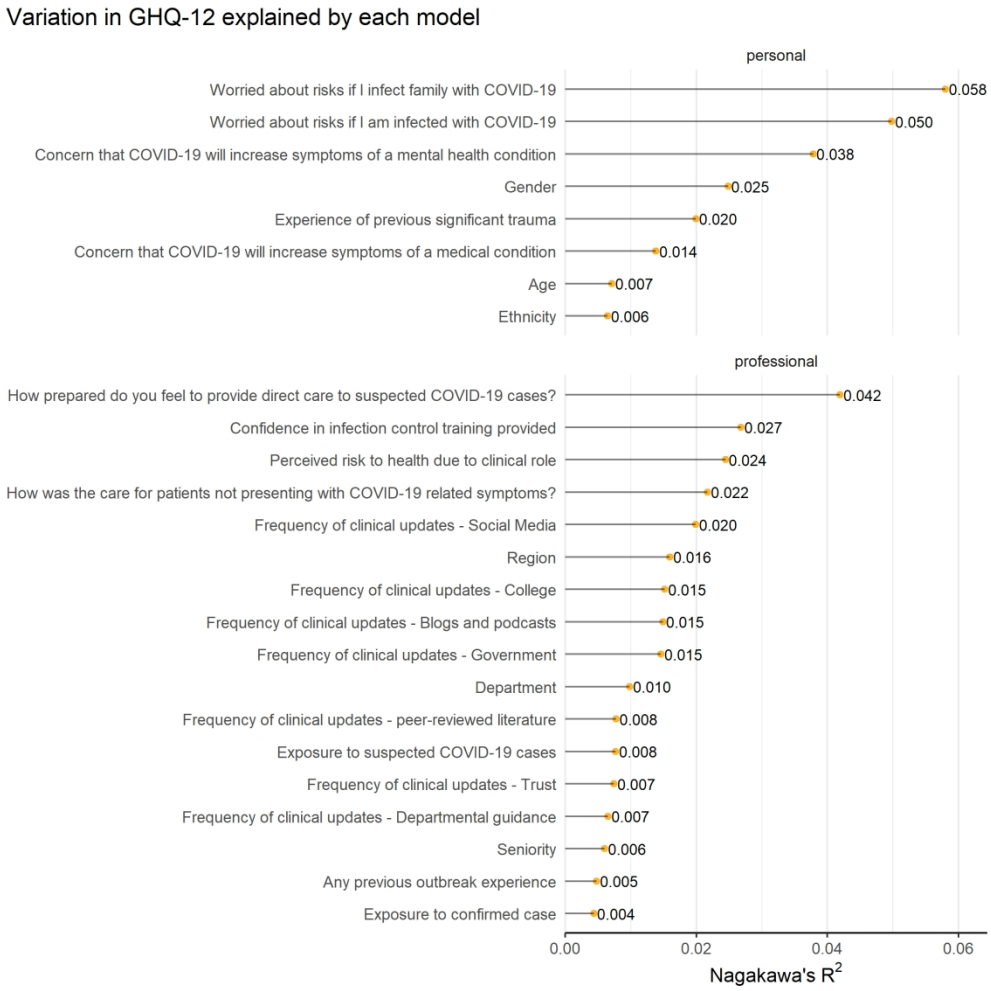


Figure 4. GHQ-12 variance explained model

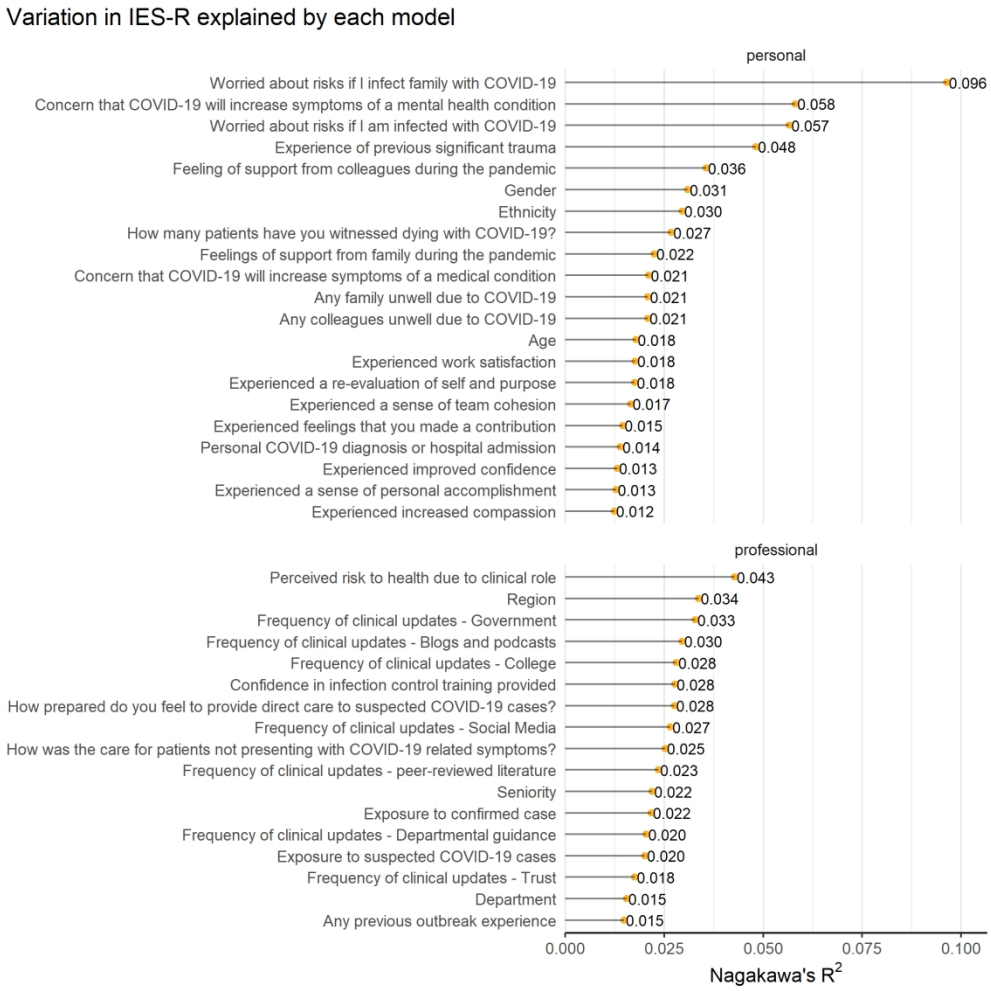


Figure 5. IES-R variance explained model

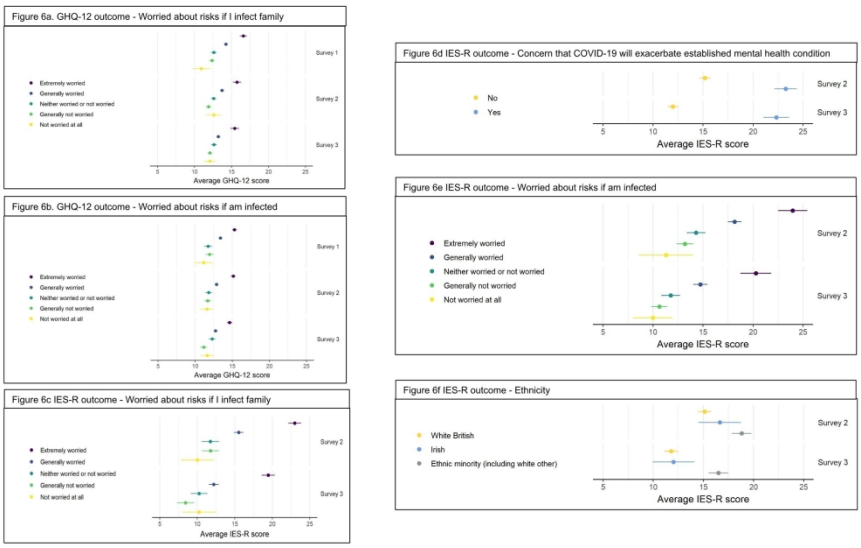


Figure 6a-f - GHQ-12 and IES-R Modelled outcomes.

705x396mm (96 x 96 DPI)

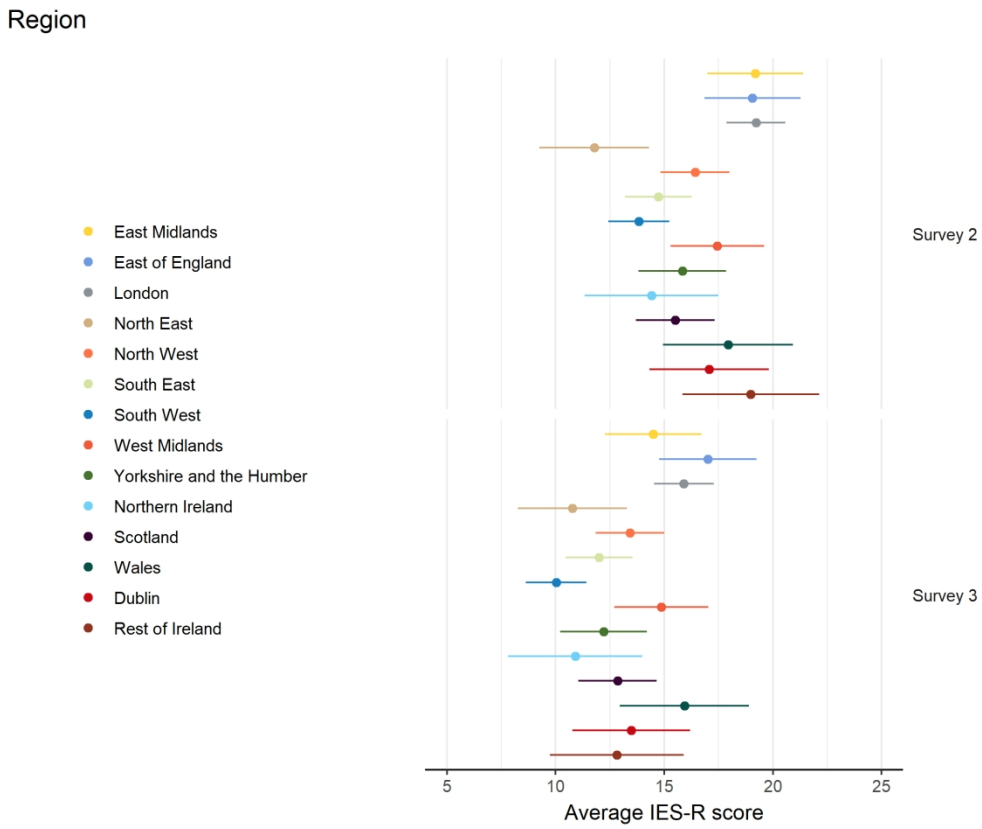
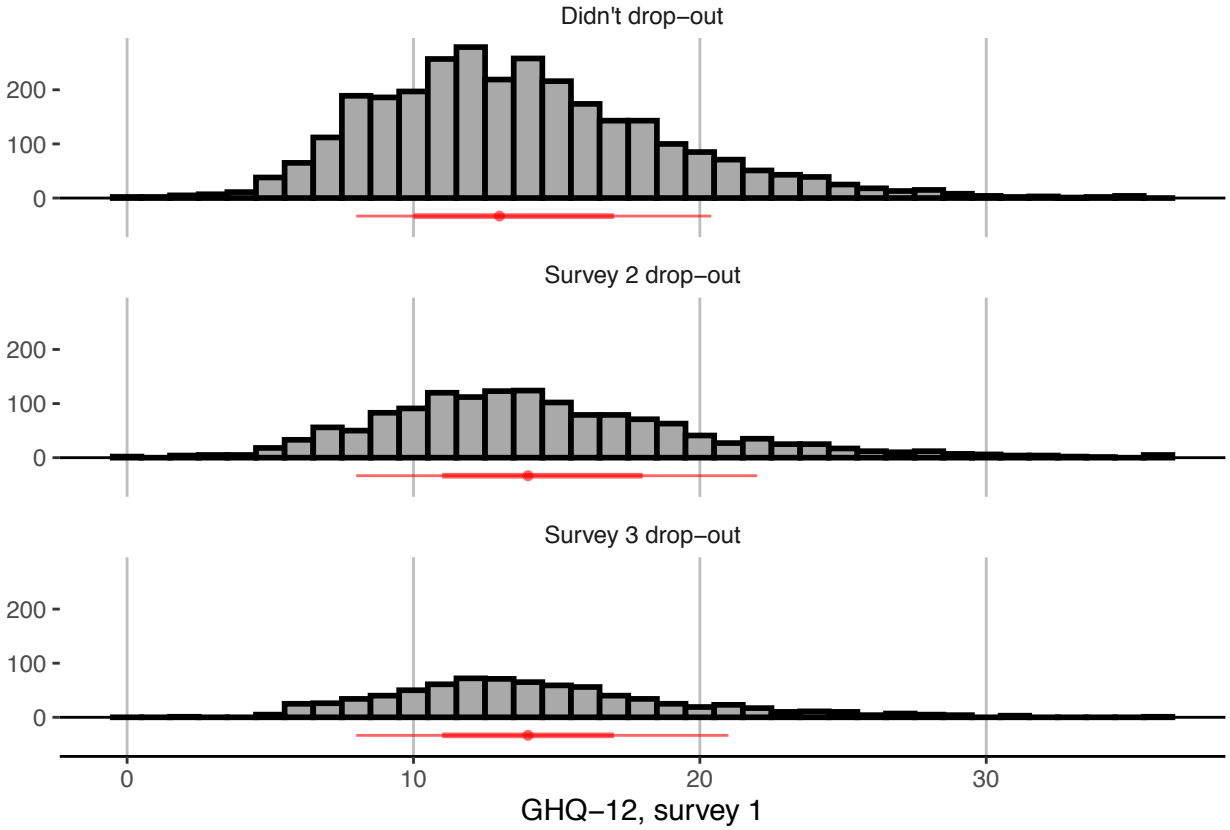


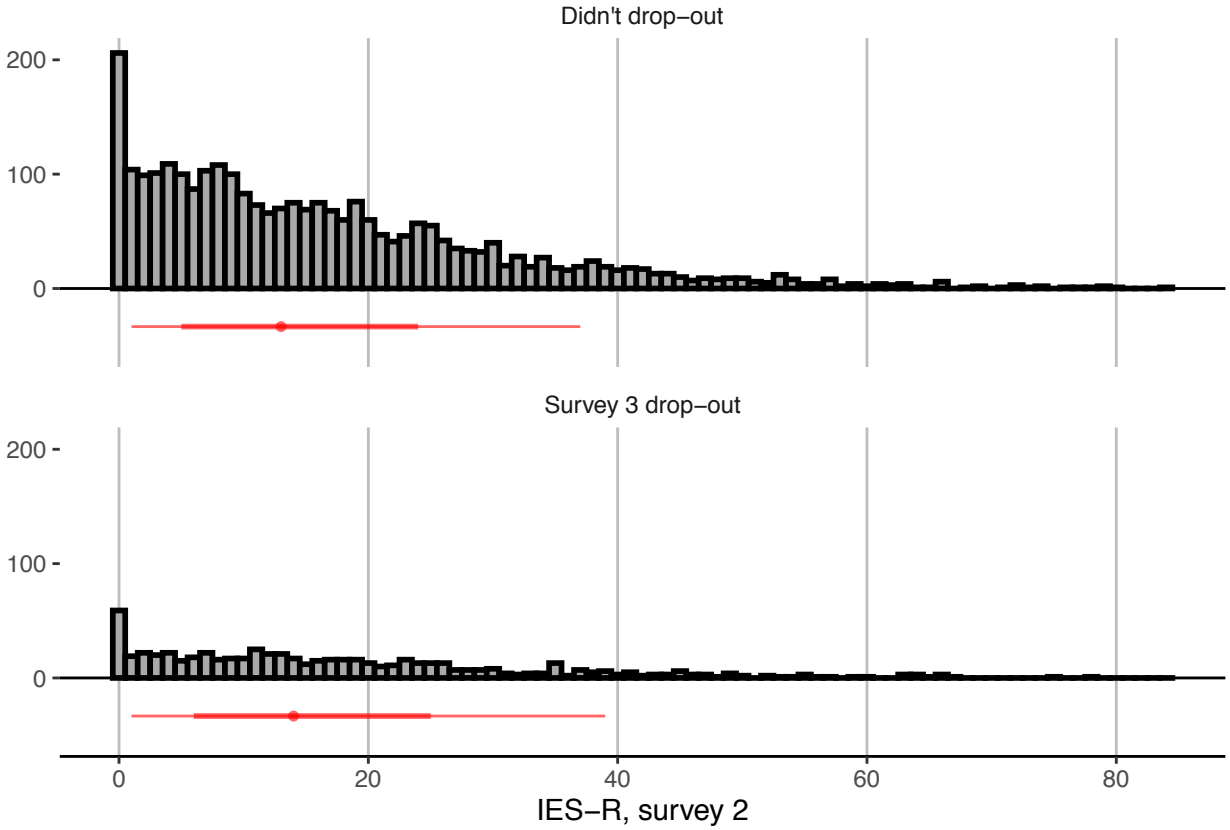
Figure 7. IES-R Outcome - Region

CERA Online Supplement - Content

Drop out rate for surveys 2 and 3 by survey 1 GHQ-12 score



Drop out rate for survey 3 by survey 2 IES-R score



CERA Survey

Thank you for taking the time to answer these questions. This survey will take less than 4 minutes.

Thank you for taking the time to consider taking part in the COVID-19 Emergency Response Assessment (CERA Study).

It is important that you read this information, so that you understand the purpose of the study and how we will treat your data.

What is the CERA study?
The CERA study consists of three questionnaires that will be conducted during the current COVID-19 outbreak. The CERA study will assess how you are feeling about your general health, anxiety levels, and mood at three points in time. Separate questionnaires will be issued before, during, and after the peak of the current COVID-19 outbreak.

What is the purpose of the CERA study?
This study will provide information regarding how staff working in Emergency care settings are feeling whilst working during the current COVID-19 outbreak. Full analysis of data will help identify how emergency staff can be better supported during future disease outbreaks.

Who has organised the CERA study?
The CERA study is led by the Trainee Emergency Research Network (TERN), in association with the Paediatric Emergency Research in the UK and Ireland (PERUKI) and Research and Audit Federation of Trainees (RAFT).
The CERA study is supported by the UK Royal College of Emergency Medicine (RCEM).

Has the CERA study received external approval?
Yes, the CERA study has received University Ethics Approval from the University of Bath (Ref: 4421). The CERA study has been approved by the Health Research Authority (HRA).

What will happen if I take part?
There will be three separate e-surveys to complete, including this one. Each survey is completed online, and will take between about 3 and 5 minutes. Surveys will be issued at different times.

You be required to submit your email address as part of this survey, which will allow us to invite you to participate in the other two surveys. You are not required to submit any additional personal identifiable information. We will remove your email address from data, prior to analysis.

Are there any potential risks?
Some of the issues explored will be sensitive, and we understand that this may be a challenging time for you. We have included some information about sources that you might wish to contact within this survey.

How will you protect my data and ensure confidentiality?
North Bristol NHS Trust is supporting this study and will be responsible for looking after your information and using it properly. The data collected will be stored for 5 years after the study has finished.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. We will collect only personal identifiable information possible.

This study is also compliant with the General Data Protection Regulations (GDPR).

Do I have to take part?
You are under no obligation to take part, and you may withdraw at any point without giving a reason.

What will happen to my data if I withdraw my involvement?
If you choose to withdraw your involvement in the study, any results that you have submitted will be kept for analysis. However, you will not be required to input further into the study.We will need to use information from you for this research project. This information will include your email address. People will use this information to do the research or to check your records to make sure that the research is being done properly. Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

What are your choices about how your information is used?
You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have.

Where can you find out more about how your information is used?
You can find out more about how we use your information
• at www.hra.nhs.uk/information-about-patients/

• our leaflet available from www.nbt.nhs.uk/PatientResearchdata
• by asking one of the research team
• by contacting Helen Williamson (Head of Information Governance) at helen.e.williamson@nbt.nhs.uk, or by ringing 0117 41 44767.

Who can I contact if I have any questions?
Please contact Dr Tom Roberts (Chief Investigator) at tern@rcem.ac.uk if you have any questions.

What to do if you need support about wellbeing
The following organisations can help provide advice and support with regards to your wellbeing.

-Your occupational health department (contact details available via your employer)
-Your general practitioner
- https://anaesthetists.org/Home/Wellbeing-support
-BMA Counselling Service (24 Hours). Telephone 0330 123 1245. (Note that you do not have to be a member of the BMA to access this service)
-The Samaritans (24 Hours). Telephone 116 123.

For the attention of Irish Clinicians:
The following organisations can help provide advice and support with regards to your wellbeing in the Republic of Ireland.

-HSE Workplace Health and Wellbeing Unit - Contact Dr Lynda Sisson HR.wellbeing@hse.ie

-The Employee Assistance and Counselling Service (EAC)

-Pieta House www.pieta.ie or call 188 247 247

-Your Mental Health www.yourmentalhealth.ie

-Practitioner Health (Ireland). Telephone 01 297 0356

Specific Consent statement for the Republic of Ireland

I consent to the processing of my personal data as set out in the information leaflet for the research purposes that are part of the CERA study - Consent using the button in the next question.

Do you want to read the participant information sheet now?
◯ Yes
◯ No

If you would like to download the patient information sheet to read later, please download the link below.

[Attachment: "CERA PIS V 1.1.docx"]

Consent and Identifiers

By checking this box, I certify that I am at least 18 years old and that I give my consent freely to participate in this study.	☐ I consent
What is your e-mail address? (This will only be used for the delivery of survey 2 + 3, which you will receive over the coming months)	_____

About you

What is the name of the hospital where you currently work?
Please type and your hospital should appear, if not present select "other"

- ◯ Aberdeen Royal Infirmary
- ◯ Addenbrooke's Cambridge University Hospital
- ◯ Aintree University Hospital
- ◯ Airedale NHS Foundation Trust
- ◯ Alder Hey Children's Hospital NHS Foundation Trust
- ◯ Altnagelvin Area Hospital
- ◯ Aneurin Bevan Health Board
- ◯ Ayr University Hospital Ayr. NHS A&A
- ◯ Havering & Redbridge University Hospitals NHS Trust
- ◯ Barnsley hospital NHS foundation trust
- ◯ Basingstoke (Hampshire Hospitals NHS Foundation Trust)
- ◯ Bedford hospital NHS trust
- ◯ Betsi Cadwaladr University Health Board
- ◯ Birmingham Children's Hospital
- ◯ Bon secours Hospital
- ◯ Bradford Teaching Hospitals Foundation Trust
- ◯ Brighton and Sussex University Hospitals NHS Trust
- ◯ Bristol Royal Hospital for Children
- ◯ Bristol Royal Infirmary
- ◯ Calderdale Hospital
- ◯ Central Manchester NHS trust
- ◯ Chelsea & Westminster Hospital
- ◯ Children's Health Ireland at Crumlin
- ◯ Children's Health Ireland at Tallaght
- ◯ Children's Health Ireland at Temple Street
- ◯ City Hospitals Sunderland NHS Foundation Trust
- ◯ Connolly Blanchardstown Hospital
- ◯ Conquest and Easborne Hospitals
- ◯ Cork University Hospital
- ◯ Countess of Chester NHS Foundation Trust
- ◯ County Durham & Darlington NHS Foundation Trust
- ◯ Craigavon Hospital
- ◯ Croydon
- ◯ Cumberland Infirmary
- ◯ Daisy Hill Hospital
- ◯ Derriford Hospital
- ◯ East and North Hertfordshire NHS Trust
- ◯ East Lancashire NHS Hospital Trust
- ◯ East Sussex Healthcare NHS Trust
- ◯ Epsom and St Helier Hospitals
- ◯ Evelina London Children's Hospital
- ◯ Fairfield
- ◯ Forth Valley Hospital
- ◯ Frimley Park Hospital
- ◯ Galway
- ◯ Gateshead Health NHS Foundation Trust
- ◯ Gloucestershire Hospitals NHS Foundation Trust
- ◯ Good Hope
- ◯ Great North Children's Hospital, Newcastle Upon Tyne
- ◯ Great Western Hospital, Swindon
- ◯ Guy's & St Thomas NHS Foundation Trust
- ◯ Harrogate & District NHS Foundation Trust
- ◯ Heartlands's Hospital
- ◯ Hillingdon Hospital
- ◯ Homerton University Hospital
- ◯ HSE Ireland - Cork University Hospital
- ◯ Huddersfield Royal Infirmary and Calderdale Royal Hospital
- ◯ Hull University Hospital
- ◯ Inverclyde Royal Hospital
- ◯ Ipswich Hospital
- ◯ James Cook University Hospital
- ◯ James Paget Hospital and NHS Trust Gorleston
- ◯ John Radcliffe Hospital
- ◯ King's College Hospital
- ◯ Kingston University Hospital and NHS Foundation Trust

- ◯ Lancashire Teaching Hospitals (Royal Preston Hospital)
- ◯ Leeds teaching hospitals NHS Trust
- ◯ Leicester Royal Infirmary
- ◯ Leighton (mid cheshire)
- ◯ Lister Hospital
- ◯ Liverpool University Hospitals NHS Trust
- ◯ Luton and Dunstable University Hospital
- ◯ Macclesfield Hospital
- ◯ Maidstone and Tunbridge Wells NHS Trust
- ◯ Manchester Univeristy NHS Foundation Trust
- ◯ Mater Misericordiae University Hospital
- ◯ Medway NHS Foundation Trust
- ◯ Mid Cheshire Hospitals NHS Foundation Trust
- ◯ Milton Keynes University Hospital
- ◯ Morriston Hospital
- ◯ Musgrove Park Hospital, Taunton
- ◯ Newcastle upon Tyne Hospitals NHS Foundation Trust
- ◯ Newham University Hospital
- ◯ Norfolk & Norwich University Hospital
- ◯ Southmead Hospital, North Bristol NHS Trust
- ◯ North Hampshire Hospital, Basingstoke
- ◯ North Manchester General Hospital
- ◯ North Middlesex Hospital
- ◯ North Tees and Hartlepool Hospitals NHS Foundation Trust
- ◯ Northern Devon Healthcare NHS Trust
- ◯ Northern general, Sheffield
- ◯ Northumbria Healthcare NHS Trust
- ◯ Northwick Park Hospital
- ◯ Nottingham University Hospitals NHS Trust
- ◯ Oldham
- ◯ Ormskirk & District General Hospital
- ◯ Peterborough City Hospital
- ◯ Portsmouth Hospitals Trust
- ◯ Princess Royal Univeristy Hospital
- ◯ Queen Alexandra Hospital
- ◯ Queen Elizabeth Hospital, Birmingham
- ◯ Queen Elizabeth Hospital, Woolwich
- ◯ Queen Elizabeth Queen's mother hospital Margate
- ◯ Queen Elizabeth University Hospital Glasgow
- ◯ Queens Medical Centre (Nottingham)
- ◯ Rotherham
- ◯ Royal Aberdeen Children's Hospital
- ◯ Royal Alexandra Children's Hospital, Brighton
- ◯ Royal Alexandra Hospital, Paisley
- ◯ Royal Belfast Hospital for Sick Children
- ◯ Royal Berkshire Hospital NHS Foundation Trust
- ◯ Royal Bolton Foundation Trust
- ◯ Royal Cornwall NHS Trust
- ◯ Royal Devon & Exeter Hospital
- ◯ Royal Free Hospital
- ◯ Royal Gwent hospital
- ◯ Royal Hampshire County Hospital
- ◯ Royal Hospital for Children, Glasgow
- ◯ Royal Hospital for Sick Children, Edinburgh
- ◯ Royal Infirmary of Edinburgh
- ◯ Royal Liverpool
- ◯ Royal London Hospital
- ◯ Royal Manchester Children's Hospital
- ◯ Royal Preston Hospital
- ◯ Royal Stoke University Hospital
- ◯ Royal Surrey County Hospital
- ◯ Royal Surrey NHS Foundation Trust
- ◯ Royal Sussex county hospital
- ◯ Royal United Hospital, Bath
- ◯ Royal Victoria Hospital, Belfast
- ◯ Royal Victoria Infirmary, Newcastle
- ◯ Royal Wolverhampton NHS Trust
- ◯ Salford Royal NHS Foundation Trust
- ◯ Salisbury NHS Foundation Trust

- ◯ Sandwell and West Birmingham NHS Foundation Trust
- ◯ Scarborough Hospital
- ◯ Sheffield Children's Hospital
- ◯ Sheffield Teaching Hospitals Foundation NHS Trust
- ◯ South Eastern Health and Social Care Trust
- ◯ Southampton Children's Hospital
- ◯ Southport
- ◯ Southport & Ormskirk Hospital
- ◯ St George's Hospital London
- ◯ St Helen's and Knowsley NHS trust
- ◯ St John's Hospital, Livingston
- ◯ St Mary's Hospital
- ◯ Stockport NHS Trust
- ◯ Stoke Mandeville Hospital
- ◯ Sunderland and South Tyneside NHS Foundation Trust
- ◯ Surrey and Sussex Healthcare NHS Trust
- ◯ Torbay and South Devon NHS Trust
- ◯ Tunbridge Wells NHS Trust
- ◯ Ulster Hospital Dundonald
- ◯ University College London Hospitals NHS Trust
- ◯ University Hospital Ayr
- ◯ University Hospital Coventry
- ◯ University Hospital Crosshouse
- ◯ University Hospital Lewisham
- ◯ University Hospital Monklands
- ◯ University Hospital of Wales, Cardiff
- ◯ University hospital Southampton
- ◯ University Hospital Waterford
- ◯ University Hospital Wishaw
- ◯ University Hospitals Birmingham
- ◯ University Hospitals Coventry & Warwickshire NHS
- ◯ University Hospitals Derby and Burton NHS Foundation
- ◯ University Hospitals of Leicester NHS Trust
- ◯ University Hospitals of North Midlands
- ◯ University Hospitals Plymouth
- ◯ Warwick Hospital
- ◯ Watford General Hospital (West Herts NHS Trust)
- ◯ West Middlesex
- ◯ Western Sussex Hospitals NHS Trust
- ◯ Wexham Park Hospital
- ◯ Whipp's Cross Hospital
- ◯ Whiston Hospital
- ◯ Whittington Health NHS Trust
- ◯ William Harvey Hospital
- ◯ Wrexham Maelor Hospital
- ◯ Yeovil District Hospital NHS Foundation Trust
- ◯ York Teaching Hospital NHSFT
- ◯ Other
- ◯ Wythenshawe Hospital
- ◯ Antrim Area Hospital
- ◯ Arrowe park hospital
- ◯ St Peter's Hospital
- ◯ Balfour Hospital, Orkney
- ◯ Barking havering and redbridge university hospitals NHS foundation trust
- ◯ Barnet Hospital
- ◯ Basildon
- ◯ Belfast City Hospital
- ◯ Blackpool Victoria Hospital
- ◯ BMI Sarum Rd Winchester
- ◯ Broomfield Hospital
- ◯ Causeway hospital
- ◯ Charing Cross Hospital, London
- ◯ Chesterfield Royal Hospital
- ◯ Colchester General Hospital
- ◯ Darent Valley Hospital
- ◯ Dartford and Gravesham NHS Trust
- ◯ Diana Princess of Wales, Grimsby
- ◯ Doncaster Royal Infirmary
- ◯ Dorset County Hospital

- ◯ Dudley Group NHS Foundation Trust
- ◯ Dumfries and Galloway Royal Infirmary
- ◯ Ealing
- ◯ East Surrey Hospital
- ◯ Freeman Hospital, Newcastle
- ◯ Galngwili General Hospital
- ◯ George Eliot Hospital Nuneaton
- ◯ Glan Clwyd hospital
- ◯ Glangwili General Hospital Carmarthen Wales
- ◯ Glasgow Royal Infirmary
- ◯ Glen field Leicester
- ◯ GP Woodlands primary care sidcup
- ◯ Great Ormond Street Hospital
- ◯ Grimsby hospital.
- ◯ Hammersmith Hospital London
- ◯ Harefield
- ◯ Hereford County Hospital
- ◯ HMS Raleigh
- ◯ Horton General Hospital Banbury
- ◯ Hull University Teaching hospitals NHS Trust
- ◯ Kent and Canterbury Hospital
- ◯ Kettering General Hospital
- ◯ Kings Mill Hospital
- ◯ Lincoln county hospital
- ◯ Liverpool Heart and Chest Hospital
- ◯ Liverpool Women's Hospital
- ◯ Mid Essex NHS Trust
- ◯ Mid yorkshire hospital
- ◯ Moorfields Eye Hospital
- ◯ National Hospital for Neurology and Neurosurgery
- ◯ Nevill Hall Hospital
- ◯ New Cross Hospital
- ◯ Ninewells Hospital, Dundee
- ◯ Northampton General Hsopital
- ◯ Northern Lincolnshire and Goole NHS Foundation Trust
- ◯ Oxford University Hospital
- ◯ Perth Royal Infirmary
- ◯ Pilgrim Hospital Boston Lincolnshire
- ◯ Pinderfields general Hospital, Wakefield
- ◯ Poole
- ◯ Prince Charles Hospital
- ◯ Princess of Wales Hospital, Bridgend
- ◯ Princess Royal Hospital, Shrewsbury and Telford Hospitals NHS Trust
- ◯ Queen Charlotte's and Chelsea Hospital
- ◯ Queen Elizabeth Hospital Gateshead
- ◯ Queen Elizabeth Hospital King's Lynn
- ◯ Queen Victoria Hospital, East Grinstead
- ◯ Queens Hospital - Romford
- ◯ Raigmore Hospital
- ◯ Raigmore Hospital, Inverness
- ◯ Robert Jones & Agnes Hunt Orthopaedic Hospital
- ◯ Royal Blackburn
- ◯ Royal Bournemouth NHS Trust
- ◯ Royal Brompton
- ◯ Royal Glamorgan Hospital
- ◯ Royal Lancaster Infimary
- ◯ Royal Marsden hospital
- ◯ Royal National Orthopaedic Hospital
- ◯ Royal Orthopaedic Hospital Birmingham
- ◯ Royal Papworth Hospital
- ◯ Royal Shrewsbury Hospital
- ◯ Russells Hall Hospital, Dudley
- ◯ Scunthorpe General Hospital
- ◯ Sherwood Forest nhs trust
- ◯ Southend University Hospital
- ◯ St Bartholomew's Hospital London
- ◯ St Peter's, Chertsey (Ashford and St Peter's Trust)
- ◯ St. Bartholomew's Hospital
- ◯ St. Mary's Hospital, Imperial College Healthcare

NHS Trust
- ◯ Tameside and Glossop
- ◯ The Balfour , Orkney
- ◯ The Horton General Hospital
- ◯ The Porch Surgery
- ◯ The Queen Elizabeth Hospital, King's Lynn
- ◯ The Royal Oldham Hospital
- ◯ University Hospitals of Morecambe Bay Foundation trust
- ◯ Walton centre
- ◯ Warrington and Halton Teaching Hospitals NHS Foundation Trust
- ◯ Wasall Manor Hospital
- ◯ West cumberland hospital
- ◯ West Middlesex University Hospital
- ◯ West Suffolk hospital
- ◯ Western General Hospital Edinburgh
- ◯ Wirral University Teaching Hospital
- ◯ Worcestershire Royal Hospital
- ◯ Worthing Hospital
- ◯ Wrightington Wigan and Leigh NHS Foundation Trust
- ◯ Wycombe Hospital Buckinghamshire NHS Trust
- ◯ Ysbyty Gwynedd
- ◯ University Hospital Hairmyres

You have selected other, please specify.

_____

What is your professional grade?

- ◯ GP Trainee
- ◯ ST1
- ◯ ST2
- ◯ ST3
- ◯ ST4
- ◯ ST5
- ◯ ST6
- ◯ ST7
- ◯ ST8
- ◯ F1
- ◯ F2
- ◯ Clinical Fellow (F2-ST3 Level)
- ◯ Clinical Fellow (>=ST4 Level)
- ◯ Consultant
- ◯ Associate Specialist
- ◯ Staff Grade
- ◯ CESR Doctor
- ◯ GP
- ◯ Other

You have selected other, please specify.

_____

What is your gender?

- ◯ Male
- ◯ Female
- ◯ Other
- ◯ Prefer not to say

How old are you?	◯ 20-25 ◯ 26-30 ◯ 31-35 ◯ 36-40 ◯ 41-45 ◯ 46-50 ◯ 51-55 ◯ 56-60 ◯ 61-65 ◯ 66-70 ◯ >70
What is your 'parent speciality'?	◯ Emergency Medicine ◯ Anaesthetics ◯ Intensive Care Medicine ◯ Paediatrics ◯ General Practice ◯ Surgery ◯ Foundation Programme ◯ Acute Internal Medicine ◯ Other
What is your 'parent speciality'?	☐ Emergency Medicine ☐ Anaesthetics ☐ Intensive Care Medicine ☐ Paediatrics ☐ General Practice ☐ Surgery ☐ Foundation Programme ☐ Acute Internal Medicine ☐ Other
You have selected other, please specify.	_____
In what Department were you working as of March 1st 2020?	◯ Emergency Department (adult or paediatric) ◯ Anaesthetic Department (adult or paediatric) ◯ Intensive Care Department (adult or paediatric) ◯ Acute Medical Unit ◯ Hospital ward (adult or paediatric) ◯ Other
In what Department were you working as of March 1st 2020? Select all that apply	☐ Emergency Department (adult or paediatric) ☐ Anaesthetic Department (adult or paediatric) ☐ Intensive Care Department (adult or paediatric) ☐ Acute Medical Unit ☐ Hospital ward (adult or paediatric) ☐ Other
You selected other, in which Department where you working as of March 1st 2020?	_____
Have you been deployed to a different clinical area as a result of the COVID-19 outbreak?	◯ Yes ◯ No

Where have you been redeployed to?	◯ Emergency Department (adult or paediatric) ◯ Anaesthetic Department (adult or paediatric) ◯ Intensive Care Department (adult or paediatric) ◯ Acute Medical Unit ◯ Hospital ward (adult or paediatric) ◯ Other
You have selected other, please specify.	_____
How satisfied are you with this redeployment?	◯ Very dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Very satisfied
Have you previously provided direct clinical care to any patients affected by these infectious disease outbreaks? (please select all that apply)	☐ None of the below ☐ Ebola virus ☐ MERS-CoV ☐ SARS ☐ Chikungunya ☐ Cholera ☐ Influenza (swine, avian, zoonotic) ☐ Zika virus ☐ Other
You have selected other, please specify.	_____

Personal Protective Equipment (PPE) and General Training

What training have you received in regards to personal protective equipment (PPE) since the COVID-19 outbreak was declared? (select all that apply)

	No training	Formal instructional video	Written instruction	Simulation training	Departmental guidance	Other
Donning and doffing (gloves, gown, facemask, eye protection)	☐	☐	☐	☐	☐	☐
Formal fit testing for mask	☐	☐	☐	☐	☐	☐
PPE training for exposure to aerosol generating procedure (e.g. intubation)	☐	☐	☐	☐	☐	☐

Other. Please specify. _____

If you have had any further PPE training please specify _____

What practical education have you received in regards to the clinical care of patients presenting with suspected/diagnosed COVID-19?

- ☐ None
- ☐ Simulation training of a possible case
- ☐ Simulation training of a case requiring aerosol procedure
- ☐ Other

You selected other. Please specify. _____

How frequently do you access the following sources of information regarding policy and clinical aspects of COVID-19?

	Hourly	Up to twice a day	Daily	Several times a week	Weekly	Less than weekly	Never
Government Guidance	◯	◯	◯	◯	◯	◯	◯
College Guidance	◯	◯	◯	◯	◯	◯	◯
Trust Guidance	◯	◯	◯	◯	◯	◯	◯
Departmental guidance	◯	◯	◯	◯	◯	◯	◯
Social Media	◯	◯	◯	◯	◯	◯	◯
Online blogs and podcasts	◯	◯	◯	◯	◯	◯	◯
Peer review literature	◯	◯	◯	◯	◯	◯	◯

How confident do you feel in the infection control training that has been provided to you?

◯ Not confident at all
◯ Somewhat not confident
◯ Neither not confident or confident
◯ Somewhat confident
◯ Very confident

How prepared do you feel to provide direct care to suspected cases?

◯ Completely unprepared
◯ Somewhat unprepared
◯ Neither unprepared or prepared
◯ Somewhat prepared
◯ Very prepared

How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?

◯ Significantly worse than before Covid-19
◯ Slightly worse than before Covid-19
◯ The same as before Covid-19
◯ Slightly better than before Covid-19
◯ Significantly better than before Covid-19

How many suspected cases of COVID-19 have you had direct clinical contact with since March 1st 2020?

◯ 0
◯ 1-5
◯ 6-10
◯ 11-15
◯ 16-20
◯ 21-25
◯ 26-30
◯ 31-35
◯ > 36

As far as you are aware, how many of these suspected cases have turned out to be confirmed cases of COVID-19?

◯ 0
◯ 1-5
◯ 6-10
◯ 11-15
◯ 16-20
◯ 21-25
◯ 26-30
◯ 31-35
◯ > 36

Personal Factors	
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established medical health conditions?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established medical condition
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established mental health conditions?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established mental health condition
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree
How worried are you about the potential risks if you were to become infected with COVID-19?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
How worried are you about the potential risks to your family. loved ones or others due to your clinical role in the COVID-19 outbreak?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all

PERA Questions: Self-isolate

Have you had to self-isolate?	◯ Yes ◯ No
For what reason did you have to self-isolate?	☐ Personal symptoms ☐ Personal diagnosis of COVID-19 ☐ Symptoms of a member of the household ☐ Exposure to a positive case of COVID-19 in the work environment ☐ Exposure to a positive case of COVID-19 in your personal environment ☐ Other (eg return from travel to high risk area)
Other - please specify	_____
How many clinical shifts in your rota have you missed due to self-isolation?	◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5-7 ◯ 8-10 ◯ >10
Date survey completed	_____

CERA Survey 2

Thank you for taking the time to complete the CERA survey part 2.

This is part 2 of the CERA study. Thank you for taking the time to fill out the questions below. It will take between 5 to 7 minutes.

We recommend using either a tablet or computer screen but the questions are accessible via mobile phones.

The Impact of Events Scale - Revised (page 3) should be answered in reference to the COVID-19 peak and your feelings over the last 7 days. All other questions should be answered in reference to the COVID-19 peak and your feelings over the past few weeks.

The definition of COVID-19 "peak", for the purpose of this study, uses nationally reported hospital death figures. This has been estimated between April 10th - April 15th. It is understood this will vary regionally.

Finally, we understand that throughout the COVID-19 pandemic many of you may have experienced very challenging events both in your personal and professional lives. We thank you for taking the time to complete this study and hope it offers an anonymised opportunity to report the psychological impact of this pandemic. If you need any further support there are details highlighted in the participant information leaflet that can be downloaded below.

If you want to download the participant information leaflet, which outlines the study and available support, please download below.

[Attachment: "CERA PIS V 1.1.docx"]

I consent to taking part in CERA survey 2.

- ◯ Yes
- ◯ No

What is your ethnicity?

- ◯ English / Welsh / Scottish / Northern Irish / British
- ◯ Irish
- ◯ Gypsy or Irish Traveller
- ◯ Any other White background
- ◯ White and Black Caribbean
- ◯ White and Black African
- ◯ White and Asian
- ◯ Any other Mixed / Multiple ethnic background
- ◯ Indian
- ◯ Pakistani
- ◯ Bangladeshi
- ◯ Chinese
- ◯ Any other Asian background
- ◯ African
- ◯ Caribbean
- ◯ Any other Black / African / Caribbean background
- ◯ Arab
- ◯ Any other ethnic group
- ◯ Prefer not to disclose

Impact of Events Scale - Revised

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 PANDEMIC PEAK.

How much have you been distressed or bothered by these difficulties?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it	○	○	○	○	○
I had trouble staying asleep	○	○	○	○	○
Other things kept me thinking about it	○	○	○	○	○
I felt irritable and angry	○	○	○	○	○
I avoided letting myself get upset when I thought about it or was reminded of it	○	○	○	○	○
I thought about it when I didn't mean to	○	○	○	○	○
I felt as if it hadn't happened or wasn't real	○	○	○	○	○
I stayed away from reminders of it	○	○	○	○	○
Pictures about it popped into my head	○	○	○	○	○
I was jumpy and easily startled	○	○	○	○	○
I tried not to think about it	○	○	○	○	○
I was aware that I still had a lot of feelings about it, but I didn't deal with them	○	○	○	○	○
My feelings about it were kind of numb	○	○	○	○	○
I found myself acting or feeling like I was back at that time	○	○	○	○	○
I had trouble falling asleep	○	○	○	○	○
I had waves of strong feelings about it	○	○	○	○	○
I tried to remove it from my memory	○	○	○	○	○
I had trouble concentrating	○	○	○	○	○
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or a pounding heart	○	○	○	○	○

I had dreams about it	○	○	○	○	○
I felt watchful and on-guard	○	○	○	○	○
I tried not to talk about it	○	○	○	○	○

Personal Protective Equipment (PPE) and General Training

What training have you received in regards to personal protective equipment (PPE) since the COVID-19 outbreak was declared? (select all that apply)

	No training	Formal instructional video	Written instruction	Simulation training	Departmental guidance	Other
Donning and doffing (gloves, gown, facemask, eye protection)	☐	☐	☐	☐	☐	☐
Formal fit testing for mask	☐	☐	☐	☐	☐	☐
PPE training for exposure to aerosol generating procedure (e.g. intubation)	☐	☐	☐	☐	☐	☐

What practical education have you received in regards to the clinical care of patients presenting with suspected/diagnosed COVID-19? (select all that apply)

- ☐ None
- ☐ Simulation training of a possible case
- ☐ Simulation training of a case requiring aerosol generating procedure
- ☐ Other

You have selected other, please specify.

_____

How confident do you feel in the infection control training that has been provided to you?

- ◯ Not confident at all
- ◯ Somewhat not confident
- ◯ Neither not confident or confident
- ◯ Somewhat confident
- ◯ Very confident

How prepared do you feel to provide direct care to suspected cases?

- ◯ Completely unprepared
- ◯ Somewhat unprepared
- ◯ Neither unprepared or prepared
- ◯ Somewhat prepared
- ◯ Very prepared

How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?

- ◯ Significantly worse than before Covid-19
- ◯ Slightly worse than before Covid-19
- ◯ The same as before Covid-19
- ◯ Slightly better than before Covid-19
- ◯ Significantly better than before Covid-19

Have you been deployed to a different clinical area as a result of the COVID-19 outbreak?

- ◯ Yes
- ◯ No

Where have you been redeployed to?

- ◯ Emergency Department (adult or paediatric)
- ◯ Anaesthetic Department (adult or paediatric)
- ◯ Intensive Care Department (adult or paediatric)
- ◯ Acute Medical Unit
- ◯ Hospital ward (adult or paediatric)
- ◯ Other

You have selected other, please specify.

_____

How satisfied are you with this redeployment?	◯ Very dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Very satisfied
In survey 1, you stated you had been re-deployed. How satisfied are you with this redeployment now?	◯ Very dissatisfied ◯ Somewhat dissatisfied ◯ Neither satisfied nor dissatisfied ◯ Somewhat satisfied ◯ Very satisfied ◯ I am no longer re-deployed
How many suspected cases of COVID-19 have you had direct clinical contact with since March 1st 2020?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
As far as you are aware, how many of these suspected cases have turned out to be confirmed cases of COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
How many patients have you witnessed dying with COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36

Personal Factors

Do you have a pre-existing physical health condition(s) that may increase your chances of suffering more severe COVID-19 disease?	◯ Yes ◯ No ◯ Prefer not to disclose
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established mental health conditions?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established mental health condition
Over the course of your life prior to the recent pandemic, have you experienced what you would characterise as a significant trauma?	◯ Yes ◯ No
During the COVID-19 pandemic, have you felt at high risk of dying/death?	◯ Yes ◯ No
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree
How worried are you about the potential risks if you were to become infected with COVID-19?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
How worried are you about the potential risks to your family, loved ones or others due to your clinical role in the COVID-19 outbreak?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
Have any of your family, friends or loved ones become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required ward level/HDU hospital treatment ☐ Unwell and required ICU treatment ☐ Died ☐ None of the above
Have any of your colleagues become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required ward level/HDU hospital treatment ☐ Unwell and required ICU treatment ☐ Died ☐ None of the above
In the last 2 weeks I have felt well supported by friends and family	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

In the last 2 weeks I have felt well supported by the senior clinical leadership team	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

Personal Coronavirus

Have you received a positive diagnosis of Coronavirus during this pandemic?	◯ Yes ◯ No
Have you been admitted to hospital due to your diagnosis of Coronavirus?	◯ Yes ◯ No
Have you had to self-isolate?	◯ Yes ◯ No
For what reason did you have to self-isolate? (select all that apply)	☐ Personal symptoms ☐ Personal diagnosis of COVID-19 ☐ Symptoms of a member of the household ☐ Exposure to a positive case of COVID-19 in the work environment ☐ Exposure to a positive case of COVID-19 in your personal environment ☐ Other (eg return from travel to high risk area)
How many clinical shifts in your rota have you missed due to self-isolation?	◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5-7 ◯ 8-10 ◯ >10
Have you been offered any of the following psychological interventions via your current place of work? (Select all that apply)	☐ Structured individual therapy with a therapist (in person/on telephone) ☐ Advice line / helpline ☐ Internet based psychological intervention ☐ Well-being app / website ☐ Brief TRiM / "safe space" session (trauma risk management) ☐ Other please state
Other, please specify	_____
During your time working in the COVID-19 pandemic have you experienced any of the following? (Select all that apply)	☐ Feelings that you made a contribution ☐ A sense of personal accomplishment ☐ Improved confidence and self esteem ☐ Increased compassion ☐ Re-evaluation of self and purpose ☐ Work satisfaction ☐ A sense of team cohesion
Would you be happy to be contacted about any further COVID-19 related research focusing on the psychological impact on Doctors?	◯ Yes ◯ No

CERA Survey 3

Please complete the survey below.

Thank you!

This is part 3 of the CERA study. Thank you for taking the time to fill out the questions below. It will take between 5 to 7 minutes.

We recommend using either a tablet or computer screen but the questions are accessible via mobile phones.

All questions should be answered in reference to the COVID-19 pandemic. The Impact of Events Scale - Revised, should be answered in reference to your feelings over the last 7 days and all other questions should be answered in reference to your feelings over the past few weeks.

Finally, we understand that throughout the COVID-19 pandemic many of you may have experienced very challenging events both in your personal and professional lives. We thank you for taking the time to complete this study and hope it offers an anonymised opportunity to report the psychological impact of this pandemic. If you need any further support there are details highlighted in the participant information leaflet that can be downloaded below.

If you want to download the participant information leaflet, which outlines the study and available support, please download below.

[Attachment: "CERA PIS V 1.1.docx"]

I consent to taking part in CERA survey 3.

◯ Yes
◯ No

Impact of Events Scale - Revised

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 PANDEMIC.

How much have you been distressed or bothered by these difficulties?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it	○	○	○	○	○
I had trouble staying asleep	○	○	○	○	○
Other things kept me thinking about it	○	○	○	○	○
I felt irritable and angry	○	○	○	○	○
I avoided letting myself get upset when I thought about it or was reminded of it	○	○	○	○	○
I thought about it when I didn't mean to	○	○	○	○	○
I felt as if it hadn't happened or wasn't real	○	○	○	○	○
I stayed away from reminders of it	○	○	○	○	○
Pictures about it popped into my head	○	○	○	○	○
I was jumpy and easily startled	○	○	○	○	○
I tried not to think about it	○	○	○	○	○
I was aware that I still had a lot of feelings about it, but I didn't deal with them	○	○	○	○	○
My feelings about it were kind of numb	○	○	○	○	○
I found myself acting or feeling like I was back at that time	○	○	○	○	○
I had trouble falling asleep	○	○	○	○	○
I had waves of strong feelings about it	○	○	○	○	○
I tried to remove it from my memory	○	○	○	○	○
I had trouble concentrating	○	○	○	○	○
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or a pounding heart	○	○	○	○	○

I had dreams about it	○	○	○	○	○
I felt watchful and on-guard	○	○	○	○	○
I tried not to talk about it	○	○	○	○	○

Occupational Factors

How confident do you feel in the infection control training that has been provided to you?	◯ Not confident at all ◯ Somewhat not confident ◯ Neither not confident or confident ◯ Somewhat confident ◯ Very confident
How prepared do you feel to provide direct care to suspected cases?	◯ Completely unprepared ◯ Somewhat unprepared ◯ Neither unprepared or prepared ◯ Somewhat prepared ◯ Very prepared
How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?	◯ Significantly worse than before Covid-19 ◯ Slightly worse than before Covid-19 ◯ The same as before Covid-19 ◯ Slightly better than before Covid-19 ◯ Significantly better than before Covid-19
Have you been deployed back to your usual clinical area after re-deployment?	◯ Yes ◯ No
How many suspected cases of COVID-19 have you had direct clinical contact with since March 1st 2020?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
As far as you are aware, how many of these suspected cases have turned out to be confirmed cases of COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36
How many patients have you witnessed dying with COVID-19?	◯ 0 ◯ 1-5 ◯ 6-10 ◯ 11-15 ◯ 16-20 ◯ 21-25 ◯ 26-30 ◯ 31-35 ◯ > 36

Personal Factors

Do you feel exposure to the COVID-19 pandemic has increased symptoms of any established mental health condition(s) you have personally?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established mental health condition
Do you feel exposure to the COVID-19 pandemic has increased symptoms of any established physical health condition(s) you have personally?	◯ Yes ◯ No ◯ Prefer not to disclose ◯ I do not have an established physical health condition
During the COVID-19 pandemic, have you felt at high risk of dying/death?	◯ Yes ◯ No
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree
How worried are you about the potential risks if you were to become infected with COVID-19?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
How worried are you about the potential risks to your family, loved ones or others due to your clinical role in the COVID-19 outbreak?	◯ Extremely worried ◯ Generally worried ◯ Neither worried or not worried ◯ Generally not worried ◯ Not worried at all
Have any of your family, friends, or loved ones become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required non-ICU hospital treatment ☐ Unwell and required ICU treatment ☐ Died
Have any of your colleagues become unwell or died due to COVID-19 or its complications? (select all that apply)	☐ Unwell at home ☐ Unwell and required non-ICU hospital treatment ☐ Unwell and required ICU treatment ☐ Died
In the last 2 weeks I have felt well supported by friends and family	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

In the last 2 weeks I have felt well supported by the senior clinical leadership team	◯ Strongly disagree ◯ Disagree ◯ Neither agree nor disagree ◯ Agree ◯ Strongly agree

Personal Coronavirus

Have you received a positive diagnosis of Coronavirus during this pandemic?	◯ Yes ◯ No
Have you been admitted to hospital due to your diagnosis of Coronavirus?	◯ Yes ◯ No
Have you had to self-isolate?	◯ Yes ◯ No
For what reason did you have to self-isolate? (select all that apply)	☐ Personal symptoms ☐ Personal diagnosis of COVID-19 ☐ Symptoms of a member of the household ☐ Exposure to a positive case of COVID-19 in the work environment ☐ Exposure to a positive case of COVID-19 in your personal environment ☐ Other (eg return from travel to high risk area)
How many clinical shifts in your rota have you missed due to self-isolation?	◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5-7 ◯ 8-10 ◯ >10
Have you had a COVID-19 antibody test?	◯ Yes ◯ No ◯ Prefer not to disclose
What was the result of your COVID-19 antibody test	◯ Positive ◯ Negative ◯ I have not yet received the result ◯ Prefer not to disclose
Have you been offered any of the following psychological interventions via your current place of work? (Select all that apply)	☐ Structured individual therapy with a therapist (in person/on telephone) ☐ Advice line / helpline ☐ Internet based psychological intervention ☐ Well-being app / website ☐ Brief TRiM / "safe space" session (trauma risk management) ☐ Other please state
Other, please specify	_____
During your time working in the COVID-19 pandemic have you experienced any of the following? (Select all that apply)	☐ Feelings that you made a contribution ☐ A sense of personal accomplishment ☐ Improved confidence and self esteem ☐ Increased compassion ☐ Re-evaluation of self and purpose ☐ Work satisfaction ☐ A sense of team cohesion

Have you experienced any other factors during the COVID-19 pandemic that have made a positive impact on your psychological health? _____

The last 3 questions are optional and not related to the CERA study but will inform future planning for psychological interventions.

We would like to know more about the type of psychological support doctors prefer. If you needed psychological support in relation to the impact from the COVID-19 pandemic, what would your preferences be in relation to:

a) Format	◯ Face to face individual ◯ Face to face group therapy ◯ Individual online therapy ◯ Online support groups ◯ Self help ◯ Guided self help
b) Timing	◯ Immediate support during the COVID-19 pandemic ◯ Immediately after the COVID-19 pandemic ◯ After the COVID-19 pandemic following a period of rest and recuperation
c) Mode of therapy	◯ Structured therapy e.g. CBT ◯ Counselling ◯ Peer support ◯ Other
Please specify	_____

Psychological distress during the acceleration phase of the COVID-19 pandemic: a survey of doctors practising in Emergency Medicine, Anaesthesia and Intensive Care Medicine in the United Kingdom and Republic of Ireland

Research Checklist: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

CHERRIES CHECKLIST ADAPTED FROM: Eysenbach, Gunther. "Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES)." *Journal of medical Internet research* vol. 6,3 e34. 29 Sep. 2004, doi:10.2196/jmir.6.3.e34			
Item Category	***Checklist Item***	***Explanation***	***Checklist Response***
Design	Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	***Outlined in 'Methods'***
IRB (Institutional Review Board) approval and informed consent process	IRB approval	Mention whether the study has been approved by an IRB.	***Outlined in 'Procedures'***
	Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	***Outlined in 'Participants and Procedures'***
	Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	***Outlined in 'Procedures'***
Development and pre-testing	Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	**Available in the published protocol** (Roberts T, Daniels J, Hulme W, et al. COVID-19 emergency response assessment study: a prospective longitudinal survey of frontline doctors in the UK and Ireland: study protocol. BMJ Open Published Online First: 2020. doi:10.1136/bmjopen-2020-039851)
Recruitment process and description of the sample having access to the questionnaire	Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	***Outlined in 'Procedures' + protocol***
	Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	***Outlined in 'Procedures' + protocol***
	Advertising the survey	How/where was the survey announced or advertised? Some examples are	***Outlined in 'Procedures' + protocol***

		offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	
Survey administration	Web/E-mail	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	***Outlined in* 'Procedures' + *protocol***
	Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	***Outlined in* 'Procedures' + *protocol***
	Mandatory/voluntary	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	- ***Outlined in* 'Procedures' + *protocol*** - ***voluntary***
	Incentives	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	***No***
	Time/Date	In what timeframe were the data collected?	***Outlined in* 'Procedures' + *protocol + Protocol***
	Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	***Not done due to maximise completion of the GHQ-12***
	Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions	***Outlined in protocol but yes ' branching logic' was used where appropriate***
	Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	***Outlined in 'online supplementary 2,3,4'***
	Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	***Outlined in 'online supplementary 2,3,4''***
	Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted.	***There were no completeness checks. The only mandatory items***

		Was this done, and if "yes", how (usually JAVAScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as "not applicable" or "rather not say", and selection of one response option should be enforced.	***were consent and email address. The decision not to include mandatory items and/or completeness checks was made due to a concern that mandatory items would increase rates of non-completion***
	Review step	State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	***This was possible but has not been included in the manuscript***
Response rates			
	Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	***Outlined in 'Figure 1'. Each access to the 1st survey page 1 was identified as a new unique visit, this was not limited by IP address or cookies***
	View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary	***Survey site contains first page of survey therefore N/A***
	Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called "recruitment" rate.	***Outlined in 'Figure 1'***
	Completion rate (Ratio of users who finished the survey/users who agreed to participate)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that "completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	***Outlined in 'Figure 1'***
Preventing multiple entries from the same individual	Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user	***Not used***

		ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	
	IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	***Not used due to survey being completed on multi-user/single log-in computers***
	Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	***Not done***
	Registration	In "closed" (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	***N/A***
Analysis	Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	***Outlined in* 'Statistical Analysis'** ***+ Protocol***
	Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined	***All questionnaires have timestamp of completion.***
	Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	***Outlined in* 'Statistical Analysis'** ***+ Protocol***