



Scoring guide

0 – Unacceptable.

1 – Uncertain; may be acceptable with further clarification.

2 – Acceptable.

Title

Please note that should this application be approved, its title, summary, lead contact name and email address will be published on the UKMED website.

The role of academic attainment in understanding sex differences in specialty choice and fitness to practise.

Summary

Please outline your proposed research covering all aspects. Maximum 250 words.

The proportions of men and women in different medical specialties varies greatly [1]. Understanding how and why is important for effective workforce planning and the provision of future healthcare, and to reduce sex segregation in some specialties. It may also help us understand other areas of stark sex differences, such as disciplinary action, where male doctors have nearly 2.5 times the odds of facing medico-legal action [2], and doctors from certain specialties are at higher risk of receiving sanctions [3]. Sex differences in specialty choice are partly explained by features such as how plannable, technical, and intellectual a specialty is [1]; but success in obtaining a training place depends on competition ratios, selection methods, and candidates' previous academic attainment – also potentially associated with sex. Academic performance is also important to help us understand how sanctions relate to sex and specialty, because past academic performance predicts future academic performance [4], and poor academic performance is associated with increased odds of sanctions [5].

References

Please reference up to five key papers from your literature review with a sentence explaining the relevance of the paper to the proposed study.

1. Elston MA. Women and medicine: the future. London: Royal College of Physicians, 2009.
2. Unwin E, Woolf K, Wadlow C, et al. Sex differences in medico-legal action against doctors: a systematic review and meta-analysis. *BMC Medicine* 2015; 13:172.
3. Unwin E, Woolf K, Wadlow C, et al. Disciplined doctors: does the sex of a doctors matter? A cross-sectional study examining the association between a doctor's sex and receiving sanctions against their medical registration. *BMJ Open* 2014; 4:8.
4. McManus IC, Woolf K, Dacre J, et al. The Academic Backbone: longitudinal continuities in educational achievement from secondary school and medical school to MRCP(UK) and the specialist register in UK medical students and doctors. *BMC Medicine* 2013; 11:242.
5. Papadakis MA, Arnold GK, Blank LL, Holmboe ES, Lipner RS. Performance during Internal Medicine Residency Training and Subsequent Disciplinary Action by State Licensing Boards. *Ann Intern Med* 2008; 148(11):869-876

Research Questions

A) Setting the scene and confirming what is already known:

1. Is there a sex difference in the measures of academic attainment used for selection into medical school?
2. Is there a sex difference in the measures of attainment used for selection into the Foundation Programme?
3. Is there a sex difference in the specialties foundation doctors apply to, receive offers from, and ultimately accept offers from?
4. Is there a sex difference between those who did and did not apply for specialty training when eligible?
5. Is prior academic attainment related to a choice not to apply for specialty training when eligible?
6. Is there a sex difference in those doctors with and without Fitness to Practise declarations?
7. Is there an association between academic attainment and having a Fitness to Practise declaration?

B) The main research questions:

8. Is the sex difference in specialty choice (application, offer and acceptance) mediated by previous academic attainment, taking into account the potential confounders of demographics and medical school attended?
9. Is specialty choice associated with Fitness to Practise declarations, taking into account sex and prior academic attainment?

Scoring guide

0 – Aims or question not clear. Question appears irrelevant to policy or practice.

1 – Question is poorly defined or uncertain as to whether it is likely to impact on policy or practice if answered. More information or clarification may be required.

2 – Question if answered has significant implications for policy or practice in medical education.

Data Required from UKMED

Please specify data items and any filters that should be applied, for example date range. The tables below are as per the UKMED data dictionary http://www.ukmed.ac.uk/documents/UKMED_data_dictionary.pdf. For data type and descriptions please refer to the dictionary.

Scoring guide

- 0 – The data requested is not contained in the UKMED.
- 1 – The data requested is within the database but does not appear capable of answering the research question identified.
- 2 – The data requested is contained within the UKMED and is well linked to the research question.

ARCP_OUTCOMES

SELECT	NAME
<input type="checkbox"/>	PERSON_UID
<input type="checkbox"/>	ARCP_EVENT_ID
<input type="checkbox"/>	ARCP_SUBMITTING_DEANERY
<input type="checkbox"/>	ARCP_DATA_YEAR
<input type="checkbox"/>	ARCP_REVIEW_DATE
<input type="checkbox"/>	ARCP_PERIOD_START_DATE
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<input type="checkbox"/>	ARCP_MILITARY_IND
<input type="checkbox"/>	ARCP_ACADEMIC_IND
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<input type="checkbox"/>	ARCP_SPECIALTY
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<input type="checkbox"/>	ARCP_OUTCOME_DESCRIPTION
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Comments about requested ARCP_OUTCOMES data (Optional)

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Comments about requested ARCP_REASON data (Optional)

FPAS

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<input type="checkbox"/>	FPAS_OTHER_QUALINSTITUTION
<input type="checkbox"/>	FPAS_WITHDRAW_DATE
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<input type="checkbox"/>	FPAS_APP_STAGE
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Comments about requested FPAS data (Optional)

GAMSAT

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<input type="checkbox"/>	GAMSAT_MAJOR_SUBJECT_AREA_1
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Comments about requested GAMSAT data (Optional)

HEE_RECRUIT_OUTCOMES

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Comments about requested HEE_RECRUIT_OUTCOMES data (Optional)

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SELECT	NAME
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Comments about requested HESA_ACAD_YEARS data (Optional)

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Comments about requested HESA_QUALIFICATION data (Optional)

NTS_TRAINEE

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Comments about requested NTS_TRAINEE data (Optional)

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Comments about requested NTS_TRAINEE_IND_SCORES data (Optional)

PERSON_STUDENT

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<input type="checkbox"/>	HESA_MATCH_SCRIPT
<input checked="" type="checkbox"/>	HESA_COMDATE
<input checked="" type="checkbox"/>	HESA_OWNSTU
<input checked="" type="checkbox"/>	HESA_UCAS_APP_ID
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<input type="checkbox"/>	UKCAT_NATIONALITY2

Comments about requested PERSON_STUDENT data (Optional)

We also need
HESA_UKPRN_FIRST and
HESA_UKPRN_LAST please

UKCAT

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<input type="checkbox"/>	PERSON_UID
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<input type="checkbox"/>	UKCAT_SCHOOL

Comments about requested UKCAT data (Optional)

UKCAT_APPLICATIONQUALIFICATIONS

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<input type="checkbox"/>	UKCAT_SUBJECT
<input type="checkbox"/>	UKCAT_SCORE

Comments about requested UKCAT_APPLICATIONQUALIFICATIONS data (Optional)

UKCAT_CR_IMDPOSTCODES

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<input type="checkbox"/>	POSTZONE

Comments about requested UKCAT_CR_IMDPOSTCODES data (Optional)

UKCAT_CR_IMDZONES

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<input type="checkbox"/>	CLASS
<input type="checkbox"/>	NAME
<input type="checkbox"/>	LOCALAUTHORITY
<input type="checkbox"/>	COUNTRY
<input type="checkbox"/>	RANK
<input checked="" type="checkbox"/>	QUINTILE

Comments about requested UKCAT_CR_IMDZONES data (Optional)

UKCAT_CR_UCASSCHOOLCATGLIST

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<input checked="" type="checkbox"/>	CATEGORYDESCRIPTION

Comments about requested UKCAT_CR_UCASSCHOOLCATGLIST data (Optional)

UKCAT_CR_UCASSCHOOLLIST

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<input type="checkbox"/>	ADDRESS2
<input type="checkbox"/>	ADDRESS3
<input type="checkbox"/>	ADDRESS4
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<input checked="" type="checkbox"/>	COUNTRY
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<input checked="" type="checkbox"/>	CATEGORYID
<input checked="" type="checkbox"/>	SUBCATEGORYID
<input checked="" type="checkbox"/>	STATUS

Comments about requested UKCAT_CR_UCASSCHOOLLIST data (Optional)

UKCAT_CR_UCASSCHOOLSUBCATEGORYGROUPLIST

SELECT	NAME
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<input type="checkbox"/>	SCHOOLGROUPDESCRIPTION

Comments about requested UKCAT_CR_UCASSCHOOLSUBCATEGORYGROUPLIST data (Optional)

UKCAT_CR_UCASSCHOOLSUBCATEGORYLIST

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<input type="checkbox"/>	SCHOOLGROUPID

Comments about requested UKCAT_CR_UCASSCHOOLSUBCATEGORYLIST data (Optional)

UKCAT_RESPONSES_NONCOG

SELECT	NAME
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<input type="checkbox"/>	UKCAT_ITEM
<input type="checkbox"/>	UKCAT_RESPONSE

Comments about requested UKCAT_RESPONSES_NONCOG data (Optional)

UKCAT_RESULTS

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Comments about requested UKCAT_RESULTS data (Optional)

UKCAT_UCASAPPLICATIONCOURSES

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Comments about requested UKCAT_UCASAPPLICATIONCOURSES data (Optional)

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Comments about requested UKCAT_UCASAPPLICATIONGCSES data (Optional)

VW_UKCAT_RESULTS_NONCOG

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<input type="checkbox"/>	SECTION
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Comments about requested VW_UKCAT_RESULTS_NONCOG data (Optional)

VW_UKMED_ALLEGATIONS

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Comments about requested VW_UKMED_ALLEGATIONS data (Optional)

VW_UKMED_FTPCHARDECLARATIONS

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Comments about requested VW_UKMED_FTPCHARDECLARATIONS data (Optional)

VW_UKMED_FTP_SUMMARY

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Comments about requested VW_UKMED_FTP_SUMMARY data (Optional)

VW_UKMED_PERSON

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Comments about requested VW_UKMED_PERSON data (Optional)

VW_UKMED_PROTECTEDCHARS

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<input type="checkbox"/>	PARED_SRC

Comments about requested VW_UKMED_PROTECTEDCHARS data (Optional)

Study design, setting and source of data:

This will be a longitudinal study using UK-wide data. The data and permission to use the data for research purposes will be obtained from the GMC.

Population:

All doctors who entered a UK medical school in 2007 or in 2008, and who were eligible to apply for a Specialty Training Programme after completion of the Foundation Programme.

Primary outcome and exposure:

The outcome of interest is the Specialty Training Programme(s) the doctor applied to, received an offer from, and accepted the offer, after completion of their Foundation Programme.

The variable, Specialty Training Programme, may be collapsed into fewer categories, to ensure there is sufficient power to perform the statistical analyses. This is dependent on the number of doctors in each category. If we feel that fewer categories are required, two researchers will independently allocate each Specialty Training Programme into a collapsed specialty category, and any disagreements about the specialty allocation will be resolved through discussion. A Kappa statistic will be calculated to report the level of agreement between the two researchers.

The exposure of interest is the doctor's sex.

Background variables:

We are interested in whether previous academic attainment mediates the relationship between doctors' sex and specialty choice. The variables we will explore to measure academic attainment prior to medical school are GCSE grades and UKCAT performance, and for graduate students GAMSAT. The EPM ranking will provide a measure of undergraduate performance. The FPAS SJT score is not strictly a measure of academic attainment, but it will provide a measure of potential postgraduate performance. Other potential confounders we will include in our analysis are ethnicity, prior degree, school type, socioeconomic status, progress through medical school, and medical school.

We are also interested in whether the specialty choice of doctors with a history of Fitness to Practise declarations differs to that of doctors who do not have a history of Fitness to Practise declarations.

The STROBE statement will be used to guide our study.

Scoring guide

0 – Methods not appropriate to addressing research aims or question.

1 – Methods may seem outdated, over simplistic or not well adapted to nature of data.

2 – Methodology takes into account the nature of and type of data available and is suitable to address the research question.

Analysis proposed

We will commence with preliminary data analyses, providing descriptive statistics on the variables we have requested, and performing bivariate analyses to confirm and explore associations in the data. If necessary we will perform multiple imputation to account for missingness. This will enable us to answer research questions 1-7.

We will proceed by completing multivariate analyses using multi-level multiple regression modelling to answer research questions 8 and 9. Multinomial regression will be used to examine the predictors of which specialties participants applied to, and logistic regression to examine the predictors of being offered vs not being offered a place, and accepting vs not accepting a place, respectively. The models will include the background variables that modify the strength of association between the exposure and outcome variables. The final regression models will enable the calculation of an adjusted measure of effect and will be assessed for the presence of effect modifiers.

Scoring guide

0 – Analysis not appropriate to addressing research aims or question.

1 – Analysis may seem outdated, over simplistic or not well adapted to nature of data.

2 – Analysis takes into account the nature of and type of data available and is suitable to address the research question.

Proposed start date

Duration

01 08 2016
DD MM YYYY

13
months

Timeline (key milestones)

August 2016: Complete administration to enable access to UKMED data.
August-October 2016: Data management (preparing data for analysis).
October 2016-January 2017: Data analysis.
November 2016: Initial findings shared with the research subgroup.
February-April 2017: Preparation of research manuscript for dissemination, and for PhD thesis.
May 2017 onwards: Research manuscript submitted for publication in peer-reviewed journal.
September 2017: Research manuscript submitted as part of PhD thesis.

Proposal for dissemination of research (E.g. proposed conference submission, proposed journal):

We plan to prepare our research outputs as an original research article for publication in a peer-reviewed journal. We would aim to submit our research manuscript to a peer-reviewed journal that attracts an audience across medical disciplines.

The research project will also be prepared and submitted as part of a PhD thesis. Emily Unwin's PhD is examining the gender difference in the professional performance of doctors, and this research project will be a part of this work.

Scoring guide

- 0 – No statement of intended use.
- 1 – Intended uses unclear.
- 2 – There is a clear statement on the intended outputs which may include publication in a peer-reviewed journal, publication on an organisation's website, reports that are evaluations of a service rather than research, or publication as a PhD thesis.

Researchers

Please provide details of all researchers who will be involved in the study.

Lead researcher's title and name

Dr Emily Unwin

Organisation

UCL

Address

UCL Medical School
Room GF/664
Royal Free Hospital
Hampstead
NW3 2PF

Email address

emily.unwin.12@ucl.ac.uk

Telephone number

n/a

Scoring guide

0 – Team is not plausible with little evidence of relevant skills or track record. There is no governance structure defined or there is indication that it may not be accountable.

1 – Team may have obvious skills gaps or limited relevant research track record. Governance structure is outlined, but is not very clear.

2 – Proposed team members have a good track record in related research and are likely to have the skills to employ the proposed methodology and manage data issues. Governance structure is described in a clear and accountable way.

Partners – those who will have access to the data

Please list name, role, organisation, address, email and telephone details.

Partner 1	
Name	Dr Katherine Woolf
Role	Researcher and PhD supervisor
Organisation	UCL
Address	UCL Medical School Room GF/664 Royal Free Hospital Hampstead NW3 2PF
Email	k.woolf@ucl.ac.uk
Telephone	020 3108 9216

Partner 2	
Name	Dr Karim Keshwani
Role	Co-researcher
Organisation	UCL
Address	UCL Medical School Room GF/664 Royal Free Hospital Hampstead NW3 2PF
Email	k.keshwani@ucl.ac.uk
Telephone	n/a

Partner 3	
Name	Dr Chris Valerio
Role	Co-researcher
Organisation	UCL
Address	UCL Medical School Room GF/664 Royal Free Hospital Hampstead NW3 2PF
Email	christopher.valerio.09@ucl.ac.uk
Telephone	n/a

Additional contact details

If you wish to make a note of contact details of other researchers involved in this project who do not require access to the safe haven but do need to be included in communication, please list their name(s) and email(s) here.

1) Professor Jane Dacre
PhD supervisor
Royal College of Physicians
11 St Andrews Place
London
NW1 4LE
jane.dacre@rcplondon.ac.uk

2) Dr. Henry Potts
PhD supervisor
University College London
Institute of Health Informatics
401 222 Euston Road
London
NW1 2DA
h.potts@ucl.ac.uk

Outline each researcher's proposed role and the working time that will be committed to the research project (e.g. 0.5 FTE)

We (EU, KW, KK and CV) have conceived and designed the study. The original idea for the study was KK's and CV's. EU reviewed and modified the original idea and prepared the research proposal with support from KW.

1. Dr. Emily Unwin (EU)

EU will lead on this research project. She will work with KW to manage and organise the datasets in preparation for data analysis. She will work with KW to perform the data analysis and data interpretation. She will also write and prepare the first draft of the manuscript for publication. She will take responsibility for submitting any research manuscripts for publication.

October 2016-September 2017 0.5 FTE

2. Dr. Katherine Woolf (KW)

As EU's PhD supervisor, KW, will be involved in preparing the data for analysis, performing and reviewing the data analysis and data interpretation. She will critically review the manuscript prior to publication. KW will be responsible for reviewing EU's progress with this project and will meet with EU on a regular basis to discuss the project (1-2 times/month).

3. Dr. Karim Keshwani (KK)

KK will support EU with any data management required. He will assist EU in writing the first draft of the manuscript by supporting her in reviewing the literature. He will critically review the manuscript prior to publication.

4. Dr. Christopher Valerio (CV)

CV will support EU with any data management required. He will assist EU in writing the first draft of the manuscript by supporting her in reviewing the literature. He will critically review the manuscript prior to publication.

All authors will contribute to the final version of the manuscript and the revisions.

Scoring guide

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2 – Proposed team members have a good track record in related research and are likely to have the skills to employ the proposed methodology and manage data issues. Governance structure is described in a clear and accountable way.

CVs

Please provide brief CVs of the lead researcher and other researchers with a significant role.

1) Dr Emily Unwin

Current role

PhD candidate at UCL Medical School

Research summary

My research attempts to explore the gender difference in the professional performance of doctors, by using epidemiological techniques and examining large datasets. I aim to identify the possible areas that we, as researchers in medical education, can focus upon to bridge the gender gap and improve doctors' professional performance as a whole. I also hope to demonstrate how the quantitative techniques usually reserved for the discipline of epidemiology can be applied to medical education research.

Academic background

2012-current date: PhD candidate – Medical Education, University College London

2011-2012: Master of Science – Epidemiology, London School of Hygiene and Tropical Medicine

2000-2006: Bachelor of Medicine and Bachelor of Surgery – University College London

2003: Bachelor of Science – Psychology with Basic Medical Sciences, University College London.

Journal article publications – original research articles (first author only)

Unwin, E., Woolf, K., Wadlow, C., Potts, H.W.W., & Dacre, J. (2015). Sex differences in medico-legal actions against doctors: A systematic review and meta-analysis. *BMC Medicine*, 13 (1).

Unwin, E., Woolf, K., Wadlow, C., & Dacre, J. (2014). Disciplined doctors: Does the sex of a doctor matter? A cross-sectional study examining the association between a doctor's sex and receiving sanctions against their medical registration. *BMJ Open*, 4(8).

2) Dr Katherine Woolf

Current role

Senior Lecturer at UCL Medical School

Research summary

My research explores the factors influencing medical students' and doctors' performance, in particular the influence of ethnicity and sex. The aim of my research is to better understand how to improve doctors' performance, improve fairness in medical education, and ultimately improve patient care.

Academic background

2005-2008: PhD in Medical Education and Psychology, University College London

2000-2003: Bachelor of Science (first class honours) – Psychology, Goldsmiths College

Journal article publications – original research articles (first author only)

Woolf, K., Elton, C., & Newport, M. (2015). The specialty choices of graduates from Brighton and Sussex Medical School: a longitudinal cohort study. *BMC Medical Education*, 15 (1), 46.

Woolf, K., Potts, H., Patel, S., & McManus, C. (2012). The hidden medical school: A longitudinal study of how social networks form, and how they relate to academic performance. *Medical Teacher*, 34 (7), 577-586.

Woolf, K.V.M., McManus, I.C., Potts, H.W.W., & Dacre, J. (2011). The mediators of minority ethnic underperformance in final medical school examinations. *British Journal of Educational Psychology*.

Woolf, K., Potts, H.W.W., & McManus, I.C. (2011). The relationship between ethnicity and academic performance in UK-trained doctors and medical students: a systematic review and meta-analysis. *BMJ*, 342, d901.

Woolf, K., Potts, H.W.W., & McManus, I.C. (2011). The relationship between ethnicity and academic performance in UK-trained doctors and medical students: a systematic review and meta-analysis. *BMJ*, 342, d901.

Is the research funded, and/or does your organisation support the work? Please outline the status of any funding application and whether it is essential for the work to proceed. When submitting the form, please attach evidence of the funding organisation's support for the proposed work (e.g. meeting minutes).

This research project will form part of EU's PhD research. EU has a fully-funded PhD studentship at UCL Medical School. KW is EU's PhD supervisor. The costs of this research project will be covered by EU's existing studentship. KK and CV will work on this research project on a voluntary basis, with the aim of furthering their research experience. No additional funding is being sought.

Scoring guide

0 – No explicit plan for how staff time or other resources will be made available to complete the analysis in a timely manner.

1 – Plan for obtaining funding outlined but not guaranteed.

Internal institutional support for staff time may be available.

2 – A source of funding has been identified and obtained. This is likely to be sufficient to cover the costs of the work.

Have you received ethical approval, or an exemption from the requirement to obtain ethical approval?

When submitting the form, please attach the relevant correspondence.

We have applied to the UCL Research Ethics Committee to extend the ethical approval for EU's PhD research to include this research project.

We believe that the amendment to the existing ethical approval should have no impact on any ethical considerations.

We will notify the UKMED team when we have received confirmation of ethical approval.

Successful applicants will access data via a safe haven. In order to manage this process, please detail the software you will need to use to complete your research.

Please include details of the version number and the terms of your license. Depending on the software required you may need to bring your own license. Note that some of the licenses held by some UK universities will permit you to use the given software in the safe haven upon provision of a valid license key provided by your institution.

Data management and analysis software:

STATA/SE 12.1