

BMJ Open Influences and outcomes of less than full-time working in the medical profession: a systematic review protocol

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ABSTRACT

Introduction An impoverished medical workforce is a global phenomenon, which can impact patient care significantly. Greater flexibility in working patterns is one approach policy-makers adopt to address this issue, and the expansion of less than full-time (LTFT) working forms part of this. Studies suggest that LTFT working has the potential to improve recruitment and retention by aligning with how doctors increasingly want to balance their careers with other commitments and interests. What is less well understood are the influencing factors and outcomes related to LTFT working among doctors. This protocol outlines the methodology for a systematic review that will evaluate existing knowledge on LTFT working in the medical profession.

Methods and analysis The Preferred Reporting Items for Systematic Reviews and Meta Analyses guidelines will be followed. Embase, MEDLINE, PsycINFO, Health Management Information Consortium, Web of Science, Cochrane Library, Healthcare Administration, and Applied Social Sciences Index and Abstracts will be searched for studies published up to March 2022. Unpublished literature from EThos and ProQuest Dissertations & Theses Global will also be searched. Bibliographic searching, citation searching and handsearching will be used to retrieve additional papers. Authors will be contacted for data or publications if necessary. Two independent reviewers will undertake study screening, data extraction and quality assessment, with disagreements resolved by consensus or by a third reviewer if necessary. Data synthesis will be by narrative synthesis and meta-analysis if possible.

Ethics and dissemination The proposed study does not require ethical approval; however, it forms part of a larger body of research on the impact of LTFT working on the medical workforce for which ethics approval has been granted by the Research Ethics Committee at University College London. Findings will be published in a peer-reviewed journal and will be presented at national and international conferences.

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INTRODUCTION

The quality and performance of a country's healthcare system is greatly influenced by the size, skill mix and allocation of its health workforce,^{1–4} which the WHO defines as 'all people engaged in actions with the primary intent of enhancing health' (World Health

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A systematic and structured approach will be used to identify, critically appraise and synthesise data on the factors which influence doctors' choices to work less than full-time and the associated outcomes, providing a thorough and auditable summary of pertinent evidence on this topic.
- ⇒ A comprehensive search strategy and detailed eligibility criteria informed by published recommendations for conducting systematic reviews will be used, adding rigour to the study.
- ⇒ The review will synthesise data from a variety of study designs and methodology, providing a rich overview of the topic but also potentially increasing the likelihood of heterogeneity of the study findings.
- ⇒ Two independent reviewers will perform data extraction and quality assessment on all included studies, to ensure agreement.
- ⇒ The review will only include studies published in the English language due to the language proficiency of the reviewers and this could introduce bias.

Organization, p1).⁵ This includes clinical staff, for example, doctors and nurses, and non-clinical staff, for example, hospital managers and accountants. Health workforce shortages are a worldwide problem and the WHO estimates that by 2030, there will be a projected worldwide shortfall of 18 million health workers.⁵ In England, the National Health Service is regarded to be in crisis with an estimated shortage of approximately 100 000 health workers.⁶ This poses a real risk to patients because the ratio of health workers, especially doctors, to the overall population is strongly linked to important health outcomes.^{3 4 7 8} Furthermore, emerging data suggest that maintaining health sector employment can contribute to the growth of other sectors in society and can bolster the resilience of national economies during downturns.^{9 10}

Anand and Bärnighausen³ and Speybroeck *et al*⁸ demonstrated that health worker density (ie, the number of doctors, nurses and midwives per specified measure of the



population) is significant in accounting for mortality rates in children under 5, and maternal mortality rates. Both studies showed that when examined alone, doctor density was significant at lowering maternal and childhood mortality rates—a result not consistently replicated when the combined density of nurses and midwives was examined separately from doctors. This suggests that there is something particularly important about the relationship between the number of available doctors and population health outcomes. Pálsdóttir *et al* demonstrated the social and economic benefits of investing in health professionals with outcomes such as enhanced health worker retention in rural areas, improved health outcomes and the generation of new economic activity and social capital in local communities.¹¹ The European Jobs Monitor report from 2013 showed that during the great recession between 2007 and 2009, stable health sector employment in high-income countries contributed to their economic resilience during that time.⁹

Less than full-time working among doctors

So far in this review protocol, the term ‘health workforce’ has been used to describe the different professionals associated with the provision of healthcare in line with the WHO’s definition.¹² However, this review will concentrate solely on doctors because they represent one of the most well-recognised professions within the health workforce and, as mentioned earlier, the supply of doctors in particular has significant effects on population health.^{3 8} For this review, the term ‘medical workforce’ will be used specifically for doctors who contribute to the health workforce of any given population, in keeping with the same use of this term by the General Medical Council.¹³

Governments and policy-makers have historically explored different strategies to tackle the problem of medical workforce shortages.^{14 15} One such strategy, which aims to improve doctors’ work–life balance and retain more doctors in the profession, is to provide greater flexibility in the workplace.^{16 17} Flexible working has multiple definitions and comprises a range of practices, including working-from-home, less than full-time (LTFT) or part-time working, job sharing, annualised hours and career breaks. Flexible working patterns which give the worker more choice or control have been shown to reduce employee stress and increase job satisfaction, productivity and well-being.^{16 18–20} It can also benefit employers by increasing organisational performance, reducing employee absenteeism and enhancing employee retention.^{21 22} From August 2022 in the UK, postgraduate medical training will see the expansion of LTFT working to anyone who is interested, without the need for the previous eligibility criteria where doctors must either have caring responsibilities, an illness or exceptional circumstances to qualify.²³ Although this new model will be introduced gradually, little is known about how an expansion of LTFT working might impact the workforce, patient care and doctors themselves over time. This review will increase our understanding of some of

the career-related choices doctors make, and the interplay between these choices, the factors which influence them and the consequences on the environment in which the doctors work. These are important considerations when supporting doctors towards career success and a healthy work–life balance, and for enabling robust medical workforce planning—all of which could have beneficial effects on both doctors and patients.

A systematic review of literature on doctors choosing to work LTFT has never previously been carried out to our knowledge. A systematic approach has been chosen to ensure an exhaustive and reproducible search process encompassing peer-reviewed empirical research of different methods (ie, qualitative, quantitative and mixed methods) as well as literature from other sources such as unpublished work and the grey literature. As LTFT working among doctors in postgraduate training becomes more accessible in the UK, it is likely that this review will be repeated in the future. The use of clear criteria *a priori* for searching, selecting, appraising and synthesising the literature in this protocol will therefore allow for greater transparency and scientific rigour,²⁴ and will serve as an important template from which future literature searches and systematic reviews on this topic can be updated in due course.

Systematic review aim and questions

The aim of the review is to provide an overview of what is currently known about the factors and outcomes associated with doctors working LTFT, and to identify gaps in the literature where further research can be directed.

The review questions are as follows:

1. What factors and characteristics are associated with doctors who work LTFT?
2. What outcomes are there for patients, the medical workforce/health service and doctors in relation to doctors working LTFT?

METHODS AND ANALYSIS

Protocol registration

This systematic review protocol has been developed in line with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 015 guideline,²⁵ and is registered with the International Prospective Register of Systematic Reviews (PROSPERO)²⁶ (registration number: CRD42022307174). In the event of any amendments to the protocol, the changes along with the date and rationale for them will be updated in PROSPERO. Please see research checklist 1 in online supplemental information for the PRISMA-P checklist.

Eligibility criteria

Studies which focus on LTFT or part-time working among doctors of any grade, in any specialty and from any country, published up to March 2022 will be included. For the purpose of this review, LTFT working refers to a working pattern chosen by a doctor or group of doctors and clearly described as LTFT or part-time, or, in which

≤40 hours are worked per week in keeping with the maximum LTFT working hours in the UK. Studies which focus on undergraduate medical trainees or on health professionals other than doctors, and studies which focus on externally enforced reduced working hours or on outcomes related solely to gender differences within the medical profession rather than working patterns, will be excluded as these concepts are outside the scope of this review. Only studies published in the English language will be included because this is the only language common to the reviewers. Reviews will not be included so as not to duplicate findings from individual empirical studies. Instead, the bibliography of relevant reviews will be screened for suitable individual studies. Conference abstracts will not be included because of limited presented data, but authors of relevant abstracts will be contacted to provide further data and/or publications. Similarly, if

relevant full-text publications are not available through the university subscription, authors will be contacted for full text. If there is no response from any author after 4 weeks, their study will be excluded. Opinion papers and commentaries with no primary data will be excluded. Relevant grey literature such as theses, dissertations, government papers and organisational reports will be included because although not peer-reviewed, they represent detailed bodies of work which have either undergone thorough academic scrutiny, or have been sanctioned by important stakeholders. See [table 1](#) for further details on the inclusion and exclusion criteria.

Search strategy and information sources

The literature search will be performed in March 2022. The electronic databases Embase, MEDLINE, PsycINFO, Health Management Information Consortium (HMIC),

Table 1 Inclusion and exclusion criteria based on the PICO framework

Concept	Inclusion criteria	Exclusion criteria
Population	Doctors in postgraduate medical training (all grades) Specialist doctors General Practitioners	Other health professionals Undergraduates Studies with no clarification of which health professionals were studied Doctors undertaking LTFT postgraduate degree courses (eg, MSc or PhD) Doctors who only work LTFT in academic and not clinical medicine Doctors accredited in multiple specialties and work LTFT in one of their specialties but work full-time overall
Intervention	LTFT or part-time working Flexible work schedule involving voluntary reduced hours	Externally enforced reduced working hours for example, European Work Time Directive Studies focused on the flexibility to increase working hours Studies which describe reduced work hours but which fall outside of the review's definition of LTFT hours (ie, ≤40 hours per week)
Comparison	Full-time working or no comparison	
Outcomes	Characteristics and factors which influence LTFT working for example, sex, age, parenthood, career stage, etc Patient outcomes, for example, patient safety, patient satisfaction, clinical outcomes, etc Workforce/health services outcomes for example, doctor recruitment, staffing levels of doctor-led healthcare services, attrition from medical career, etc Doctor outcomes, for example, career satisfaction, well-being, burn-out, etc	Outcomes related to gender differences within the medical profession rather than working patterns Outcomes related to externally enforced reduced working hours
Context	Any specialty within medicine Any country Publications up to March 2022	Studies published in languages other than English
Study type	Quantitative Qualitative Mixed methods Grey literature such as theses, dissertations, government papers and reports from relevant organisations	Reviews Conference abstracts unless further data or publications can be obtained from authors Opinion papers, editorials and commentaries without primary data Book chapters or sections
LTFT, less than full time.		



Healthcare Administration, Applied Social Sciences Index and Abstracts (ASSIA), Web of Science and Cochrane Library will be searched for published literature, while ProQuest Dissertations & Theses Global and EThos will be searched for unpublished theses and dissertations. Embase, MEDLINE, PsycINFO and HMIC will be searched together via the OVID interface using a search strategy which incorporates subject headings that are common to all the individual databases. Where subject headings do not overlap across the four OVID databases, the extensive list of keywords in the search strategy will enable all the pertinent studies to be captured. No filters will be used, and no limits will be placed on publication date nor on language but, as mentioned in the previous section, only studies published in the English language will eventually be included in the systematic review. Healthcare Administration, ASSIA and ProQuest Dissertations & Theses Global will be searched together via the ProQuest interface using a search strategy which aligns with the ProQuest search parameters and thesaurus terms. In the ProQuest search strategy, no limits will be placed on date or language, but a filter will be applied to the ProQuest Dissertations & Theses Global database to exclude theses from Business, Science & Technology, Literature & Languages, The Arts and History because these subjects are not relevant to the review topic. Web of Science, Cochrane Library and EThos will be searched individually, each with its own search strategy with no limits and no filters. Please see online supplemental material 1 for the search strategies for each of the databases. The rest of the literature search for the review will comprise the following steps:

1. Bibliography searching, and citation searching of included papers for further relevant studies and additional grey literature such as government papers and reports from relevant organisations.
2. Handsearching if any particular journals are identified as key sources of relevant studies through the searches listed above.
3. Contacting authors if important data within included studies are unclear or incomplete.

Screening and study selection

All the studies retrieved from the full literature search will be exported to EndNote V.20 where duplicates will be removed. The remaining papers will be exported to Rayyan where a title and abstract sift, followed by screening of full texts, will be conducted by the first reviewer to identify papers which are relevant to the review questions, and to remove those which are not. A sample of 10% of all the original studies from the full search will be screened by a second reviewer independently, using the eligibility criteria listed in [table 1](#) to ensure agreement. Any disagreement between the two reviewers will be discussed and resolved by consensus, and if necessary, a third reviewer will facilitate this. The resultant included articles will undergo data extraction, quality assessment and data synthesis as described below. A PRISMA flow

diagram for systematic reviews²⁷ will be used to illustrate the study selection process, an example of which is shown in [figure 1](#).

Data extraction

A data extraction form adapted from the Best Evidence Medical Education coding sheet²⁸ has been designed to capture pertinent information from the selected papers including publication details, study design, study objectives, location and setting, methods of data collection and types of outcomes measured (see online supplemental material 2). This will facilitate the assessment of the degree of heterogeneity in the data, and thus, whether a meta-analysis of quantitative studies can be carried out. The data extraction form also incorporates a scoring system as an initial evaluation of the quality of the papers. As discussed below, any numerical appraisal scores for the studies will only be used as a way of informing the reader of the quality of the paper and will not be used to exclude articles. Data extraction from all the included studies will be undertaken by two reviewers independently. Any disagreements will be discussed and resolved by consensus and facilitated by a third reviewer if necessary. All extracted information will be uploaded onto a Microsoft Excel spreadsheet.

Quality assessment

Based on scoping the literature, it is anticipated that this review will yield empirical research papers with different study types (quantitative, qualitative and mixed methods) and outcomes. Grey literature will also be reviewed. To ensure that the methodological quality of the selected studies is rigorously assessed, the Mixed Methods Appraisal Tool (MMAT)²⁹ will be used to appraise empirical studies, and the AACODS (Authority, Accuracy, Coverage, Objectivity, Date, Significance) checklist³⁰ will be used to appraise grey literature. The MMAT is a critical appraisal tool originally developed in 2006 to assess the quality of quantitative, qualitative and mixed-methods studies in reviews.³¹ It was updated in 2018 to make the tool more efficient²⁹ and is an appropriate choice for this review given the likely heterogeneity of the studies that will be included. The AACODS checklist was designed for evaluating grey literature by critically appraising six domains: authority, accuracy, coverage, objectivity, date, and significance.³⁰

The use of summative numerical scores to determine the quality of individual studies is common practice in the appraisal process of reviews^{32–34}; however, the authors of the MMAT version 2018 discourage this because they argue that the specific details which determine the quality of the studies cannot be explicated by a single number. Instead, they advise reviewers to present the ratings of each criterion within the MMAT so that the reader has a better understanding of where the strengths and limitations of the included studies lie. In keeping with this advice, the ratings in both the MMAT and AACODS checklist for the included studies will be displayed in a

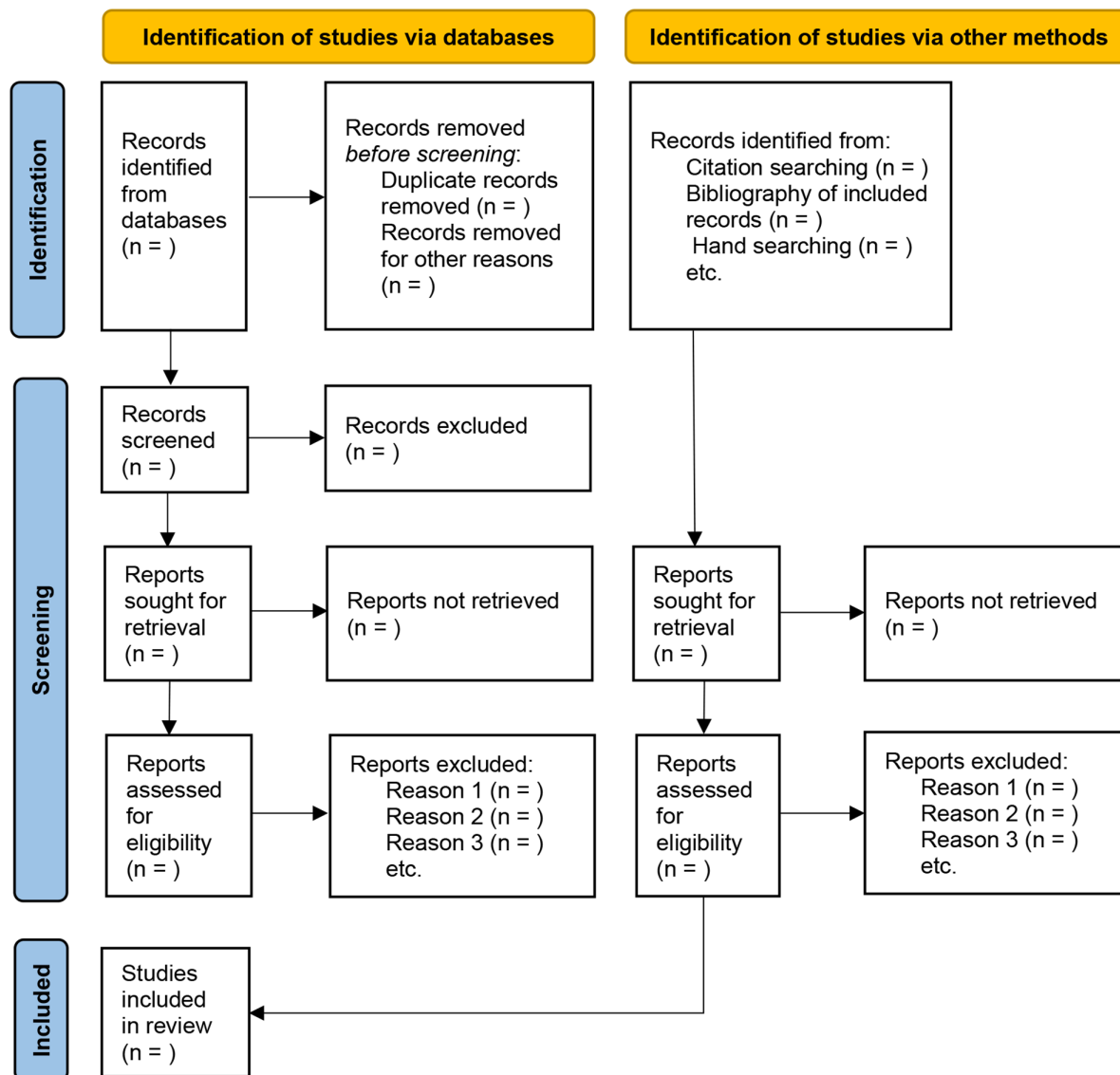


Figure 1 PRISMA flow diagram. PRISMA, Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols.

table to inform the reader's interpretation of the conclusions reached in the review. It is therefore anticipated that relevant studies will not necessarily be excluded solely based on what would conventionally be described as a low-quality score, because this review seeks to present as full a picture as possible of the existing data on LTFT working in medicine. Quality appraisal of all the included studies will be conducted by two reviewers independently, and any disagreements will be discussed and resolved by consensus and facilitated by a third reviewer if necessary. Please see online supplemental materials 3 and 4 for the MMAT and the AACODS checklists, respectively.

Data synthesis

A narrative interpretive approach to data synthesis will be adopted in keeping with the framework proposed by Popay *et al.*³⁵ Narrative synthesis primarily uses words and text to synthesise findings from multiple studies pertinent to a conceptual hypothesis or a review question. It is an

iterative process with four main elements, which are not necessarily completed in a linear fashion:

1. Developing a theory of change by making decisions about the review question and types of studies to be included.
2. Developing a preliminary synthesis of study findings by making initial descriptions of emerging patterns across the studies.
3. Exploring relationships in the data by identifying the factors which influence findings and describing how they influence the findings.
4. Assessing the robustness of the synthesis product by evaluating the strength of evidence from the data prior to drawing any conclusions.

Narrative synthesis can be used in a variety of review types, from those which require the manipulation of statistical data, to those which identify common themes across different sources to produce new insights or theories. It therefore lends itself well to this review which aims



to describe what is known about LTFT working among doctors by integrating findings from qualitative and quantitative sources. The process of developing a theory of change in this review has already commenced through a preliminary scoping search exercise, which facilitated the generation of the review questions and the eligibility criteria for relevant studies. The rest of the synthesis process will be carried out once the full literature search and study selection have identified the most relevant papers for data extraction.

The scoping search yielded quantitative articles in which a variety of variables and outcomes were studied. It is therefore possible that heterogeneity of studies may prohibit the pooling of quantitative data by meta-analysis. If this is the case, a purely narrative synthesis of data will be performed as described above. If, however, the full literature search generates enough appropriate quantitative studies for meta-analysis, this will be carried out using R software. Results from each included study will be summarised in tables showing dichotomous variables presented as risk ratios or ORs, and continuous variables presented as mean differences or standardised mean differences, with 95% CIs. Heterogeneity will be assessed using the χ^2 test where $p < 0.1$ will indicate the presence of heterogeneity. If present, the level of variation will be assessed using the I^2 test. If heterogeneity is high ($I^2 \geq 50\%$) and if feasible, this will be explored using subgroup analysis of covariates such as age, sex, parental status and specialty. In the case of high heterogeneity, a random effects model will be used for the meta-analysis. If there is sufficient data, funnel plots and the Egger test will be used to assess the likelihood of publication bias.

Patient and public involvement

Patients and members of the public were not involved in the development of this review protocol.

DISCUSSION

This is the first systematic review on LTFT working among doctors, and it will increase our understanding of the characteristics of doctors who choose to work LTFT, the factors which influence this choice and the impact on patients, the workforce and doctors themselves. This is important because in the current climate of doctor shortages, there is a need for a strong evidence base for any strategies adopted to increase workplace flexibility to enhance doctors' lives. Furthermore, gaining a better grasp of how working LTFT might influence different outcomes related to doctors could potentially inform decisions around future medical workforce planning so that health service provision and patient care are maintained to the highest standards. The review is also likely to uncover gaps in the literature and highlight areas for future research into the role of LTFT working in promoting the retention and recruitment of doctors.

There are some limitations associated with this study, which will be mitigated where possible. First, only papers

published in the English language will be selected for inclusion. Though this could potentially exclude relevant studies or introduce bias, it is a pragmatic decision based on the language proficiency of the reviewers, and readers will be invited to take this into account when interpreting the findings. Second, the broad scope of information sources could result in heterogeneity of study findings, making data synthesis more challenging. Narrative synthesis has therefore been chosen as the main method for data synthesis because words can be used to effectively summarise the findings from multiple studies, regardless of the study type. Meta-analysis will also be performed if there is sufficient quantitative data with comparable outcome measures.

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Contributors MB conceived the idea of the review and designed the protocol. AG, JD and AM substantively contributed to the development of the methodology. MB drafted the manuscript which was subsequently reviewed and approved by all authors.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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Supplemental material 1

Search strategies for all databases

Ovid search strategy used for Embase, MEDLINE, PsycINFO and HMIC

This search strategy was devised from a pilot search on the Embase database. The four databases named above (Embase, MEDLINE, PsycINFO and HMIC) will be searched together via the OVID interface using this search strategy which incorporates subject headings that are common to all the individual databases. Where subject headings do not overlap across the four OVID databases, the extensive list of keywords in the search strategy will enable all the pertinent studies to be captured. No filters will be used, and no limits will be placed on publication date nor on language.

1. resident/
2. exp physician/
3. medical education/
4. postgraduate education/
5. doctor*.ti,ab.
6. physician*.ti,ab.
7. trainee*.ti,ab.
8. resident.ti,ab.
9. residents.ti,ab.
10. residency.ti,ab.
11. medical graduate*.ti,ab.
12. medical officer*.ti,ab.
13. houseman.ti,ab.
14. SHO.ti,ab.
15. SHOs.ti,ab.
16. PRHO.ti,ab.
17. PRHOs.ti,ab.
18. house officer*.ti,ab.
19. FY1.ti,ab.
20. FY1s.ti,ab.
21. FY2.ti,ab.
22. FY2s.ti,ab.
23. fellow*.ti,ab.
24. foundation doctor*.ti,ab.

25. foundation train*.ti,ab.
26. registrar*.ti,ab.
27. consultant*.ti,ab.
28. specialist*.ti,ab.
29. general practitioner*.ti,ab.
30. GP.ti,ab.
31. GPs.ti,ab.
32. intern.ti,ab.
33. interns.ti,ab.
34. internist*.ti,ab.
35. internship.ti,ab.
36. clinician*.ti,ab.
37. medical practitioner*.ti,ab.
38. staff grade*.ti,ab.
39. hospitalist*.ti,ab.
40. postgraduate*.ti,ab.
41. core train*.ti,ab.
42. specialty train*.ti,ab.
43. family medicine.ti,ab.
44. or/1-43
45. parttime employment/
46. full time employment/
47. work schedule/
48. part time.ti,ab.
49. (flexib* adj5 hour*).ti,ab.
50. (flexib* adj5 employ*).ti,ab.
51. (flexib* adj5 work*).ti,ab.
52. (flexib* adj5 dut*).ti,ab.
53. (flexib* adj5 sched*).ti,ab.
54. (flexib* adj5 job*).ti,ab.
55. (flexib* adj5 post*).ti,ab.

56. (flexib* adj5 train*).ti,ab.
57. (flexib* adj5 practi*).ti,ab.
58. (flexib* adj5 appoint*).ti,ab.
59. less than full time.ti,ab.
60. LTFT.ti,ab.
61. or/45-60
62. health service/
63. health care delivery/
64. health care quality/
65. productivity/
66. patient safety/
67. clinical outcome/
68. patient satisfaction/
69. medical error/
70. mortality/
71. health workforce/
72. specialisation/
73. career planning/
74. career mobility/
75. professional development/
76. job performance/
77. work-life balance/
78. wellbeing/
79. (patient adj5 outcome*).ti,ab.
80. (patient adj5 safety*).ti,ab.
81. (patient adj5 mortality*).ti,ab.
82. error*.ti,ab.
83. mistake*.ti,ab.
84. (quality adj5 care).ti,ab.
85. perform*.ti,ab.
86. recruitment.ti,ab.

87. retention.ti,ab.
88. attrition.ti,ab.
89. progress*.ti,ab.
90. profession*.ti,ab.
91. education.ti,ab.
92. train*.ti,ab.
93. satisfaction.ti,ab.
94. opinion*.ti,ab.
95. perspective*.ti,ab.
96. perception*.ti,ab.
97. experience*.ti,ab.
98. (quality adj5 life).ti,ab.
99. wellbeing.ti,ab.
100. work life balance.ti,ab.
101. burnout.ti,ab.
102. stress.ti,ab.
103. wellness.ti,ab.
104. or/62-103
105. 44 and 61 and 104

[ProQuest search strategy used for ASSIA, Healthcare Administration Database and ProQuest Dissertations & Theses Global](#)

ProQuest search (3 databases)

The three databases named above (ASSIA, Healthcare Administration Database and ProQuest Dissertations & Theses Global) will be searched together via the ProQuest interface using this search strategy which aligns with the ProQuest search parameters and thesaurus terms. No limits will be placed on date or language, but a filter will be applied to the ProQuest Dissertations & Theses Global database to exclude theses from Business, Science & Technology, Literature & Languages, The Arts, and History because these subjects are not relevant to review topic.

Searched for:((AB("Physicians") OR AB("Medical residencies") OR AB("Medical education") OR AB(doctor* OR physician* OR trainee* OR resident OR residents OR residency OR medical graduate* OR medical officer* OR houseman OR SHO OR SHOs OR PRHO OR PRHOs OR house officer* OR FY1 OR FY1s OR FY2 OR FY2s OR fellow* OR foundation doctor* OR foundation train* OR registrar* OR consultant* OR specialist* OR General practitioner* OR GP OR GPs OR intern OR interns OR internist* OR internship OR clinician* OR medical practitioner* OR staff grade* OR hospitalist* OR

postgraduate* OR core train* OR specialty train* OR family medicine)) AND (AB("Part time employment") OR AB("Working hours") OR AB("{part time}" OR flexib* NEAR/5 hour* OR flexib* NEAR/5 employ* OR flexib* NEAR/5 work* OR flexib* NEAR/5 dut* OR flexib* NEAR/5 sched* OR flexib* NEAR/5 job* OR flexib* NEAR/5 post* OR flexib* NEAR/5 train* OR flexib* NEAR/5 practi* OR flexib* NEAR/5 appoint* OR "{Less than full time}" OR LTFT)) AND (AB("Specialization") OR AB("Patient safety") OR AB("Health care delivery") OR AB("Patient satisfaction") OR AB("Work life balance") OR AB("Productivity") OR AB("Career development planning") OR AB("Workforce") OR AB("Professional development") OR AB("Health services") OR AB("Health care") OR AB("Clinical outcomes") OR AB("Mortality") OR AB("Career advancement") OR AB("Medical errors") OR AB("Quality of care") OR AB(patient NEAR/5 outcome* OR patient NEAR/5 safety* OR patient NEAR/5 mortality* OR error* OR mistake* OR quality NEAR/5 care OR perform* OR recruitment OR retention OR attrition OR progress* OR profession* OR education OR train* OR satisfaction OR opinion* OR perspective* OR perception* OR experience* OR quality NEAR/5 life OR wellbeing OR "{work life balance}" OR burnout OR stress OR wellness))) NOT bdl(1008748 1008752 1008751 1008747 1008750)

Databases:

Applied Social Sciences Index & Abstracts (ASSIA)

Healthcare Administration Database

ProQuest Dissertations & Theses Global

These databases are searched for part of your query.

[Web of Science search strategy](#)

This database will be searched individually using this search strategy with no limits or filters.

TS=("doctor*" OR "physician*" OR "trainee*" OR "resident" OR "residents" OR "residency" OR "medical graduate*" OR "medical officer*" OR "houseman" OR "SHO" OR "SHOs" OR "PRHO" OR "PRHOs" OR "house officer*" OR "FY1" OR "FY1s" OR "FY2" OR "FY2s" OR "fellow*" OR "foundation doctor*" OR "foundation train*" OR "registrar*" OR "consultant*" OR "specialist*" OR "General practitioner*" OR "GP" OR "GPs" OR "intern" OR "interns" OR "internist*" OR "internship" OR "clinician*" OR "medical practitioner*" OR "staff grade*" OR "hospitalist*" OR "postgraduate*" OR "core train*" OR "specialty train*" OR "family medicine") AND TS=("part time" OR "flexib* NEAR/5 hour*" OR "flexib* NEAR/5 employ*" OR "flexib* NEAR/5 work*" OR "flexib* NEAR/5 dut*" OR "flexib* NEAR/5 sched*" OR "flexib* NEAR/5 job*" OR "flexib* NEAR/5 post*" OR "flexib* NEAR/5 train*" OR "flexib* NEAR/5 practi*" OR "flexib* NEAR/5 appoint*" OR "Less than full time" OR "LTFT") AND TS=("patient NEAR/5 outcome*" OR "patient NEAR/5 safety*" OR "patient NEAR/5 mortality*" OR "error*" OR "mistake*" OR "quality NEAR/5 care" OR "perform*" OR "recruitment" OR "retention" OR "attrition" OR "progress*" OR "profession*" OR "education" OR "train*" OR "satisfaction" OR "opinion*" OR "perspective*" OR "perception*" OR "experience*" OR "quality NEAR/5 life" OR "wellbeing" OR "work life balance" OR "burnout" OR "stress" OR "wellness")

[Cochrane search strategy](#)

This database will be searched individually using this search strategy with no limits or filters.

- ID Search
- #1 MeSH descriptor: [Physicians] explode all trees
- #2 MeSH descriptor: [Education, Medical] explode all trees
- #3 #1 OR #2
- #4 (doctor* OR physician* OR trainee* OR resident OR residents OR residency OR "medical graduate*" OR "medical officer*" OR houseman OR SHO OR SHOs OR PRHO OR PRHOs OR "house officer*" OR FY1 OR FY1s OR FY2 OR FY2s OR fellow* OR "foundation doctor*" OR "foundation train*" OR registrar* OR consultant* OR specialist* OR "General practitioner*" OR GP OR GPs OR intern OR interns OR internist* OR internship OR clinician* OR "medical practitioner*" OR "staff grade*" OR hospitalist* OR postgraduate* OR "core train*" OR "specialty train*" OR "family medicine"):ti,ab,kw (Word variations have been searched)
- #5 #3 OR #4
- #6 #1 OR #2 OR #4
- #7 MeSH descriptor: [Personnel Staffing and Scheduling] explode all trees
- #8 ("part time" OR flexib* NEXT hour* OR flexib* NEXT employ* OR flexib* NEXT work* OR flexib* NEXT dut* OR flexib* NEXT sched* OR flexib* NEXT job* OR flexib* NEXT post* OR flexib* NEXT train* OR flexib* NEXT practi* OR flexib* NEXT appoint* OR "Less than full time" OR LTFT):ti,ab,kw
- #9 #7 OR #8
- #10 MeSH descriptor: [Health Services] explode all trees
- #11 MeSH descriptor: [Delivery of Health Care] explode all trees
- #12 MeSH descriptor: [Quality of Health Care] explode all trees
- #13 MeSH descriptor: [Efficiency] explode all trees
- #14 MeSH descriptor: [Patient Safety] explode all trees
- #15 MeSH descriptor: [Treatment Outcome] explode all trees
- #16 MeSH descriptor: [Patient Satisfaction] explode all trees
- #17 MeSH descriptor: [Medical Errors] explode all trees
- #18 MeSH descriptor: [Mortality] explode all trees
- #19 MeSH descriptor: [Health Workforce] explode all trees
- #20 MeSH descriptor: [Specialization] explode all trees
- #21 MeSH descriptor: [Career Mobility] explode all trees
- #22 MeSH descriptor: [Career Choice] explode all trees
- #23 MeSH descriptor: [Work Performance] explode all trees
- #24 MeSH descriptor: [Work-Life Balance] explode all trees

#25 #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24

#26 (patient NEXT outcome* OR patient NEXT safety* OR patient NEXT mortality* OR error* OR mistake* OR quality NEXT care OR perform* OR recruitment OR retention OR attrition OR progress* OR profession* OR education OR train* OR satisfaction OR opinion* OR perspective* OR perception* OR experience* OR quality NEXT life OR wellbeing OR "work life balance" OR burnout OR stress OR wellness):ti,ab,kw

#27 #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 OR #26

#28 #25 OR #26

#29 #6 AND #9 AND #28

[EThos search strategy](#)

This database will be searched individually using this search strategy with no limits or filters.

Advanced search

less than full time (Any word)

OR

LTFT (Any word)

OR


part time (Any word)


Supplemental material 2

Adapted BEME Coding Sheet

1 Administrative			
Reference Number:			
Date:			
Reviewer:			
Citation Type:	<input type="checkbox"/> Journal article <input type="checkbox"/> Non-peer review article <input type="checkbox"/> Official publication <input type="checkbox"/> Thesis/Dissertation <input type="checkbox"/> Other		
Citation information			
Author(s):			
Title:			
Publication			
Year	Volume	Issue	Pages
Search Method:	<input type="checkbox"/> Electronic search <input type="checkbox"/> Hand search <input type="checkbox"/> Bibliography search <input type="checkbox"/> Citation search <input type="checkbox"/> Grey literature <input type="checkbox"/> Contacting author <input type="checkbox"/> Other		
2 Evaluation Methods			
Research design (tick all that apply)	Non-comparative studies		
	<input type="checkbox"/> Audit <input type="checkbox"/> Action-based <input type="checkbox"/> Case series <input type="checkbox"/> Expert Opinion <input type="checkbox"/> Focus group <input type="checkbox"/> Historical <input type="checkbox"/> Report <input type="checkbox"/> Observation <input type="checkbox"/> Survey		
	Comparative studies		
	<input type="checkbox"/> Cross sectional <input type="checkbox"/> Single group before & after studies <input type="checkbox"/> Single group time series <input type="checkbox"/> Case control <input type="checkbox"/> Prospective cohort study <input type="checkbox"/> Retrospective cohort study		

<p>Data collection methods (tick all that apply)</p>	<input type="checkbox"/> Non-randomised trials <input type="checkbox"/> Randomised trials <input type="checkbox"/> Questionnaire <input type="checkbox"/> Interview <input type="checkbox"/> Focus group <input type="checkbox"/> Observation <input type="checkbox"/> Opinion <input type="checkbox"/> Document analysis <input type="checkbox"/> Other
<p>3 Context (Target Population)</p> <p>Number of participants:</p> <p>Response rate:</p> <p>Country/location of study:</p> <p>Type of setting (e.g. hospital; community, university, if stated):</p> <p>Level/stage of doctors' career:</p> <p>Age of participants <input type="checkbox"/> Stated Details: <input type="checkbox"/> Not stated</p> <p>Sex of participants: <input type="checkbox"/> Female only <input type="checkbox"/> Male only <input type="checkbox"/> Mixed (both female and male participants) <input type="checkbox"/> Not specified</p> <p>Specialty: <input type="checkbox"/> Anaesthesia <input type="checkbox"/> Emergency Medicine <input type="checkbox"/> General Practice <input type="checkbox"/> Medicine <input type="checkbox"/> Obstetrics & Gynaecology <input type="checkbox"/> Occupational Medicine <input type="checkbox"/> Ophthalmology <input type="checkbox"/> Paediatrics <input type="checkbox"/> Pathology <input type="checkbox"/> Psychiatry <input type="checkbox"/> Public Health <input type="checkbox"/> Radiology <input type="checkbox"/> Oncology <input type="checkbox"/> Sports medicine <input type="checkbox"/> Surgery <input type="checkbox"/> Other:</p>	
<p>4 Aim of Study</p> <p>Objective/purpose of the study <input type="checkbox"/> Stated Details:</p>	

<p>Tied to theoretical/conceptual framework</p> <p>Based on relevant literature</p>	<p><input type="checkbox"/> Not available</p> <p><input type="checkbox"/> Stated Theoretical/conceptual framework used:</p> <p><input type="checkbox"/> Not available</p> <p><input type="checkbox"/> Stated Specify whether author demonstrated awareness of the literature:</p> <p><input type="checkbox"/> Not available</p>
5 Outcome studied	<p><input type="checkbox"/> Characteristics and factors which influence LTFT working</p> <p><input type="checkbox"/> Patient outcomes</p> <p><input type="checkbox"/> Workforce/health service outcomes</p> <p><input type="checkbox"/> Doctor outcomes</p> <p>Details:</p>
6 Authors' key findings:	
7 Strength of findings:	
<p>Low</p>  <p>High</p> <p>Comments:</p>	<p><input type="checkbox"/> No clear results can be drawn. Not significant</p> <p><input type="checkbox"/> Results ambiguous but there appears to be a trend</p> <p><input type="checkbox"/> Conclusions can probably be based on the results</p> <p><input type="checkbox"/> Results are clear and very likely to be true</p> <p><input type="checkbox"/> Results are unequivocal</p>
8 Rate Evaluation Methods	
	<p>Strongly disagree Disagree Uncertain Agree Strongly agree</p>
i. Appropriate study/review/design	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
ii. Well implemented study/review design	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
iii. Appropriate data analysis	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
iv. Comment on evaluation methods, if applicable:	

<p>Overall quality of study: Low Quality  High Quality</p> <p>1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/></p>
<p>9 Further details</p> <p>Strengths and weaknesses of the article:</p> <p>New insights/implications:</p> <p>Avenues for further research:</p>
<p>Overall impression of article:</p>

Supplemental material 3

Mixed Methods Appraisal Tool Version 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?				
	S2. Do the collected data allow to address the research questions?				
	<i>Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.</i>				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?				
	1.2. Are the qualitative data collection methods adequate to address the research question?				
	1.3. Are the findings adequately derived from the data?				
	1.4. Is the interpretation of results sufficiently substantiated by data?				
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?				
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5. Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
	4.1. Is the sampling strategy relevant to address the research question?				

4. Quantitative descriptive	4.2. Is the sample representative of the target population?				
	4.3. Are the measurements appropriate?				
	4.4. Is the risk of nonresponse bias low?				
	4.5. Is the statistical analysis appropriate to answer the research question?				
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?				
	5.2. Are the different components of the study effectively integrated to answer the research question?				
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?				
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?				
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?				

From: Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, Dagenais P, Gagnon M-P, Griffiths F, Nicolau B, O’Cathain A, Rousseau M-C, Vedel I. Mixed Methods Appraisal Tool (MMAT), version 2018. Registration of Copyright (#1148552), Canadian Intellectual Property Office, Industry Canada.

Supplemental material 4

AACODS checklist (authority, accuracy, coverage, objectivity, date, significance)

AACODS		Yes	No	?	Comments
Authority	<p>Identifying who is responsible for the intellectual content.</p> <p>Individual author:</p> <ul style="list-style-type: none"> • Associated with a reputable organisation? • Professional qualifications or considerable experience? • Produced/published other work (grey/black) in the field? • Recognised expert, identified in other sources? • Cited by others? (use Google Scholar as a quick check) • Higher degree student under “expert” supervision? <p>Organisation or group:</p> <ul style="list-style-type: none"> • Is the organisation reputable? (e.g. W.H.O) • Is the organisation an authority in the field? <p>In all cases:</p> <ul style="list-style-type: none"> • Does the item have a detailed reference list or bibliography? 				
Accuracy	<ul style="list-style-type: none"> • Does the item have a clearly stated aim or brief? • Is so, is this met? • Does it have a stated methodology? • If so, is it adhered to? • Has it been peer-reviewed? • Has it been edited by a reputable authority? 				

	<ul style="list-style-type: none"> Supported by authoritative, documented references or credible sources? Is it representative of work in the field? If No, is it a valid counterbalance? Is any data collection explicit and appropriate for the research? If item is secondary material (e.g. a policy brief of a technical report) refer to the original. Is it an accurate, unbiased interpretation or analysis? 				
Coverage	<p>All items have parameters which define their content coverage. These limits might mean that a work refers to a particular population group, or that it excluded certain types of publication. A report could be designed to answer a particular question, or be based on statistics from a particular survey.</p> <ul style="list-style-type: none"> Are any limits clearly stated? 				
Objectivity	<p>It is important to identify bias, particularly if it is unstated or unacknowledged.</p> <ul style="list-style-type: none"> Opinion, expert or otherwise, is still opinion: is the author's standpoint clear? Does the work seem to be balanced in presentation? 				
Date	<p>For the item to inform your research, it needs to have a date that confirms relevance</p>				

	<ul style="list-style-type: none"> • Does the item have a clearly stated date related to content? No easily discernible date is a strong concern. • If no date is given, but can be closely ascertained, is there a valid reason for its absence? • Check the bibliography: have key contemporary material been included? 				
Significance	<p>This is a value judgment of the item, in the context of the relevant research area</p> <ul style="list-style-type: none"> • Is the item meaningful? (this incorporates feasibility, utility and relevance) • Does it add context? • Does it enrich or add something unique to the research? • Does it strengthen or refute a current position? • Would the research area be lesser without it? • Is it integral, representative, typical? • Does it have impact? (in the sense of influencing the work or behaviour of others) 				

