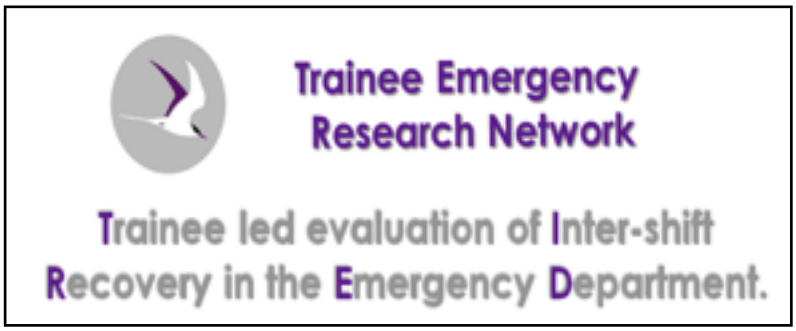

Research Protocol

Full Title:

*T*rainee- led evaluation of the need for *I*ntershift *R*ecovery among *E*mergency *D*epartment doctors in the United Kingdom

Short Title:

The TIRED-UK Study

Chief Investigator:

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Sponsor: University Hospitals Plymouth NHS Trust

Version: 4.0

Updated: 20/02/19

IRAS Number: 262048

Sponsor Number: 19/WBG/242

This protocol has regard for the HRA guidance and order of content

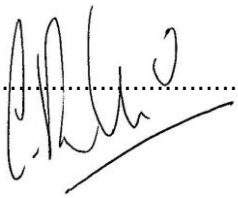
SIGNATURE PAGE

The undersigned confirm that the following protocol has been agreed and accepted and that the Chief Investigator agrees to conduct the study in compliance with the approved protocol and will adhere to the principles outlined in the Declaration of Helsinki, the Sponsor's SOPs, and other regulatory requirement.

I agree to ensure that the confidential information contained in this document will not be used for any other purpose other than the evaluation or conduct of the investigation without the prior written consent of the Sponsor

I also confirm that I will make the findings of the study publically available through publication or other dissemination tools without any unnecessary delay and that an honest accurate and transparent account of the study will be given; and that any discrepancies from the study as planned in this protocol will be explained.

For and on behalf of the Study Sponsor

Signature: 

Date: 17/04/2019

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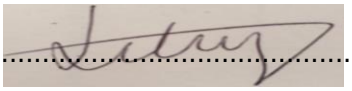
Name (please print):

Chris Rollinson

Position: Research Governance Manager, UHP

Chief Investigator:

Signature: 

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Name: (please print):

Laura Cottey

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GLOSSARY OF ABBREVIATIONS

AE	Adverse event
CI	Chief Investigator
CRF	Case Report Form
ED	Emergency Department
GCP	Good Clinical Practice
ICH	International Conference of Harmonisation
NHS	National Health Service
NRES	National Research Ethics Service
R&D	NHS Trust R&D Department
REC	Research Ethics Committee
TERN	Trainees Emergency Research Network
UK	United Kingdom

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Study Co-coordinator	Dr Tom Roberts RCEM Trainee Emergency Research Network Fellow, Bristol
Sponsor	University Hospitals Plymouth NHS Trust (UHPNT) is the main research sponsor for this study. For further information regarding the sponsorship conditions, please contact the Research Development & Innovation Manager at: Research Office, University Hospitals Plymouth NHS Trust, Level 2 MSCP, Bircham Park Offices, 1 Roscoff Rise, Derriford, Plymouth PL6 5FP Telephone 01752 432842
Funder(s)	RCEM TERN project
Key Protocol Contributors	Trainee Emergency Research Network (TERN) executive team
Committees	**TERN executive committee** **Study Steering Committee** Professor Daniel Horner RCEM Professor, Manchester. Carrie Thomas, Emergency Department Registrar, London

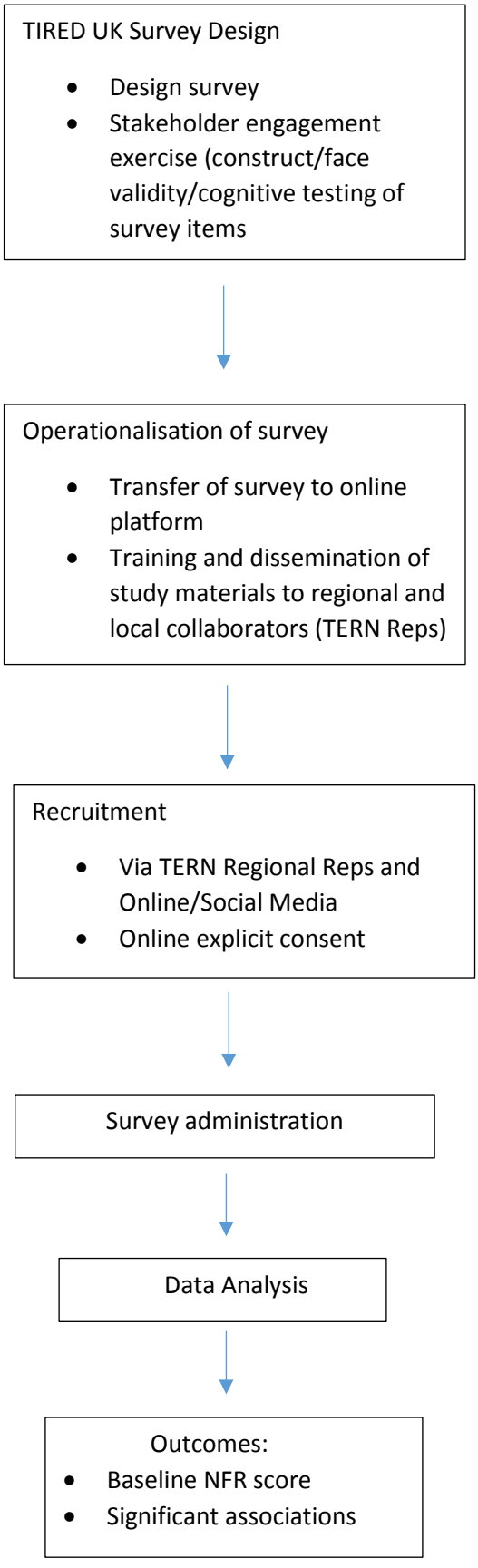
FUNDING AND SUPPORT IN KIND

FUNDER(S) (Names and contact details of ALL organisations providing funding and/or support in kind for this study)	**FINANCIAL AND NON FINANCIAL SUPPORT GIVEN**
Royal College of Emergency Medicine research grant	Grant number TERN Award GR222017

STUDY SUMMARY

Study Title	Trainee led evaluation of the need for Inter-shift Recovery among Emergency Department doctors in the United Kingdom.
Internal ref. no. (or short title)	The TIRED-UK Study
Study Design	Survey study
Study Participants	GMC registered doctors practising in a UK Emergency Department (ED) during the study period.
Planned Study Period	12 months
Summary of research question/aims (specific to project phase)	
Cross Sectional Survey of Emergency Department (ED) doctors	*Question:* What is the baseline need for recovery (NFR) score among ED doctors in the UK and which factors influence NFR? *Aims:* • Conduct a national study to characterise the baseline NFR score in ED doctors across the UK. • Determine whether there are any associations and differences between NFR scores and demographic, occupational, personal wellbeing, rota characteristics, or geographical region variables.

STUDY FLOW CHART



PLAIN ENGLISH SUMMARY

Providing safe and effective emergency care is difficult, especially as patient demand and expectation increases, and resources become more constrained.[1] Increasingly, Emergency Department (ED) doctors are becoming aware of the potential negative impact of fatigue and tiredness on clinical effectiveness and patient safety, as well as on their own physical and psychological wellbeing. It is also possible that fatigue—and specifically the need for recovery (NFR) between working shifts ('intershift recovery)—is an early feature, or possibly even a discrete precursor, of occupational burnout. If so, the measurement of fatigue and NFR could act as a simple 'early warning' indicator for burnout, which could empower individuals and institutions to make positive change before long standing negative effects ensue. At present burnout which is characterised as a syndrome defined by the presence of emotional exhaustion, depersonalisation and loss of job satisfaction, is thought to be present in up to 60% of ED doctors at any one time.[2] Not only is burnout unpleasant and linked to worse health outcomes for sufferers—including major depression and suicide—it may in its own right lead to worse patient outcomes, poor patient experience, and contribute to staff retention and recruitment problems. In turn, the latter stands to exacerbate the pressures on those who remain, establishing a vicious cycle.

In addition to being a useful measurement tool or staff fatigue it is possible the NFR could also offer a major advantage over 'burnout inventories' currently used to assess staff wellbeing, which serve to only identify and categorise the problem after it has occurred, at a point when interventions are reactive rather than proactive and likely to be more complex, costly, and less effective.

Using the comprehensively validated *Need for Recovery* (NFR) scale, this study aims to provide an assessment of ED doctors' need for intershift recovery across the UK, which will allow for point comparison between populations and pre and post work-based interventions. The study also aims to establish whether factors including demographic characteristics such as gender, caring responsibilities and health problems and occupational characteristics such as stage of training and rota pattern, affect an ED doctor's need for intershift recovery. Finally, data will be exploited to identify characteristics of doctors who are 'outliers', and who need much more or less recovery than is normal and to look at demographics, working patterns or organisational factors which may influence this.

It is anticipated that the findings of this study will be of interest to employers to guide the implementation of strategies to reduce unnecessary need for recovery amongst doctors. If an association between early increased need for recovery and perceived risk or current

burnout is demonstrated, the scale may be used to monitor staff wellbeing and compare wellbeing between different populations or localities. On an individual level, the survey may empower individual clinicians to increase self-awareness and management of personal fatigue and need for inter-shift recovery.

Although this study proposal is unique to ED doctors, it is anticipated that the methodology will be applicable to other staff groups within emergency care, other healthcare settings, and other industries.

What is the 'Need for Recovery': A more detailed insight

The concept of 'need for recovery' refers to the perceived need to recover from the physiological and psychological demands of a working day. Where increased need for recovery is not identified or acted upon, the effects can be cumulative. We hypothesise that increased need for recovery occurs before the development of long-term health problems or features of burnout such as depersonalisation, emotional exhaustion, and reduced personal accomplishment.

The 'need for recovery' (NFR) scale is a validated questionnaire originally developed in the Netherlands, to assess how work demands affect inter-shift recovery.[3] It features eleven items requiring a dichotomous ('yes'/'no') response, takes only a few minutes to complete, and shows high acceptability amongst surveyed populations. Responses are summated to provide an NFRS of 0-100, with '0' representing the least attainable need for recovery and 100 representing the highest need. The instrument has good reliability (Cronbach =0.82) and has been validated in two large cross-sectional studies (n=80, 870), where norms within the Dutch general population have been generated.[4,5] Subsequent smaller studies have indicated norms in a range of health- and non-health related occupations.[6-11]

1. INTRODUCTION

1.1 Background

Emergency departments (ED) provide emergency care to patients 24 hours a day all year round. This often requires staff to work long consecutive shifts that can result in fatigue. It is recognised that fatigue negatively impacts productivity, exacerbates the risk of human error, and in the clinical context may impact effectiveness, safety and experience of care. Fatigue may be measured by a variety of approaches including psychometric testing, assessment of reaction speeds, and personal diaries. However, these methods are impractical for providing rapid assessment within a working population and may have limited validity. Indirect measurement of fatigue using the 'need for recovery' (NFR) score is therefore an attractive alternative. The scale was originally developed in the Netherlands to assess how work demands affect intershift recovery.[3] It features eleven items requiring a dichotomous ('yes'/'no') response, takes only a few minutes to complete, and shows high acceptability amongst surveyed populations. Responses are summated to provide the NFR score of 0-100, with '0' representing the least attainable need for recovery and '100' representing the highest need. The instrument has good reliability (Chronbach α=0.82) and has been validated in two large cross-sectional studies (n=80 860), where norms within the Dutch general population have been generated.[4,5] Subsequent smaller studies have indicated norms in a range of health- and non-health related occupations.[6-10]

Table 1: NFR score—International Comparisons by Occupation and compared to 'whole population' average of Dutch Validation Study.[5]

Occupation	Bus drivers	Merchant Sailors	Nurses	**Whole Population**	Nurses	Paramedics	Miners
Country	NL	UK	BR	**NL**	NL	NL	IL
n	920	332	128	**12038**	922	53	80
NFRS	**27.2**	**36.4**	**36.4**	**38**	**39.4**	**43.6**	**55.2**

BR=Brazil; IL=Israel; NL=Netherlands; UK=United Kingdom; NFRS=Need for Recovery Scale

Feasibility of assessing NFR in a ED in the UK

A feasibility study to assess acceptability and utility of the NFR score within a single ED in the UK was conducted January 2018. Full results are provided in Appendix 1. In this study, permanent staff (n=209) were invited to participate in an online NFR survey. Additional items explored personal (n=4), work-pattern (n=14) and wellbeing/burnout (n=5) characteristics. The response rate was 85.1% reporting an average NFR score within clinical groups of 72.2, and was highest amongst senior medical trainees (79.9). Additional findings found that NFR score increased with age and shift duration and that NFR score was higher amongst part-time compared to full-time workers. This study indicated that the need for recovery amongst staff working in the surveyed ED exceeded all previously reported norms. It also confirmed very high acceptability of the survey amongst ED staff.

1.2 Rationale for current study

Being an ED doctor is an inherently high-risk occupation. Errors resulting from fatigue are likely to be common and result in excess morbidity and mortality for patients. In addition, fatigue is likely to negatively impact the health outcomes of providers, contribute to occupational burnout, and—where it is endemic—exacerbate recruitment and retention problems.[11,12] This study has the potential to aid patient safety by providing individuals and employers with an indication of who is most at risk of increased need for recovery, identify whether disparities exist between different staff groups, departments, and localities, and demonstrate whether increased need for recovery is a reliable precursor of future occupational burnout.

This research aims to evaluate NFR in UK ED doctors, and compare this to established population norms. This will allow the work intensity encountered by ED doctors to be compared meaningfully to other occupations. Once nationwide data collection is complete, it may be possible to understand characteristics indicating increased need for recovery within certain demographics of ED doctors e.g. training grade, less than full time and a range of working pattern and organisational characteristics. It is envisaged that practical recommendations and suggestions for improving working lives may result, the effectiveness of which can be monitored by organisations using serial evaluations of the NFR score.

1.3 Research question

What is the baseline need for recovery (NFR) score among ED doctors in the UK and which factors influence NFR?

1.4 Patient and public involvement

Staff wellbeing is the fourth highest priority of the James Lind Alliance Priority Setting Partnership, which was conducted following extensive consultation with patients, public and carers.[13] This recognises that patients place high priority upon ensuring doctors attending them are well rested and satisfied with their jobs.

The concept of the TIRED study was presented to over 100 members of the public at a Research & Development PPI Conference on 20th September 2018. Participants were supportive of the concept of the study, and no concerns were raised.

1.5 Third party stakeholder involvement

A third-party stakeholder consultation has been conducted to determine how the results of the study may be applied at a strategic level to effect positive change. Stakeholders consulted were the Royal College of Emergency Medicine, British Medical Association and The Emergency Medicine Trainees' Association.

1.6 Professional stakeholder involvement

Results from feasibility work were presented at a local ED wellbeing event in the South West of England attended by approximately 40 professionals. In addition, national professional representatives were consulted at the TERN meeting held during the EuSEM European Congress on Emergency Medicine. A sub-group analysis of NFR amongst Emergency Nurses from the feasibility work was presented at the International Conference for Emergency Nursing in Australia in October 2018. Again, this highlighted interest in the study from across disciplines, with potential for international collaboration resulting.

To encourage active participation of UK ED doctors, focus groups were held with current ED trainees at the Emergency Medicine Trainees Association (EMTA) Conference in Cardiff. The aim of the focus group was established possible study facilitators and barriers to

operationalisation of the study and assessing face validity of the current iteration of the cross sectional survey. Specifically, participants considered the validity of need for recovery as a construct for ED doctors, the adequacy of study information, ethical protocol, and questionnaire design including selection of items and measurement scales. Participants reported that they felt measurement of the NFR may allow for meaningful comparison between ED which could empower positive change in the future. Participants did not raise any additional ethical concerns when directly asked and were satisfied with the content of the Participant Information. Participants gave valuable perspectives on minimising the length of the survey to avoid respondent fatigue, and strongly recommended differentiation of NFR from occupational burnout. As a result, there is no burnout inventory included in the proposed questionnaire. Similarly, participants questioned the utility of a repeat survey due to perceived problems with loss to follow-up and confounding factors such as job rotations. As such, planned follow up with a serial NFR evaluation has been omitted from this protocol.

2. STUDY AIMS

- Conduct a national study to characterise the baseline NFR score in ED doctors across the UK.

- Determine whether there are any associations and differences between NFR score and selected demographic, occupational and personal wellbeing, rota or organisational characteristics and geographical region variables.

3. STUDY DESIGN

A survey study utilising a cross-sectional survey consisting of the NFR score.

3.1 Methodology

The methodology has been designed with regard to the Checklist for Reporting Results of Internet E-surveys (CHERRIES).

A 57-item cross sectional survey has been developed for online administration (please see Annex 1: TIRED-UK_Participant_Questionnaire_262048). The survey will seek to gather information on consent (4 items), demographic characteristics (6 items), NFR questionnaire

(11 items), length of time working in EM (2 items), commute (5 items), operational/rota characteristics (25 items), personal circumstances (2 items), perceptions relating to burnout (2 items). The survey should take no longer than 10-15 minutes for each participant to complete, with attention to reducing respondent fatigue and participants will be notified of this at the start of the survey. Questions will use binominal scales, multiple options and free text questions.

Each participant will be assigned a study identification number but no individually identifiable information will be collected.

In addition to the individual doctor surveys, a nominated TERN representative will collect anonymous site-specific data from EDs which is collected locally and nationally (see Annex 2: TIRED-UK_Participant_Questionnaire_262048). This will include broader information on the characteristics of the ED, staffing, rota pattern, leave allocation, teaching & training, consultant/ senior supervision, case-mix, specialist designation (e.g. Major Trauma Centre, Hyper acute Stroke centre, etc.) which can then be associated with individuals' responses.

3.2 Survey testing

This team has previously conducted this survey in a ED single UK centre, Appendix 1, as discussed in the background section. Lessons learnt from this feasibility work has been used to refine this protocol.

Questions have been peer reviewed by the TERN Executive Committee and TERN Regional Representatives. A focus group at the Emergency Medicine Trainees Association annual conference, discussed the concept and reviewed the proposed questions.

Questions were also piloted with an ED consultant, ED middle grade doctor and a Foundation Year 1 and 2 doctor and less than full time doctor.

3.3 Study outcome measures

i) **Primary Outcome**

a. Baseline NFR score amongst ED doctors in the UK.

ii) **Secondary outcomes**

a. Determine any associations between NFR score and selected demographic, occupational and personal wellbeing, rota or organisational characteristics and geographical region variables.(see Table 1a)

Table 1

Table 1a: Demographic, Occupational and Wellbeing descriptive characteristics	
Demographic Characteristics	Age Gender Caring responsibilities outside of work Long term health conditions Disability Nationality Ethnicity
Occupational Characteristics	Grade Time spent working in ED Individual rota/shift characteristics Sub-speciality interest (Formal/ Informal) Non- Clinical Roles and Responsibilities
Wellbeing Characteristics	Availability of rest breaks Feeling overwhelmed at work Perceived work life balance Perceived burnout (present) Perceived burnout (future risk)

4. PARTICIPANT ENTRY

Participants will be invited to participate if they are working as a doctor within an ED in the UK at the time of the survey for the preceding month.

4.1 Recruitment

Participation in the survey is voluntary. Participants will be recruited by self-accessing the link to the online survey. The survey link will be advertised through posters distributed to EDs, emails from local and regional TERN representatives and social media including Twitter, RCEM learning and Facebook. In addition, the Emergency Medicine Trainees

Association and Forum for Associate Specialist and Staff Grade Doctors in Emergency Medicine will be asked for assistance in publicising the survey.

For pragmatic reasons, a stratified sample based upon geographical region (Table 2) will be sought to represent the cross-section of EDs in the UK. Each regional TERN representative will be required to advertise the survey at a pre-determined number of centres, to include at least one Type 1 ED designated as a major trauma centre and an additional Type 1 ED. Each representative will be tasked to achieve a response rate amongst all included participants of ≥70% within these selected centres. This data will be reviewed to confirm representativeness of the data obtained from centres.

Table 2: TERN Geographical Regions At least one Type 1 ED with major trauma centre status, and an additional Type 1 ED will be sought.
Scotland
Yorkshire and Humber
North West
North East
Wales
West Midlands
East Midlands
East of England
Peninsula (South West)
Severn
Thames Valley
Wessex
London-North Central and East
London-North West London
London-South London
Kent, Surrey and Sussex
Northern Ireland

4.2 Informed consent

Consent will be explicit prior to completion of the survey. A full participant information sheet (Appendix 2) will be provided at the beginning of the survey, and participants will be required to confirm (*via* a form function) that they have read and understand the information and they consent to part in the study.

4.3 Inclusion criteria

- Doctors with full or provisional registration with the General Medical Council who have been employed in their main role as an ED doctor for the preceding month at the time of completion of the survey.
    - This includes; ED consultants, ED specialist training doctors, ED associate specialist and staff grades doctors, acute common care stem trainees, GP trainees, Foundation Year one and two doctors, clinical fellows and trust grade doctors.

4.4 Exclusion criteria

- Doctors whose main place of employment is outside of the ED. This includes speciality doctors employed in specialties other than Emergency Medicine.

- EDs designated as Type 2, 3, or 4 by NHS England.

4.5 Withdrawal

Participants can exit the survey online if they no longer wish to take part, however it will be clear in the introductory statement that questions already completed will be collected and data reviewed.

4.6 Administration

The survey will be administered via the online platform RedCap. This is an electronic data capture platform that is fully compliant with Good Clinical Practice, 21 CFR Part 11, GDPR, ISO 27001 and ISO 9001.[14] It has stringent data security procedures and uses private

servers. Prior to selection of an online platform a database specification was created which can be found at Appendix 3.

l) **Regional/Local Collaborator Involvement**

Overall responsibility and oversight for the study will be provided by the study Chief Investigator. The co-investigators and study coordinator will assist with the day-to-day management of the study.

Regional and local TERN representatives will be responsible for the local advertisements of the survey and for collecting local data from EDs for participants who have contributed. All TERN representatives will have completed a GCP course.

Questions from participants regarding the study will be directed to the study coordinator in the first instance.

5. ADVERSE EVENTS

This is a low risk cross-sectional survey and there are no anticipated adverse events. The NFR questions used in the survey have been well validated in large populations. It is possible that questions relating to personal health and wellbeing and occupational burnout may trigger emotive responses in participants. Participants will be signposted to suggested local sources where they may obtain support. National advice numbers and websites will also be provided for the BMA Counselling service, the Samaritans and the Doctors Support Network (Appendices 4 & 5).

6. ASSESSMENT AND FOLLOW-UP

Results will be widely disseminated (anonymised) in multiple formats, from local presentations by TERN reps through to publication and dissemination on RCEM online resource.

7. STATISTICS AND DATA ANALYSIS

Statistical support has been sought to inform survey design and the selection of scales. Survey data analysis will be conducted by the Chief Investigator, co-investigators and study coordinator with the support of a biostatistician.

Descriptive statistics will be analysed using Microsoft Excel. Further analysis will occur using IBM SPSS. The data will also be ranked to identify the positive and negative outliers. Free text responses will be individually read and categorised using content analysis.

7.1 Description of statistical methods

The overall 'baseline' NFR score will be determined and associated with demographic, occupational and wellbeing characteristics. Descriptive statistics will be detailed and free text comments will be individually read and categorised by theme into groups. The information will be displayed graphically in jittered scatter plots to look for associations.

7.2 The number of participants

This survey will be open for the period of one calendar month (anticipated March/April 2019). The number of participants who can participant is not limited.

7.3 Criteria for the termination of the trial

The termination of the trial will be reached when the online survey has been open for one calendar month.

7.4 Procedure for accounting for missing, unused, and spurious data

Response rates will be analysed by grouping for certain characteristics to ascertain whether a particular demographic did not complete certain questions.

7.6 Procedures for reporting any deviation(s) from the original statistical plan

Any requirement to deviate from the original statistical plan will be discussed with the Study Steering Committee and documented appropriately with a full explanation as to reasoning and requirement.

7.7 Inclusion analysis

All eligible participants will be included in the analysis.

8. ARCHIVING

Data will be stored for 10 years in the University Hospitals Plymouth NHS Trust's dedicated archive facility.

9. ETHICAL AND REGULATORY COMPLIANCE

9.1 Ethics and HRA approval

The Chief Investigator has submitted this protocol to obtain approval from the Health Research Authority (HRA) and Research Ethics Committee (REC) which will be in place to any commencement of study. The Investigator will ensure that this study is conducted in full conformity with relevant regulations and with the UK Policy Framework for Health and Social Care Research (2017), which have their basis in the Declaration of Helsinki.

9.3 Confidentiality

To comply with the Data Protection legislation information must be collected and used fairly, stored safely and not disclosed to any unauthorised person. This applies to both manual and electronically held data.

The Chief Investigator will preserve the confidentiality of participants taking part in the study and ensure the EU General Data Protection Regulation (GDPR) in conjunction with the UK Data Protection Act 2018, which sets out the statutory requirements for the processing of personal data is adhered to.

All investigators will comply with regards to the collection, storage, processing and disclosure of personal information in accordance with current regulations.

No personally identifiable information will be collected. Survey information will be stored on the secure electronic database used for data collection. There will be no paper copies. When data is exported from the electronic database it will be anonymised. If data is required to be transferred or sent this will be done using encrypted digital files or storage media. Only the CI, co-investigators and persons conducting the study will have access to information. The Sponsor will have access to the data on request.

9.4 Sponsor

UHPNT will act as the sponsor for this study.

9.5 Funding

The Royal College of Emergency Medicine TERN project is funding this study.

9.6 Monitoring

The study will be subject to monitoring by UHPNT under their remit as sponsor to ensure adherence to the UK Policy Framework for Health and Social Care Research (2017). All UHPNT studies will be initially monitored at 25 days (+/- 7 days) after R&D capability and capacity has been given. The subsequent level of monitoring will be determined by a risk assessment, or on a for cause basis. The study may also be audited/ inspected by regulatory bodies to ensure compliance with national regulations.

10. STUDY MANAGEMENT

The day-to-day management of the study will be co-ordinated by the study coordinator, Tom Roberts, with input from the Chief Investigator and co-investigators. The study steering group will meet, via teleconference, quarterly.

11. PUBLICATION POLICY

On completion of the study the data will be analysed and tabulated and a Final Study Report prepared. No participants or specific departments will be identified in any report, publication or presentation. Regional variation will only be commented on if individual ED's cannot be identified from the data reported.
Participants will receive a report on the study's findings at the earliest convenience. The Final Study Report will be subsequently condensed into manuscript format for submission to a peer reviewed scientific journal. The work will also be submitted for presentation at a relevant scientific meeting. Identifiable personal data will not be used during publication of the results.

When the results of a study are published, any named researchers must have provided written consent for their name to appear in the publication prior to it being published. Funding and supporting bodies will be acknowledged on any reports or publications.

Publication recognition will be conducted in accordance with the TERN publication policy.

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APPENDICES

Appendix 1	Feasibility Data
Appendix 2	Participant Information
Appendix 3	Post- Survey Instructions
Appendix 4	Electronic Survey Platform Specification

Appendix 1: Abstract Feasibility Study

Need for Recovery amongst staff in a UK Emergency Department—Results of a cross-sectional survey (Part I: Quantitative Findings)

Background

Emergency Department (ED) staff work long shifts around the clock, and are at risk of fatigue. Fatigue impairs decision making, leads to errors, and negatively affects well-being. To prevent fatigue, staff must be able to recuperate between shifts.

The 'need for recovery' (NFR) scale has been developed in the Netherlands to assess how work demands affect inter-shift recovery using eleven items requiring a dichotomous response. Responses are summated to provide the NFR Score (NFRS) of 0-100. The instrument has good reliability (Cronbach α=0.82) and has been validated in a cross-sectional study (n=12,038), demonstrating an average NFRS of 38.1 amongst the Dutch population. Subsequent work confirmed an NFRS of 43.6 for paramedics and 39.4 for nurses.

To our knowledge, this is the first study to evaluate the NFR scale in a UK ED setting.

Aims

1. Quantify NFRS amongst staff working in a UK ED setting.

2. Describe the relationship of NFRS with personal characteristics and work pattern.

3. Determine whether there is any association between NFRS and likelihood of burnout, feeling and risk of burnout, and perception of personal wellbeing.

Methods

Institutional approval was granted. Permanent staff (n=209) working in a large UK ED (93,000 attendances/yr.) were invited to participate in an online NFR survey during January 2018. Additional items explored personal (n=4), work-pattern (n=14) and wellbeing/burnout (n=5) characteristics.

Results

Response rate was 85.1% (n=178). Nurses formed 39.3% of respondents (n=70) and physicians 32.0% (n=57). Others comprised radiographers, allied professionals and administrators. Average age was 37 years; 71% were female; and 38% had caring responsibilities.

The average NFRS was 69 for males, and 70.9 for females. Average NFRS within clinical groups was 72.2, and was highest amongst senior medical trainees (79.9).

NFRS increased with age (64.5 aged over 51 years *vs.* 60.9 aged between 21 and 30 years (p=0.02)) and shift duration (74.5 greater than 12 hours *vs.* 61.0 less than 8 hours (p=0.03)). NFR was higher amongst part-time compared to full-time workers (73.6 *vs.* 67.2 (p= 0.04)). Part-timers more frequently reported caring responsibilities (p=<0.01).

NFRS was elevated in those reporting burnout (51.8%; NFRS 83.9 *vs*. 58.7 (p=<0.01)), perceiving high risk of future burnout (73.7%; NFRS 67.9 *vs*. 49.6 (p=<0.01)), and dissatisfied with work-life balance (57.8%; NFRS 66.4 *vs*. 58.5 (p=<0.01)).

Discussion

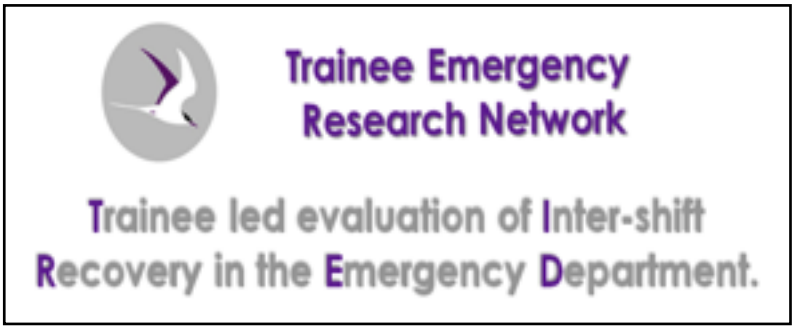
The high response rate confirms acceptability of the NFR scale amongst ED staff.

NFRS amongst the study population exceeds previously reported norms. Furthermore, this study confirms an association between NFRS and age, shift duration, presence of burnout, perceived risk of burnout, and dissatisfaction with work-life balance.

Operational pressures encountered in this single centre study were broadly reflective of the state of emergency care nationally, and as such, findings are likely to be widely applicable.

A larger scale study is required to confirm these findings, and evaluate the utility of the NFR scale as a tool for monitoring staff wellbeing and risk of burnout in the ED.

Appendix 2: Participant Information



Participant Information Sheet

Welcome to the 2019 TERN Need for Recovery Survey.

This is an electronic participant information sheet. Please take a minute or two to read this information before proceeding with the survey.

What is need for recovery?
Need for recovery is the time taken to physically and psychologically recover from work. Increased need for recovery is linked to fatigue and a range of physical and psychological health outcomes including burnout.

Why have I been asked to take part?
You are either:

- A doctor working in an Emergency Department which has been nominated to participate in this survey.
  or
- You are an interested doctor who works in another Emergency Department.

We are keen to seek responses from both of these groups.

What is the purpose of the study?
This survey is being conducted as part of a national survey by the Trainee Emergency Research Network (TERN). The project is being led by Dr Laura Cottey (Chief Investigator) and Dr Blair Graham, with oversight from the TERN executive committee. We hope that the results from this survey will provide a baseline assessment of trainee need for recovery and demonstrate risk factors that may indicate an increased need for recovery. It is hoped that this survey will provide insight into the phenomenon of need for recovery amongst Emergency Department doctors, show where differences exist, and how need for recovery may be reduced in the future. Ultimately it is hoped that this survey may lead to initiatives to improve the working lives of doctors in the Emergency Department.

What will happen if I take part?
You will be asked to consent to take part and confirm that you have read this participant information sheet. You will asked to take part in this electronic questionnaire. You should allocate about 10 to 15 minutes to complete the survey, although you can save and return to completing it at a later time.

Do I have to take part?

In order that these results can inform future initiatives to improve working lives of emergency doctors, we do require a robust response rate (i.e. at least 70% of doctors to respond within the nominated centres). However, you are under no obligation to take part and may withdraw at any point without the need to give a reason.

Should you have uncertainties of queries about this survey, please do not hesitate to contact the study team.

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.

If you would like to be formally withdrawn from the study at any point, please contact the study team (email). You do not have to give a reason.

Are there any potential risks or benefits of taking part?
This survey will provide valuable insight into the wellbeing of emergency department doctors nationally. We appreciate issues such as wellbeing and burnout are sensitive. We have included some information about sources that you might wish to contact for support both as part of this introduction, and at the end of the survey.

Who is involved in this project?
The project is being led by Dr Laura Cottey (Chief Investigator) and Dr Blair Graham, with oversight from the TERN executive committee which is led by Dr Tom Roberts. The study is indirectly supported by the Royal College of Emergency Medicine, but TERN is independent from the college.

What if something goes wrong?
It is very unlikely that anything will go wrong. If you feel it does, please contact the study team directly.

How will you protect my data and confidentiality?
The University Hospitals Plymouth NHS Trust is the sponsor for this study. The sponsor will be using information in order to undertake the study and will be responsible for looking after your information and using it properly. The data collected will be kept for 10 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. To safeguard your rights, we will use the minimum personally identifiable information possible.

This study is also compliant with the General Data Protection Regulations (GDPR). For more information about GDPR click here.

Our data protection officer is Name and you can contact by [email]

How may I contact the study team in the future?
You can contact the study team by emailing Dr Laura Cottey at laura.cottey@nhs.net

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
-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.

You can also access further information and signposting online via the Doctors Support Network https://www.dsn.org.uk/

Consent

□ I have read and understood the participant information

□ I understand the information about confidentiality and GDPR

□ I understand that I may withdraw my involvement from the survey at any point

□ I agree to take part.

[Proceed]

Appendix 3: Post Survey Information

Thank you for participating

Your responses have been received.

If you have any questions outstanding, or would like to withdraw your involvement, please contact [Email]

What to do if you need support about wellbeing
Please remember that 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
-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.

You can also access further information and signposting online via the Doctors Support Network https://www.dsn.org.uk/

Appendix 4: Electronic survey platform specification

Provisional specification for Database:

The TIRED Study will consist of

- Establishing the baseline need for recovery (NFR) score amongst Emergency Department (ED) Doctors nationally, and draw associations based on demographic/ operational/ rota characteristics.

A questionnaire platform and database is required to undertake the study. The database should be able to accommodate a large, national sample- for example, the number of trainees and consultants currently employed in ED's in the UK is in the region of 5,000.

Any platform used must have full compliance with data protection/ GDPR requirements.

The questionnaire will be completed by front-line doctors who are very busy. It is imperative that the format is user friendly. In particular, the questionnaire should be quick and intuitive to complete, and respondent fatigue kept to a minimum. The questionnaire should be accessible via both PC and mobile device.

The results database should allow easy interpretation of basic results (descriptive statistics) and sub-groups analysis based on demographic/occupational/rota characteristics. Data must be easily transferable into a statistics package (e.g SPSS).

This is a provisional outline of requirements—please contact blair.graham1@nhs.net to discuss further.