How prepared are UK medical graduates for practice? A rapid review of the literature 2009-2014

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How prepared are UK medical graduates for practice? A rapid review of the literature 2009-2014


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ABSTRACT

OBJECTIVE
To understand how prepared UK medical graduates are for practice and the effectiveness of workplace transition interventions.

DESIGN
A rapid review of the literature (registration #CRD42013005305).

DATA SOURCES
Nine major databases (and key websites) were searched in two timeframes (July–September 2013; updated May–June 2014): Cinahl, Embase, Educational Resources Information Centre, Health Management Information Consortium, Medline, Medline in Process, Psychinfo, Scopus and Web of Knowledge.

ELIGIBILITY CRITERIA FOR SELECTING STUDIES
Primary research or studies reporting UK medical graduates’ preparedness between 2009-2014: Manuscripts in English; all study types; participants who are final year medical students, medical graduates, clinical educators, patients or NHS employers; all outcome measures.

DATA EXTRACTION
At time 1, three researchers screened manuscripts (for duplicates, exclusion/inclusion criteria, quality). Remaining 81 manuscripts were coded. At time 2, one researcher repeated the process for 2013-2014 (adding 6 manuscripts). Data were analysed using a narrative synthesis and mapped against Tomorrow’s Doctors (2009) graduate outcomes.

RESULTS
Most studies comprised junior doctors’ self-reports (65/87, 75%), few defined preparedness and a programmatic approach was lacking. Six themes were highlighted: individual skills/knowledge, interactional competence, systemic/technological competence, personal preparedness, demographic factors and transitional interventions. Graduates appear prepared for history taking, physical examinations and some clinical skills, but unprepared for other aspects including prescribing, clinical reasoning/diagnoses, emergency management, multidisciplinary...
team-working, handover, error/safety incidents, understanding ethical/legal issues and ward environment familiarity. Shadowing and induction smooth transition into practice, but there is a paucity of evidence around assistantship efficacy.

CONCLUSIONS

Educational interventions are needed to address areas of unpreparedness (e.g. multidisciplinary team-working, prescribing, clinical reasoning). Future research in areas we are unsure about should adopt a programmatic and rigorous approach, with clear definitions of preparedness, multiple stakeholder perspectives along with multi-site and longitudinal research designs to achieve a joined-up, systematic, approach to understanding future educational requirements for junior doctors.

Article Summary

STRENGTHS AND LIMITATIONS OF THIS STUDY

1. A rigorous review using nine major databases resulting in a comprehensive narrative synthesis of 87 manuscripts.
2. Our narrative synthesis and mapping findings against the GMCs Outcomes for Graduates facilitates a deeper understanding of graduates’ preparedness.
3. Our rigorous approach has clearly identified areas where research is lacking and the need for programmatic research in this area.
4. The broad scope of what comprises preparedness, the lack of definitions in the literature and diversity in study designs and quality led to difficulties in ascertaining firm generalisable conclusions in some areas.
5. Many studies collected data immediately after graduation and focused purely on preparedness for graduates’ first days as a junior doctor.
Introduction

Society and healthcare are changing fast. An ageing population means increasingly complex patient co-morbidity and chronic healthcare and social needs. Medical knowledge and ways of treating disease are also rapidly expanding, and there is an increasing requirement to provide a greater proportion of healthcare provision in the community setting, close to patients. Healthcare delivery must change to meet the needs of patients both now and in the future. In order to keep pace with such challenges, high quality education and training of healthcare workforce is essential. Furthermore, as patients’ lives are at stake, our healthcare workforce need to be prepared for practice from the very start of their working lives. But how prepared are today’s medical graduates to practice as doctors?

Over the past decade there has been a steep rise in the number of research papers published on the subject of medical graduates’ preparedness for practice for certain clinical domains (e.g. safe prescribing). Given this increase of literature, and that most educators lack the time to find and critically evaluate original articles, review papers play a vital role in our understanding and evidence-based decision-making in medical education. Reviews identify, evaluate and syntheses research findings, making available evidence highly accessible to those who require it.

A systematic review of research examining medical graduates’ preparedness for practice was published in 2014. Problems identified in the review include graduates’ prescribing skills and practical procedures along with their personal issues such as high levels of neuroticism and low levels of confidence impacting negatively on preparedness. Poor supervisory interactions were identified as having a negative effect on preparedness with early clinical experience and shadowing opportunities appearing to have a positive impact. More recently, Ferguson et al. reported their systematic review of the literature relating to the educational provision for medical students’ preparedness specifically for ear, nose and throat (ENT) surgery in the UK. They found that medical students’ training in ENT was extremely short (around 8 days, with some receiving no training at all) and lacked educational value, and both final year medical students and clinicians lacked confidence in their own ability to assess and manage ENT patients.
However, despite these reviews, evidence of UK graduates’ preparedness for practice is still lacking, mainly due to limitations within current studies. For example, Cameron and his colleagues\textsuperscript{15} identified only 9 research papers (from 218 potentially relevant articles) published over the past 10 years that examined preparedness to practice across the undergraduate to junior doctor transition. Examining their accompanying online supplementary documents further, it appears the search strategy was rather narrow: only two databases (Medline and Scopus) were searched using minimal items (only 8 terms comprising: teaching, education, medical education, medical undergraduate students, medical teaching, transition, clinical clerkship and patient safety). Furthermore, 192 papers were excluded based only on their title with the exclusion criteria used in this process being unclear. This is problematic as not only does the process lack transparency but also it is often difficult to know about the contents of a manuscript based on title alone. The study by Ferguson and his colleagues, whilst being more rigorous and transparent, is limited in scope, focusing on a very small area of preparedness (ENT surgery). What is needed therefore is a study that critically examines the literature around medical graduates’ preparedness for practice that has both greater transparency and scope than previous studies.

Our research aims to address this gap in the literature by synthesising studies published between 2009-14 that seek to evaluate the success of undergraduate medical education in preparing the next generation of doctors. Given the large amount of literature published since Tomorrow’s Doctors 2009\textsuperscript{17} the start date of 2009 was selected. Further, within this timeframe notable changes have occurred, partly in response to Tomorrow’s Doctors 2009, including: the introduction of new curricula and transition interventions such as assistantships (where students are integrated within a clinical team and undertake specified duties under supervision), shadowing (where students observe their specific first job prior to taking it on) and induction\textsuperscript{18}. Synthesis of this literature is important in order to identify good practice in education and training, identify areas of practice requiring improvement, and to set the agenda for future research priorities.

**Aim and Research Questions**

The aim of this review is to understand how prepared UK medical graduates are for practice and to inform policy.\textsuperscript{19} Our specific research questions are:
RQ1: How prepared are UK medical graduates for practice?

RQ2: How effective are transitional interventions addressing the final year medical undergraduates’ move into the workplace as a junior doctor?

Method

A Rapid Review (RR) was conducted using streamlined systematic review methods and reported in accordance with the PRISMA guidelines,\(^\text{20}\) and registered with PROSPERO (registration number CRD42013005305).\(^\text{21}\) As the name implies, a RR is designed to answer a question swiftly, thus addresses urgent demands for synthesized evidence.\(^\text{22}\) RRs utilise the rigor of a systematic review, but do so in a shorter time frame. To undertake a high quality review within these deadlines, RRs are clearly focused.\(^\text{22}\)

Procedure

The time frame for this review comprised an initial 3-month period for the main review (July-August 2013) and a subsequent 6-week period for the update review 10 months later (April-May 2014). The inclusion/exclusion criteria used for the RR were: (1) manuscripts published from 2009-2013 (initial review) and 2013-2014 (follow up review); (2) manuscripts published in English; (3) all types of research studies; (4) participant groups: final year medical students, medical graduates, clinical educators, patients, NHS employers; (5) all outcome measures.

In July 2013, three researchers (LG, EP, ZJ) searched the following databases: Cinahl, Embase, Educational Resources Information Centre (ERIC), Health Management Information Consortium – Grey literature (HMC), Medline, Medline in Process, Psychinfo, Scopus and Web of Knowledge (WOK). A comprehensive search strategy was developed in Ovid Medline using a combination of Medical subject headings and free text terms. The Medline search strategy was modified according to the indexing systems of the other databases.

Across three stages the strategy combined: Boolean operators, adjacency operators, wildcard symbols, truncation and subject headings and free text search terms. Firstly, terms representing the population were combined using ‘OR’. Secondly, 54 searches representing variables of preparedness (developed from Tomorrow’s Doctors outcomes) were combined using the ‘OR’ Boolean command. Finally, the geographic
inclusion areas for the research were added and combined. These three combined ‘OR’ searches were selected and submitted with the ‘AND’ function and the data were limited by timeframe. To identify research reported in the grey literature a range of relevant websites were searched. In addition, to identify published resources that have not yet been catalogued in the electronic databases, recent editions of key journals were searched (strategies for each database and websites along with exact numbers of identified manuscripts for each combination are available in the online supplement A).

**Study selection, quality assessment and data extraction**

The initial search yielded 3,762 results, Figure 1 shows the flow of studies through the review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.20

**BOX 1: PICO INCLUSION CRITERIA**

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<th>Participants/ population</th>
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<th>Intervention(s), exposure(s)</th>
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<td>Medical graduates working as Foundation 1 or 2 trainees in the UK.</td>
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<th>Outcome(s)</th>
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<td><strong>Primary outcomes:</strong> The effectiveness of formal Y5 to F1 transition interventions.</td>
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After screening manuscripts for duplicates and removing manuscripts that did not meet our exclusion and inclusion criteria (Box 1), we quality assessed 163 manuscripts using standards specific to their methodology: for quantitative manuscripts we adapted criteria from the Medical Education Research Study Quality Inventory23 and for qualitative designs we followed Mays & Pope24 guidance. Both
indices were used for mixed methodology studies (see Online Supplement B for full criteria used). To ensure a cohesive assessment, a second researcher crosschecked 30% of the manuscripts. Following quality assessment, the remaining 81 manuscripts were managed using Atlas.ti software. These were coded using a framework developed by the researchers (855 codes) and data were extracted for synthesis (see Online Supplement C).

Using exactly the same methodology and process, in May 2014, one of the researchers (LG) updated the review to include manuscripts published between April 2013 and May 2014 (Figure 2). After quality assessment, 6 manuscripts were added to the original Atlas.ti database resulting in 87 manuscripts being included in this RR overall: n=5 reviews, n=50 quantitative studies, n=17 qualitative studies and n=15 mixed methods studies. As the review comprises a secondary analysis of published data, no ethical approval was needed.

Analysis

Synthesis of literature on this topic was challenging since it is diverse (different methodologies used, different contexts studied, and different cohorts of graduates), sometimes of low quality and often contradictory. Ideally study quality influences how much weighting it should be given in drawing conclusions. Due to the variability in study design across the manuscripts, we were unable use meta-analysis to depict trends in the literature. Instead we report our narrative synthesis by theme and then map findings from the various studies against the outcomes outlined in the GMCs Outcomes for Graduates, grouping them according to whether their data indicate preparedness or not. This mapping provides a useful rubric for those involved in curriculum development, offering an at-a-glance understanding of the literature to date for each outcome. Our narrative synthesis presents a second way of thinking about graduates’ preparedness by theming the data in terms of the different aspects involved in preparedness for practice. In doing so, we have needed to judge whether data indicate ‘preparedness’, and we have done that as follows:

Quantitative Studies: When Likert scale data are reported as categorical data, at least 20% of the respondents had to indicate preparedness at the highest level in order for us to conclude that this demonstrated ‘preparedness’. This rubric was chosen to avoid an assumption of preparedness in situations where
respondents clustered around a mid-point – ‘neither prepared nor unprepared’ – category. When Likert data were treated as parametric data, the mean level of preparedness is above the mid-point (or equivalent, as some researchers employed a 4-point scale).

Qualitative Studies: A theme (or subtheme) in which participants verbally reported a high level of preparedness had to be reported for us to conclude that this demonstrated ‘preparedness’.

Mixed Methodology Studies: The process for quantitative and qualitative studies was amalgamated. There were no studies where different data types contradicted.

Results

Overview of included studies

A programmatic approach to studying preparedness was lacking: studies varied greatly in terms of design and measures used to determine preparedness. The majority of the studies (66/87, 76%) comprised junior doctors’ self-reports of preparedness via questionnaires or interviews that may not reflect actual preparedness. Eighteen of these (18/65, 28%) also collected data from trainers and/or used more than one data-collection method. Trainer reports were in 21/87 (24%) of the studies, via questionnaires (15/21, 71%) or qualitative interviews (6/21, 29%). Of these, only 3 (14%) did not also contain self-report data. Other groups, such as NHS employees or policy makers were involved in 5/87 (6%) studies, and only 1/87 (1%) involved patients as participants. The number of participants within the studies varied greatly, even within the same methodology. For example, qualitative research studies comprised as few as seven or eight participants from a single location, to 152 participants across three different locations. Questionnaire studies comprised as few as 89 participants from a single location, to thousands of participants across multiple locations.

Even studies with similar methods of data collection varied substantially in how they conceptualised preparedness and measuring the concept varied greatly. For example, some asked a simple broad question such as "how well did your
undergraduate course prepare you for examining patients” and provided five categories from ‘unprepared’ to ‘extremely well prepared’. Others provided a general statement such as “my experience at [medical school] prepared me well for the jobs I have undertaken so far” using five categories from ‘strongly agree’ to ‘strongly disagree’ or a scaled response from ‘generally not at all’ to ‘generally very well prepared’. Another approach required junior doctors to rate their preparedness for practice at the point of graduation (a more specific question) against curricula outcomes with a four-point scale from ‘poor’ to ‘very good’. One used a five-point scale (‘not at all prepared’ to ‘fully prepared’) for 53 of the outcomes. However, this study failed to specify all points on their scale, meaning the reader was unable to pinpoint the exact place that ‘unpreparedness’ commences. Not all studies measured confidence or competence. Some tested knowledge (e.g. a short test using ‘essential’ and ‘useful’ scenarios) based on topics considered as important for medical graduates.

**Narrative synthesis**

To address Research Question 1, we synthesise the studies identified, discussing our findings in order according to the following themes: medical graduates’ preparedness for specific tasks, skills and knowledge; interactional and interpersonal aspects of their preparedness; preparedness for systemic and technological aspects of practice; personal preparedness for practice and the contribution of personal and situational demographic factors to preparedness variation. We then address Research Question 2, in the final section: the effectiveness of transitional interventions for final year medical undergraduates’ move to become junior doctors.

**Preparedness for specific tasks, skills and knowledge**

The area of medical graduates’ preparedness for tasks, skills and knowledge received a great deal of research attention between 2009 and 2014: 34/87 (39%) of the studies identified provided information on this aspect. Our synthesis suggests that graduates are reasonably well prepared for history-taking and performing full physical examinations. However, they are generally unprepared for prescribing safely and legally, clinical reasoning and making diagnoses, and the early management of patients with emergency conditions.
The GMC graduate outcomes list 32 specific practical procedures that graduates should be prepared to perform.\textsuperscript{42} To date there has been no study (or set of studies) that has examined all 32. Only 14 studies identified graduates’ preparedness when mapped across these (Table 1). When we consider Table 1, this mapping suggests that graduates are prepared for around one-third of the 32 procedures (34%, n=11). For example, we found unanimous evidence that graduates were prepared for venipuncture;\textsuperscript{30,42,45} yet for other skills, such as wound suturing,\textsuperscript{39,45,61} and central venous line insertion,\textsuperscript{38,89} all the available evidence unanimously suggested they were unprepared. Table 1 also identifies 11 practical procedures that are absent in the GMC outcomes, yet data suggest graduates have a level of preparedness for them (e.g. chest drain insertion).\textsuperscript{38,61}

Data are sometimes inconclusive in terms of preparedness with similar numbers of studies supporting on each side (Table 1). These disparities, to an extent, are due to different participant groups reporting different preparedness levels (e.g. educational supervisors’ reports are generally lower than trainees’ self-reports)\textsuperscript{39,45} or to studies evaluating different curricula.\textsuperscript{39} Most of the data suggesting preparedness came from a limited study range using self-reports, whereas the reports of unpreparedness are from a wider range of studies/methodologies.

\textit{Preparedness for interactional and interpersonal aspects of practice}

A small proportion of studies (12/87, 14\%) researched preparedness at an interactional and interpersonal level, and the results were mixed. For almost all of the interactional and interpersonal aspects of practice domains identified by the GMC outcomes, there are contradictory results. Where there are data, by purely adding up the number of studies we might think that graduates are prepared for communication with colleagues and patients.\textsuperscript{30,39,40,42,44,45} Although there are few studies of preparedness for multidisciplinary team working, the evidence is relatively robust and indicates unpreparedness of graduates: thus, two of the three manuscripts suggesting problems in this area had multidisciplinary team-working as the sole focus of their work.\textsuperscript{62,63} Both concluded that medical graduates have preparedness problems. This contrasts with scant data suggesting trainees’ preparedness based on simple questions in two large-scale studies focusing on the wider issue of preparedness.\textsuperscript{45,54}
For breaking bad news, equal number of studies provide evidence for preparedness and unpreparedness. In terms of preparedness, the evidence comprises three questionnaire studies containing a single self-report. However, of these, one also found supervisor reports differed considerably, suggesting serious concerns. Furthermore, two other studies highlighted the breaking of bad news as complex and considered by trainees to be more distressing than other upsetting duties, giving potential for them getting quickly out of their depth. Finally, only three papers reported on handover preparedness for trainees, all suggesting trainees’ unpreparedness.

**Preparedness for systemic and technological aspects of practice**

Preparedness for systemic and technological aspects of practice is generally an under researched area (13/87, 15%), again providing very mixed results. For example, the same studies found evidence that graduates have knowledge of, and are able to use, audit to improve patient care, but they also lack such knowledge. This contradiction can be understood in terms of there being different cohorts under study (e.g. self-reports from the ‘old’ curriculum suggesting unprepared and the ‘new’ suggesting prepared) and self-report/other-report differences (suggesting prepared and unprepared respectively).

Other aspects within this theme suggest a clearer picture. For example, three studies provided self- and patient-reported data suggesting medical graduates’ unpreparedness for reporting and dealing with error and safety incidents. Studies also strongly suggest that graduates are ill prepared for understanding how the clinical environment works: both junior doctors and their educational supervisors thought that familiarity with the ward environment was an important missing component of transition, with feelings of preparedness being contingent on understanding ward culture and practices.

**Personal preparedness for practice**

Personal preparedness refers to individual aspects of preparedness. Only 11 (13%) of the manuscripts reported data regarding trainees’ personal preparedness for practice. As with earlier sections, the evidence is complex. Medical graduates often have problems with time-management, but seem to understand their own limitations with inconclusive data on trainees’ abilities to identify and
organize their learning needs and reflective practice.\textsuperscript{40} 44 45 For this latter aspect, perhaps graduates from older curricula are less well prepared than those learning in a more contemporary way.\textsuperscript{40} Finally, there is reasonably strong evidence (multi-centre studies and knowledge measures) that graduates have problems of preparedness around ethical and legal issues,\textsuperscript{42} including for complex ethical situations (e.g. caring for dying patients)\textsuperscript{64} and understanding mental health law.\textsuperscript{71}

\textbf{The impact of personal and situational demographic factors on preparedness variation}

This issue of whether personal or situational demographic factors affected preparedness for practice was not included in many of the manuscripts identified in this review. In terms of personal demographics, only ethnicity, gender and personality ‘traits’ are addressed in the studies found. In terms of ethnicity, an extremely large cohort study (with 11,610 trainees 1-year post-graduation and 8,427 3-years post-graduation) found ethnicity to be a statistically significant predictor of general feelings of preparedness in both cohorts, but gender only at the 3-year post graduate time: white doctors reporting higher levels than non-white doctors and males higher than females.\textsuperscript{38} Furthermore, another study using the same measurement also found no significant effect of gender on graduation.\textsuperscript{72} From this we might conclude that any effect of gender in self-reported preparedness might well be due to an interaction between gender and the workplace environment. One further personal factor that has been demonstrated to have an effect on levels of preparedness is personality ‘traits’: with positive correlations between ‘agreeableness’ and ‘conscientiousness’ and preparedness, and a negative correlation between ‘neuroticism’ and preparedness.\textsuperscript{72} However, although statistically significant, effect sizes are very low (all well below r=.20) suggesting these findings might have limited practical use.

In terms of situational factors, this was generally researched using self-reported data. Evidence suggests the following factors influence higher self-ratings of preparedness: medical school,\textsuperscript{14 37-39 42 69} graduates from more recent cohorts,\textsuperscript{30 37 38 40} graduate-entry students,\textsuperscript{38 72} shadowing and other attachments,\textsuperscript{72} problem-based learning courses,\textsuperscript{30 72} UK-trained vs non-UK trained graduates working in UK,\textsuperscript{35 62} graduates with an intercalated degree,\textsuperscript{38} and experience since starting work.\textsuperscript{72} Further, there is some evidence that suggests that school is not a factor.\textsuperscript{14 30} Looking at the studies further we can see that medical school does not appear to make a big
difference for self-reported preparedness when the broad question ‘Experience at medical school prepared me well for the jobs I have undertaken so far’ is asked. However, when the more nuanced question of ‘preparedness for what?’ is asked, differences between schools for certain domains of activities are revealed. As such, research examining the detail tends to provide more practical data for us to develop future curricula.

**Effectiveness of final-year undergraduate to junior doctor transition interventions**

Few of the papers (15/87; 17%) in this review contributed to our understandings of the efficacy of assistantships, induction and shadowing.

**ASSISTANTSHIPS**

Assistantships have been defined as a period of hands-on learning enabling medical students to become fully integrated in a clinical team to practise their clinical skills and to take on some responsibilities under supervision. Only one paper reported data on assistantships which considered them beneficial in relieving anxieties and providing invaluable opportunities for incorporating students into multi-disciplinary teams. Although not the focus of their research, authors of other papers appeared hopeful that assistantships could help with many preparedness problems.

**SHADOWING**

Shadowing comprises a compulsory 4-day paid period immediately prior to becoming a junior doctor in which they are able to become familiar with future working environments and expectations. It should provide protected time for graduates to develop relationships with their clinical and educational supervisors alongside their future colleagues. A total of 11/87 (13%) of manuscripts in this review reported relevant data on shadowing, of which 9/11 (82%) presented self-reported data (all except). Generally, these data suggest that shadowing is considered an efficacious method for developing graduates’ preparedness. However, whilst some shadowing is considered better than none, it should be reflective of the new post, and reinforced with related teaching. Finally, a prolonged shadowing period can be ineffectual due to repetitive tasks undertaken with little opportunity for new learning.
INDUCTION

Induction is a mandatory process whereby a medical graduate is introduced to the junior doctors’ work environment and employment policies by the human resources team. Despite a clear definition, researchers and participants sometimes confused shadowing with induction. Moreover, induction varies: it can comprise face-to-face meetings, information packs and online courses. The majority of studies in this section comprised self-report data (only one exception), often being large-scale, across multiple sites and suggesting a high level of efficacy for the process. However, despite this, the inconsistent nature of induction across trusts or wards is problematic. This includes problems of insufficient induction stemming from timetable difficulties and staff shortages, with researchers suggesting a possible correlation between feeling unprepared and inadequate (or no) induction breeding errors alongside feelings of unpreparedness, disorganization, frustration and anxiety.

Mapping preparedness to graduate outcomes

We now present our findings by mapping the included papers to the graduate outcomes as represented in the GMC Outcomes for Graduates document (Table 2). This comprises three main sub-headings for outcomes: Doctor as scientist and scholar, as practitioner and as professional. Given that we have already discussed specific preparedness issues by topic, we now highlight the amount of evidence present for each of these aspects of practice. As we can see from Table 2, only 5 studies presented data relating to the doctor as scientist and scholar outcomes; and the vast majority of studies considered the doctor as practitioner and professional outcomes. Data mainly suggest that graduates are prepared for the scientist and scholar aspect.

Within the doctor as practitioner outcomes, some aspects (e.g. drugs and prescribing) receive more attention than others (e.g. keeping accurate medical records). Furthermore, many more studies suggest graduates are unprepared than those suggesting they are prepared. Most studies providing evidence of graduates’ preparedness also provide evidence of graduates’ unpreparedness (only four do not); such studies include different cohorts of graduates (e.g. new vs old curricula), or differing perspectives (e.g. trainee vs trainer). Similarly, the studies mapping to the doctor as professional show
more contributing evidence to suggest graduates unprepared than prepared, with only one study contributing data purely suggesting graduates are prepared.

Finally, in the last section of Table 2 we set out where studies in our review provide data on graduates’ relative preparedness for aspects of their work that do not feature in the outcomes for graduates. For example, understanding how the clinical environment works and clinical handover (sometimes called handoff). Once again the pattern of preparedness shows far more studies providing evidence that graduates are unprepared than those providing evidence they are prepared, with no studies purely contributing to the latter.

Discussion

Through our rapid review (RR) we have assimilated the literature published after the introduction of the Tomorrow’s Doctors 2009 outcomes to investigate questions around UK graduates’ preparedness to practise as junior doctors. The majority of studies comprised self-reports, although over one quarter also included other-reports (e.g. trainers, policy-makers). The concept of preparedness was variously defined and measured making quantitative synthesis problematic. We therefore presented a qualitative synthesis of the studies. Many studies provided evidence of both preparedness and unpreparedness of graduates, although overall, a greater number of studies in our review provided data to suggest that graduates are more unprepared for practice than they are prepared.

Studies in our review suggested that junior doctors appear well prepared for history taking, physical examinations, venipuncture, audit and understanding their own limitations. Studies were inconclusive regarding levels of preparedness for communication with colleagues and patients: problem areas seem to include multidisciplinary team-working, handovers, breaking bad news to patients, learning needs and reflective practice. There is also much evidence to suggest that graduates are underprepared for safe and legal prescribing, and some evidence for clinical reasoning and diagnoses, early management of emergency patients, wound suturing, central venous line and chest drain insertion, dealing with safety and error reporting, ethical and legal issues and understanding how the clinical environment works.
Clearly the issue of preparedness is not clear-cut. One reason for this is that we identified clear contradictions in the literature regarding the level of self-reported preparedness compared with expert assessment of their skills whereby graduates rate themselves as more prepared than their seniors rate them.\textsuperscript{39, 41, 44, 54} For example, this discrepancy was identified in assessing communication skills: whilst graduates rated themselves as prepared for breaking bad news and communicating with a multidisciplinary team, their experienced senior colleagues reported that this was not the case.\textsuperscript{54} Such an overestimation of preparedness could be an example of illusory superiority.\textsuperscript{83} This increased perception could be a protective mechanism, whereby graduates do not want to acknowledge that they are less than well prepared as a way of maintaining positivity.\textsuperscript{84, 85} Alternatively, this could be due to a discrepancy in experience: seniors viewing everyone below their own level as being less competent, therefore graduates are deemed unprepared for the reality of everyday work as known by their seniors. As graduates can only assess their preparedness against their own experiences, they are therefore unlikely to be aware of the nuances of preparedness that only comes with experience: the so-called unknown unknowns.\textsuperscript{86} Together, these two perceptions of what comprises preparedness can explain the apparent contradictions found in the literature.

In addition to differing perspectives on levels of preparedness, we identified numerous studies reporting differences in preparedness due to personal or situational demographics that also contribute to the lack of clarity around graduates’ preparedness for specific factors (i.e. why some studies suggest graduates are both prepared and unprepared). Regarding personal factors, we found weak evidence to suggest that ethnicity, gender and personality traits’ impact upon self-reported levels of preparedness.\textsuperscript{38, 72} The evidence regarding the impact of situational factors, however, is stronger. Following the extensive transformation of medical education curricula in the UK since the 1990’s, numerous studies are beginning to shed light onto how changes might affect levels of preparedness: higher levels have been recorded for graduates of ‘new’ (versus ‘traditional’) curricula, graduate-entry students, graduates of problem-based learning courses and those who have intercalated.\textsuperscript{14, 30, 35, 37, 38, 40, 62, 72} However, this issue of curricula brings forth a concern around the issue of publication bias – since researchers might be loathe to publish null or even negative results on this issue; particularly if they have been through a great
deal of organizational strife to achieve changes in their curricula. The evidence is mixed, however, in terms of whether different medical schools in the UK graduate more prepared students, generalised self-reports of preparedness by school are consistent over time and some schools fare better than others across different activity domains.

Our findings around preparedness are often contradictory. However, we found areas of preparedness where the evidence was strong and we now consider those areas where conclusions can be drawn with some confidence. For example, we have strong evidence to suggest that graduates are unprepared in their understanding of the issues around prescribing and emergency care (including their clinical reasoning skills). Not only have there been numerous studies in these areas, all pointing to similar issues, but also studies have utilized more robust methodologies, including having multiple sources of data across more than one location. From studies such as these, researchers have been able to unpick the various individual and contextual factors related to the issue of unpreparedness: for example, in terms of prescribing, preparedness is no longer considered as an individual ‘skill’ in isolation, but rather has been re-framed to include the consideration of a wider range of interpersonal, cultural and environmental aspects that impact on medical graduates’ abilities to prescribe safely.

Our second research question focused on the different types of transitional interventions that might affect graduates’ preparedness: namely assistantships, shadowing and induction. We found very little evidence with which to draw any firm conclusions around the efficacy of assistantships, although some evidence that they alleviate anxieties and provide opportunities for team working. More recent research (outside the scope of this RR) focusing on student assistantships in placements aligned and misaligned with their future junior doctor post sheds further light on these findings; suggesting that alignment with students’ first post can enhance confidence, team belonging and workplace acclimatisation. Indeed, aligning final student placements with their first post as a junior doctor is effectively providing them with an extended shadowing period. This finding therefore builds on the evidence in our review around the efficacious effect of the trainee shadowing their first post so long as appropriate teaching is in place. Finally, studies examining the induction period provide further evidence of the importance of the organisational factors involved in
graduates’ preparedness: when induction is insufficient (either inadequate or absent) graduates can feel unprepared, disorganised, frustrated and anxious.\textsuperscript{8,12,37} Taken together, this suggests that carefully designed and implemented transitional interventions, on both the undergraduate and postgraduate sides, is an essential component to junior doctors’ wellbeing as well as patient safety.

\textbf{Study limitations and strengths}

This study has a number of limitations. Although our methodology has enabled us to quickly assimilate the literature to provide an overview of the current climate of graduates’ preparedness, the broad scope of preparedness, wide variability in conceptualising \textit{preparedness for practice}, diverse study designs and quality led to difficulties in ascertaining firm conclusions as to whether or not graduates are generally prepared for practice. Additionally, many studies collected data immediately after graduation, so focused purely on short-term aspects of preparedness: preparedness for graduates’ \textit{first days} as a junior doctor. Many papers failed to state when the data were collected e.g. how far into practice, as those first few weeks are a steep learning curve and data might change substantially one week in, to one month in, to one year in. Due to the lack of longitudinal studies, there are currently no data following graduates throughout their career and measuring their preparedness for lifelong learning and adaptation to their roles as doctors. The majority of manuscripts did not define the concept of \textit{preparedness} but tended to focus on knowledge and skills required immediately upon graduation rather than researching longer-term preparedness for becoming a doctor, or behaviours and patient outcomes. The effect of this is to downplay the important remit of medical schools in preparing graduates for life-long learning and development. There are also important issues to consider with regards all published literature, such as the influence of publication bias.

We recognise that this RR is limited by stringent time constraints. However, due to the concentrated effort of the research team, we were able to undertake the same rigorous steps as other systematic reviews. We therefore believe that our findings are credible. Indeed, research comparing RR and systematic review methodologies suggest that, despite the differences between them, their essential conclusions do not differ extensively.\textsuperscript{88} As such, we believe that our research has a number of strengths, including the robustness of our search strategy and methodological rigour. This has
enabled us to identify a greater range of relevant manuscripts than previous studies examining the issue of UK graduates’ preparedness, leading to a synthesis of the current literature on medical graduates’ preparedness to practise in the UK that we hope provides policy makers and educational developers with a strong overview of the current climate of preparedness.

**Recommendations for future practice and research**

Based on our analysis of the studies undertaken so far we make methodological and topic focused recommendations. In terms of topic-focused recommendations, the data are clear that graduates are unprepared in certain areas, for example, prescribing. For these areas we need educational interventions in order to address them and then further research. For example, the prescribing safety assessment (PSA) was piloted in the UK in 2013, and by 2014 most medical students graduating in the UK sat it for the first time. We would therefore expect to see research arising from the PSA implementation in the near future given that success in the PSA is becoming a requirement for completion of the Foundation 1 year.

It is also easy to see from our review where further research is needed (e.g. where data are unclear). For the latter, future research should adopt a more programmatic and rigorous approach to understanding the issues at hand and clear definitions of preparedness. Self-report data alone are insufficient and multiple stakeholder perspectives are recommended. Furthermore, we suggest future research employs multi-site and longitudinal research designs using a range of research methods (e.g. observational, questionnaire, action research) to understand the concept and process of preparedness alongside the variety of individual, cultural and organizational issues that might impact on this. In short, a more joined-up, systematic, approach to understanding the educational requirements for junior doctors, and how to achieve this, is required.

**Conclusion**

Graduates appear to be well prepared for some of the basic clinical procedures (e.g. venipuncture) and other aspects of clinical practice (e.g. history taking) that will be required of them as new graduates. Through this research we have identified some areas in which graduates are clearly underprepared and where educational and support interventions will be required, either during medical school and/or in the clinical
environment in which the junior doctor will work. Some interventions have already
been introduced to address these areas (e.g. the Prescribing Safety Assessment for
fifth year medical students) and future research should explore the impact they have
made. Through this research we have also identified other areas in which the degree
of preparedness of graduates is unclear and these require further research. We have
also identified ways in which the quality of research in this area can be improved and
so we believe that researchers interested in exploring this important topic should be
very well positioned to make a significant research contribution.

AUTHOR’S CONTRIBUTIONS
LVM, MM, AB and KM conceived the idea and designed the study. LG, EP and ZJ
developed the search strategy for the study and undertook the search and
screening process at Time 1 under the supervision of MM, LVM and AB. LG
undertook the search and screening process at Time 2 under the supervision of
LVM. All authors developed the thematic coding and subsequent data analysis.
LVM, LG and KM undertook the first draft of the manuscript. All authors
reviewed and revised the manuscript and all authors approved the final version.

COMPETING INTERESTS
None declared.

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DATA SHARING STATEMENT
The raw data for this research comprises research available to others through peer-
reviewed journals, some of which is copyright, we therefore are not at liberty to share.

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Jefferies and Ms Camille Kostov for their work on the wider study and comments on the original report to the funders
<table>
<thead>
<tr>
<th>Practical procedure</th>
<th>Prepared: number &amp; reference(s)</th>
<th>Unprepared: number &amp; reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‡ Venipuncture</td>
<td>4 Bleakley and Brennan (2011)(^{47}) Matheson and Matheson (2009)(^{45}) Illing et al. (2013)(^{30}) Morrow et al. (2012)(^{42})</td>
<td>0</td>
</tr>
<tr>
<td>‡ Urinary catheterisation</td>
<td>3 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44}) Matheson and Matheson (2009)(^{45})</td>
<td>3 Bleakley and Brennan (2011)(^{47}) Morrow et al. (2012)(^{42}) Illing et al. (2013)(^{30})</td>
</tr>
<tr>
<td>‡ Wound suturing</td>
<td>0</td>
<td>3 Matheson and Matheson (2009)(^{45}) Bleakley and Brennan (2011)(^{47}) Naghavi and Sanati (2009)(^{69})</td>
</tr>
<tr>
<td>‡ Administering intramuscular and subcutaneous injections</td>
<td>1 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44}) Matheson and Matheson (2009)(^{45})</td>
<td>3 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44}) Matheson and Matheson (2009)(^{45})</td>
</tr>
<tr>
<td>‡ Carry out basic respiratory function tests</td>
<td>1 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44}) Matheson and Matheson (2009)(^{45})</td>
<td>4 Matheson and Matheson (2009)(^{45}) Brown et al. (2010)(^{44}) Bleakley and Brennan (2011)(^{47}) Naghavi and Sanati (2009)(^{69})</td>
</tr>
<tr>
<td>‡ Blood cultures from peripheral and central sites</td>
<td>1 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44}) Matheson and Matheson (2009)(^{45})</td>
<td>0</td>
</tr>
<tr>
<td>‡ Use of local anaesthetics</td>
<td>1 Brown et al. (2010)(^{44})++ Brown et al. (2010)(^{44})++ Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++</td>
<td>2 Brown et al. (2010)(^{44})++</td>
</tr>
<tr>
<td>‡ Making up drugs for parenteral administration</td>
<td>1 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44}) Matheson and Matheson (2009)(^{45})</td>
<td>4 Brown et al. (2010)(^{44}) Bleakley and Brennan (2011)(^{47}) Naghavi and Sanati (2009)(^{69}) Morrow et al. (2012)(^{62})</td>
</tr>
<tr>
<td>‡ Perform and interpret electrocardiograms (ECG)</td>
<td>2 Brown et al. (2010)(^{44})++ Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++</td>
<td>1 Brown et al. (2010)(^{44})++</td>
</tr>
<tr>
<td>‡ Administer oxygen therapy</td>
<td>2 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++</td>
<td>2 Brown et al. (2010)(^{44})++ Matheson and Matheson (2009)(^{45})</td>
</tr>
<tr>
<td>‡ Establishing peripheral intravenous access and setting up an infusion</td>
<td>3 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++ Matheson and Matheson (2009)(^{45})</td>
<td>2 Brown et al. (2010)(^{44})++ Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++ Matheson and Matheson</td>
</tr>
<tr>
<td>Nasogastric tube insertion</td>
<td>2 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++</td>
<td>4 Bleakley and Brennan (2011)(^{47}) Brown et al. (2010)(^{44})++ Matheson and Matheson</td>
</tr>
<tr>
<td>Procedure</td>
<td>Year</td>
<td>Authors 1</td>
</tr>
<tr>
<td>------------------------------------------</td>
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</tr>
<tr>
<td>Establish IV access for patient with broken veins</td>
<td>2012</td>
<td>Wijnen-R Meijer et al.</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Matheson and Matheson</td>
</tr>
<tr>
<td>Inserting a central venous line</td>
<td>2010</td>
<td>Goldacre et al.</td>
</tr>
<tr>
<td>Inserting a chest drain</td>
<td>2011</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>Morrow et al.</td>
</tr>
<tr>
<td>Basic CPR (TD09 16e)</td>
<td>2011</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Matheson and Matheson</td>
</tr>
<tr>
<td>Control of haemorrhage</td>
<td>2011</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
</tbody>
</table>

| Total number of different studies        |      | 5         | 9         |

**Note:** Blue text = self-report only; Red text = mixed participants/methods; Black text = trainer report only; ‡ = skills specifically identified in TD09 Appendix A; * = partial evidence; Δ = Different cohorts, newer evidencing greater preparedness; ++ = self-report measures differ from supervisor-report.
TABLE 2: MANUSCRIPTS SUGGESTING PREPAREDNESS VERSUS UNPREPAREDNESS OF MEDICAL GRADUATES FROM 2009-2014 MAPPED AGAINST THE OUTCOMES FOR GRADUATES.

<table>
<thead>
<tr>
<th>Specific Outcome</th>
<th>Prepared: number &amp; reference(s)</th>
<th>Unprepared: number &amp; reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOCTOR AS SCIENTIST AND SCHOLAR (8-12)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of anatomy (TD09 8*)</td>
<td>0</td>
<td>1 Dickson et al. (2009)³³</td>
</tr>
<tr>
<td>Understanding disease processes (TD09 8e*)</td>
<td>2 Matheson and Matheson (2009)⁴³</td>
<td>1 Watmough et al. (2012)⁴⁰Δ</td>
</tr>
<tr>
<td>Apply scientific principles, method and knowledge to medical practice and research (TD09 9*)</td>
<td>1 Tallentire et al. (2011b)⁴⁴</td>
<td>0</td>
</tr>
<tr>
<td>Knowledge of clinical, behavioral and social sciences for medicine (TD09 9* &amp; 10*)</td>
<td>2 Matheson and Matheson (2009)⁴³</td>
<td>0 Tallentire et al. (2011b)⁴⁴</td>
</tr>
<tr>
<td>Basic nutritional care/knowledge (TD09 11h)</td>
<td>2 Bleakley and Brennan (2011)⁴⁷</td>
<td>0</td>
</tr>
<tr>
<td>Total number of different studies</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>DOCTOR AS PRACTITIONER (13-19)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking a history (TD09 13a)</td>
<td>8 Bleakley and Brennan (2011)⁴⁷</td>
<td>0</td>
</tr>
<tr>
<td>Communicate sensitively, clearly and effectively with patients and relatives (TD09 13b*)</td>
<td>2 Bleakley and Brennan (2011)⁴⁷</td>
<td>0</td>
</tr>
<tr>
<td>Performing a full physical examination (TD09 13c)</td>
<td>5 Bleakley and Brennan (2011)⁴⁷</td>
<td>0</td>
</tr>
<tr>
<td>Perform a mental-state examination (TD09 13d)</td>
<td>2 Matheson and Matheson (2009)⁴³</td>
<td>1 Gordon (2012)⁷⁷</td>
</tr>
<tr>
<td>Task Description</td>
<td>Tier</td>
<td>Reference</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hold conversation with patient and family to explain a mistake (TD09 13g*)</td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)‡‡</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)‡‡</td>
</tr>
<tr>
<td>Using evidence and guidelines for patient care (including developing critical thinking) (TD09 14a*)</td>
<td>1</td>
<td>Watmough et al. (2012)‡∆</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tallentire et al. (2011b)‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)‡∆</td>
</tr>
<tr>
<td>Recognising the social and emotional factors in illness and treatment (TD09 14a*)</td>
<td>3</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)‡∆</td>
</tr>
<tr>
<td>Clinical reasoning and making a diagnosis (TD09 14b,f*)</td>
<td>3</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laws et al. (2012)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)‡∆</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Atrey et al. (2010)§‡</td>
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<tr>
<td></td>
<td></td>
<td>Brown et al. (2010)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Davis and MacLullich (2009)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Estcourt et al. (2009)§‡</td>
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<tr>
<td></td>
<td></td>
<td>George et al. (2011)§‡</td>
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<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)‡‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tallentire et al. (2011b)‡</td>
</tr>
<tr>
<td>To draw up an examination plan for a new patient at the outpatient department (TD09 14c*)</td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)‡‡</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)‡‡</td>
</tr>
<tr>
<td>Selecting appropriate investigations and interpreting the results (TD09 14d*)</td>
<td>2</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)‡∆</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td>Protecting patients’ rights (TD09 14e*)</td>
<td>1</td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td>Planning discharge for patients (TD09 14f*)</td>
<td>1</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td>Identifying signs of abuse (TD09 14i)</td>
<td>0</td>
<td>Estcourt et al. (2009)§‡</td>
</tr>
<tr>
<td>End of life care (TD09 14j)</td>
<td>0</td>
<td>Gibbins et al. (2011)‡</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Linklater et al. (2010)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bowden et al. (2013)§‡</td>
</tr>
<tr>
<td>Writing out Part A of a cremation form (TD09 14k*)</td>
<td>0</td>
<td>Morrow et al. (2012)‡‡</td>
</tr>
<tr>
<td>Communicate effectively in multi-disciplinary / inter-disciplinary team (TD09 15a*)</td>
<td>2</td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wijnen-Meijer et al. (2012)‡‡</td>
</tr>
<tr>
<td>Communicate effectively in a medical context (TD09 15b*)</td>
<td>1</td>
<td>Tallentire et al. (2011b)‡</td>
</tr>
<tr>
<td>Communicate effectively with colleagues (TD09 15c*)</td>
<td>4</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illing et al. (2013)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)§‡</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wijnen-Meijer et al. (2012)‡‡</td>
</tr>
<tr>
<td>Breaking bad news to patients and relatives (TD09 15d*)</td>
<td>3</td>
<td>Bleakley and Brennan (2011)†‡</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Linklater et al. (2010)§‡</td>
</tr>
<tr>
<td>15d)</td>
<td>Matheson and Matheson (2009)\textsuperscript{45}</td>
<td>IIling et al. (2013)\textsuperscript{30}</td>
</tr>
<tr>
<td></td>
<td>Wijnen-RMeijer et al. (2012)\textsuperscript{44}‡</td>
<td>Wijnen-RMeijer et al. (2012)\textsuperscript{44}‡</td>
</tr>
</tbody>
</table>

| Dealing with difficult or violent patients (TD09 15e) | 0 | 2 | Matheson and Matheson (2009)\textsuperscript{45} |
|                                                    |   |   | Morrow et al. (2012)\textsuperscript{42} |

| Treating acutely ill patients (TD09 item 16) | 3 | 2 | IIling et al. (2013)\textsuperscript{30} |
|                                            |   |   | Wijnen-RMeijer et al. (2012)\textsuperscript{40} |

| Diagnose and manage acute medical emergencies (TD09 16b) | 3 | 9 | Bleakley and Brennan (2011)\textsuperscript{47} |
|                                                       |   |   | Gordon et al. (2012)\textsuperscript{49} |
|                                                       |   |   | Hobson et al. (2011)\textsuperscript{43} Δ |
|                                                       |   |   | Tallentire et al. (2011b)\textsuperscript{44} Δ ‡ |

| Explain drug prescription choice to a pharmacist (TD09 17b) | 1 | 1 | Wijnen-RMeijer et al. (2012)\textsuperscript{44}‡ |

| Prescribing safely (TD09 17c) | 5 | 23 | Ahmed et al. (2012)\textsuperscript{47} |
|                                |   |   | Brown et al. (2010)\textsuperscript{44} |
|                                |   |   | Bertels et al. (2013)\textsuperscript{47} |
|                                |   |   | Bleakley and Brennan (2011)\textsuperscript{47} |
|                                |   |   | Brennan et al. (2010)\textsuperscript{47} |
|                                |   |   | Dornan et al. (2009)\textsuperscript{42}† |
|                                |   |   | Franklin et al. (2011)\textsuperscript{48} |
|                                |   |   | Goldacre et al. (2010)\textsuperscript{38} |
|                                |   |   | Harding et al. (2010)\textsuperscript{11} |
|                                |   |   | Illing et al. (2013)\textsuperscript{40} |
|                                |   |   | Kavanagh et al. (2012)\textsuperscript{49} |
|                                |   |   | Kilminster et al. (2011)\textsuperscript{40} |
|                                |   |   | Lewis and Tully (2009)\textsuperscript{43} |
|                                |   |   | Mattick et al. (2013)\textsuperscript{13} |
|                                |   |   | Morrow et al. (2012)\textsuperscript{42} |
|                                |   |   | Ross et al. (2012)\textsuperscript{41} |
|                                |   |   | Ross et al. (2013)\textsuperscript{41} |
|                                |   |   | Rothwell et al. (2012)\textsuperscript{14} |
|                                |   |   | Ryan et al. (2013)\textsuperscript{42} |
|                                |   |   | Seden et al. (2013)\textsuperscript{56} |
|                                |   |   | Tallentire et al. (2012)\textsuperscript{53} |
|                                |   |   | Watmough et al. (2012)\textsuperscript{40}Δ |
|                                |   |   | Wijnen-RMeijer et al. (2012)\textsuperscript{44}‡ |

| Calculate drug dosage and record outcome (TD09 17d) | 0 | 5 | Bleakley and Brennan (2011)\textsuperscript{47} |
|                                                    |   |   | Dornan et al. (2009)\textsuperscript{40} |
|                                                    |   |   | Matheson and Matheson (2009)\textsuperscript{45} |
|                                                    |   |   | Mattick et al. (2013)\textsuperscript{13} |
|                                                    |   |   | Morrow et al. (2012)\textsuperscript{42} |

| Apply knowledge of | 0 | 1 | Morrow et al. (2012)\textsuperscript{42} |
alternative and complementary therapies and how these may affect other treatments (TD09 17b)

| Keeping an accurate and relevant medical record (TD09 19a) | 2 | Brown et al. (2010)44 Matheson and Matheson (2009)55 | Bleakley and Brennan (2011)7 |
| Maintaining confidentiality (TD2009 19c*) | 1 | Matheson and Matheson (2009)55 | 0 |
| Total number of different studies | 15 | 37 |

**DOCTOR AS PROFESSIONAL (20-23)**

<p>| Overall patient-centred practice and humane care recognizes all aspects of care (TD09 20b*) | 1 | Bleakley and Brennan (2011)7 | 1 | McGettigan et al. (2013)62 |
| Acting in a professional manner (with honesty and probity) (TD09 20c*) | 2 | Bleakley and Brennan (2011)7 Matheson and Matheson (2009)55 | 0 |
| Providing appropriate care for people of different cultures (TD09 20d*) | 2 | Bleakley and Brennan (2011)7Δ Matheson and Matheson (2009)55 | 1 | Bleakley and Brennan (2011)7Δ |
| Knowledge of key mental health legislation (TD09 20*) | 1 | Wadoo et al. (2011)11 | 0 |
| Sickness certification (TD09 20g*) | 0 | Walters et al. (2010)44 |
| Asking for help (TD09 21e*) | 2 | Brown et al. (2010)44 Matheson and Matheson (2009)55 | 0 |
| Being aware of their limitations (TD09 21e*) | 4 | Bleakley and Brennan (2011)7 | 1 | Watmough et al. (2012)68Δ |</p>
<table>
<thead>
<tr>
<th>Task</th>
<th>Number of Studies</th>
<th>Authors and Year of Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undertaking a teaching role (TD09 21f*)</td>
<td>2</td>
<td>Bleakley and Brennan (2011)$^{19}$, Wijnen-RMeijer et al. (2012)$^{54}$</td>
</tr>
<tr>
<td>Understanding roles of other healthcare professionals (TD09 22a*)</td>
<td>1</td>
<td>Watmough et al. (2012)$^{30}$ $^{\Delta}$, Wijnen-RMeijer et al. (2012)$^{54}$ $^{\Delta}$</td>
</tr>
<tr>
<td>Ensuring and promoting patient safety (TD09 23a*, d*)</td>
<td>1</td>
<td>Bleakley and Brennan (2011)$^{37}$, McGartigan et al. (2013)$^{22}$</td>
</tr>
<tr>
<td>Coping with uncertainty (TD09 23b)</td>
<td>0</td>
<td>Bleakley and Brennan (2011)$^{37}$ $^{\Delta}$, Wijnen-RMeijer et al. (2012)$^{54}$ $^{\Delta}$</td>
</tr>
<tr>
<td>Using knowledge of the structures and functions of the NHS in practice (TD09 23c*)</td>
<td>0</td>
<td>Morrow et al. (2012)$^{40}$</td>
</tr>
<tr>
<td>Reporting and dealing with error and safety incidents (TD09 23d*)</td>
<td>0</td>
<td>Ahmed et al. (2012)$^{32}$, Bleakley and Brennan (2011)$^{37}$, Cresswell et al. (2013)$^{22}$</td>
</tr>
<tr>
<td>Clinical governance (TD09 23d*)</td>
<td>1</td>
<td>Bleakley and Brennan (2011)$^{37}$ $^{\Delta}$, Wijnen-RMeijer et al. (2012)$^{54}$ $^{\Delta}$</td>
</tr>
<tr>
<td>Knowledge/Using audit to improve patient care (TD09 23e*)</td>
<td>3</td>
<td>Bleakley and Brennan (2011)$^{37}$ $^{\Delta}$, Brown et al. (2010)$^{44}$ $^{\Delta}$, Watmough et al. (2012)$^{40}$ $^{\Delta}$</td>
</tr>
<tr>
<td>Dealing appropriately, effectively, and in patients’ interests with problems in the performance, conduct or health of colleagues (TD09 23d*, i*)</td>
<td>0</td>
<td>Matheson and Matheson (2009)$^{45}$</td>
</tr>
<tr>
<td>Reducing the risk of cross-infection (TD09 23b)</td>
<td>1</td>
<td>Bleakley and Brennan (2011)$^{37}$ $^{\Delta}$</td>
</tr>
<tr>
<td>Managing their health, including stress (TD09 23i*)</td>
<td>0</td>
<td>Bleakley and Brennan (2011)$^{37}$ $^{\Delta}$</td>
</tr>
<tr>
<td><strong>Total number of different studies</strong></td>
<td><strong>10</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

**ITEMS NOT DIRECTLY MAPPED TO OUTCOMES FOR GRADUATES**

- To give a presentation at the clinical team meeting after a night shift | 1 | Wijnen-RMeijer et al. (2012)$^{24}$ |
- Write letter of referral to | 1 | Wijnen-RMeijer et al. (2012)$^{24}$ $^{\Delta}$, Wijnen-RMeijer et al. (2012)$^{54}$ $^{\Delta}$ |
<table>
<thead>
<tr>
<th>Competency</th>
<th>Study Count</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to participate in effective handover</td>
<td>3</td>
<td>Burns (2011), Cleland et al. (2009), Raduma Tomas et al. (2011)</td>
</tr>
<tr>
<td>Knowledge and understanding of rehabilitation and care within institutions and the community</td>
<td>2</td>
<td>Matheson and Matheson (2009)b, Matheson and Matheson (2009)d</td>
</tr>
<tr>
<td>Understanding the purpose and practice of appraisal</td>
<td>1</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td>Use information and technology effectively in medical context</td>
<td>1</td>
<td>Tallentire et al. (2011)b</td>
</tr>
<tr>
<td>Organisational decision making</td>
<td>1</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td>Applying clinical pharmacology and therapeutics (CPT) to prescribing</td>
<td>2</td>
<td>Harding et al. (2010), Mattick et al. (2013)</td>
</tr>
<tr>
<td>To ask a representative critical questions about the pharmaceutical product</td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)</td>
</tr>
<tr>
<td>Pre-operative assessment of patients</td>
<td>1</td>
<td>Morrow et al. (2012)</td>
</tr>
<tr>
<td>Taking part in advanced life support</td>
<td>1</td>
<td>Bleakley and Brennan (2011)d, Bleakley and Brennan (2011)d</td>
</tr>
<tr>
<td>Functioning safely in an acute ‘take’ team</td>
<td>1</td>
<td>Bleakley and Brennan (2011)d</td>
</tr>
<tr>
<td>Educating patients (health and public health) promotion</td>
<td>1</td>
<td>Bleakley and Brennan (2011)d</td>
</tr>
<tr>
<td>Maintaining good quality care</td>
<td>1</td>
<td>Bleakley and Brennan (2011)d</td>
</tr>
<tr>
<td>Carrying out a literature search</td>
<td>1</td>
<td>Watmough et al. (2012), Watmough et al. (2012)</td>
</tr>
<tr>
<td>Skills of close observation</td>
<td>1</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td><strong>Total number of different studies</strong></td>
<td><strong>5</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

**Note:** Blue text = Self-report only; Red text = Mixed participants/methods; Black text = Trainer report only; * = Partially relevant to the specified outcome; ‡ = trainees suggest preparedness where supervisors do not; Δ = Different cohorts, newer
evidencing greater preparedness; † = self-reports suggest prepared, observational data suggests unprepared.
FIGURE 1: STUDY SELECTION PROCESS 2009-2013

Records identified through database searching (n = 1,705)

Additional records identified through other sources (n = 2,057)

Records after duplicates removed (n = 1,617)

Records screened (titles/abstract against criteria) (n = 1,617)

Records excluded (n = 1,410)

Full-text articles assessed for eligibility (n = 207) plus additional records identified from reference lists (n = 49)

Full-text articles excluded (n = 93)

Quality assessment (n = 163)

Full-text articles excluded (n = 82)

Studies in synthesis:
  - Reviews (n = 4)
  - Quantitative (n = 46)
  - Qualitative (n = 17)
  - Mixed methods (n = 14)
**Figure 2: Study Selection Process 2013-2014**

- **Identification**
  - Records identified through database searching (n = 580)
  - Additional records identified through other sources (n = 880)

- **Screening**
  - Records after duplicates removed (n = 134)

- **Eligibility**
  - Records screened (n = 134)
  - Records excluded (n = 76)
  - Full-text articles assessed for eligibility (n = 58)
  - Full-text articles excluded, with reasons (n = 52)

- **Included**
  - Studies included in synthesis:
    - Qualitative (n = 5)
    - Quantitative (n = 1)
References


13. Mattick K, Rees C, Kelly N. "By junior doctors for junior doctors": A project to develop educational interventions to support junior doctor's antimicrobial prescribing, 2013.


31. Hobson J. Will our junior doctors be ready for the next major incident? A questionnaire audit on major accident awareness across three NHS Trusts in Wales. 2011.


Online supplement A: Searches and Results
2009-2013

Database: Ovid MEDLINE(R) <1946 to June Week 4 2013>

436 Results

1  Junior doctor*1.mp. (1519)
2  pre-registration house officer.tw. (57)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (40696)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (2826)
5  new* qualif* doctor*.tw. (97)
6  (SHO or senior house officer*).tw. (1005)
7  (medic* adj3 graduat*).tw. (7127)
8  "Internship and Residency"/ (34048)
9  or/1-8 (82614)
10  exp Professional Competence/ (82404)
11  exp Clinical Competence/ (63261)
12  exp Self Efficacy/ (11734)
13  (Confidence adj3 practice).tw. (232)
14  exp Professional Practice/ (215546)
15  exp Resilience, Psychological/ (1272)
16  exp coping behavior/ (100563)
17  exp Competency-Based Education/ (2705)
18  *"Education, Medical, Graduate"/ (14401)
19  *"Education, Medical"/ (34246)
20  "Education, Medical, Continuing"/ (20783)
21  (prepar* adj3 practi*).tw. (2393)
22  ((readiness or ready) adj3 practi*).tw. (253)
23  (transition* adj3 pract*).tw. (502)
24  ((Competence or prepare* or confidence* or ready) adj3 (practise or purpose or employab*)).tw. (361)
25  (resilien* adj3 medical).tw. (18)
26  (effective* adj3 medical curriculum).tw. (4)
27  foundation train*.tw. (43)
28  medical education.tw. (24142)
29  professionalism.tw. (4052)
30  prescribing skill*1.tw. (58)
31  scientific knowledge.tw. (3028)
32  (fitness adj3 practise).tw. (76)
33  (fitness adj3 purpose).tw. (156)
34  (defin* adj3 practi*).tw. (2392)
35  (asses* adj3 prepar*).tw. (1922)
36  (toler* adj3 uncert*).tw. (174)
37  Leadership.tw. (18613)
38  Ethical manner.tw. (50)
39  Clinical analysis.tw. (4760)
40  Clinical* effective*.tw. (9746)
41  Communicate effectively.tw. (392)
42  *"Communication"/ (26239)
43  Communicate appropriately.tw. (4)
44  Clinical responsibil*.tw. (258)
45  (Adapt adj3 chang*).tw. (1810)
<p>| | |</p>
<table>
<thead>
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<th></th>
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<tbody>
<tr>
<td>46</td>
<td>Patient safety.tw. (11959)</td>
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<tr>
<td>47</td>
<td>*Patient Safety/ (1584)</td>
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<td>48</td>
<td>Clinical judgement.tw. (1250)</td>
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<td>49</td>
<td>Patient care.tw. (35296)</td>
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<tr>
<td>50</td>
<td>*Quality Assurance, Health Care/ (27761)</td>
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<td>52</td>
<td>(CPD or Continuing professional development).tw. (3858)</td>
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<td>(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (1614)</td>
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<td>((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (18527)</td>
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<td>clinical performance.tw. (4913)</td>
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<td>56</td>
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<td>58</td>
<td>Safe prescribing.tw. (103)</td>
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<td>59</td>
<td>Reflection.tw. (27262)</td>
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<td>60</td>
<td>&quot;Feedback&quot;/ (26196)</td>
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<td>61</td>
<td>(Work adj3 autonomously).tw. (18)</td>
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<td>Psychology/ (20398)</td>
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<td>65</td>
<td>or/10-64 (684911)</td>
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<td>66</td>
<td>exp Great Britain/ (295235)</td>
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<td>67</td>
<td>exp Scotland/ (20714)</td>
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<tr>
<td>68</td>
<td>exp Northern Ireland/ (3907)</td>
</tr>
<tr>
<td>69</td>
<td>exp Wales/ (11989)</td>
</tr>
<tr>
<td>70</td>
<td>(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (229183)</td>
</tr>
<tr>
<td>71</td>
<td>or/66-70 (443340)</td>
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<td>72</td>
<td>9 and 65 and 71 (1501)</td>
</tr>
<tr>
<td>73</td>
<td>limit 72 to yr=&quot;2009 -Current&quot; (436)</td>
</tr>
</tbody>
</table>

**Database: CINAHL**

191 Results
20. (MM "Education, Medical, Continuing") (2286)
21. AB (prepar* W3 practi*) (1024)
22. TX (readiness W3 practi*) OR (ready W3 practi*) (670)
23. TX (transition* W3 pract*) (2367)
24. TX ((Competence OR prepare* OR confiden* OR ready) W3 (practise OR purpose OR employab*)). (672)
25. TX (resilien* W3 medical)  (195)
26. TX (effective* W3 medical curriculum) (10)
27. TI "foundation train*" OR AB "foundation train*" (29)
28. TI medical education OR AB medical education (5841)
29. TI professionalism OR AB professionalism  (2555)
30. TI "prescribing skill*" OR AB “prescribing skill*” (22)
31. TI “scientific knowledge” OR AB “scientific knowledge” (834)
32. TI ( fitness W3 practise) OR AB (fitness W3 practise) (163)
33. TI (fitness W3 purpose) OR AB (fitness W3 purpose) (64)
34. TI (defin* W3 practi*) OR AB (defin* W3 practi*) (867)
35. TI (asses* W3 prepar*) OR AB(asses* W3 prepar*) (374)
36. TI (toler* W3 uncert*) OR AB (toler* W3 uncert*) (39)
37. TI “Leadership” OR AB “Leadership” (16780)
38. TI “Ethical manner” OR AB “Ethical manner” (1)
39. TI “Clinical analysis” OR AB “Clinical analysis” (205)
40. TI “Clinical* effective*” OR AB “Clinical* effective*” (2166)
41. TI “Communicate effectively” OR AB “Communicate effectively”” (248)
42. TI (**Communication”) OR AB (**Communication”) (40288)
43. TI “Communicate appropriately” OR AB “Communicate appropriately” (1)
44. TI “Clinical responsibil***” OR AB “Clinical responsibil***” (91)
45. TI (Adapt W3 chang*) OR AB (Adapt W3 chang*) (323)
46. TI “Patient safety” OR AB “Patient safety” (9589)
47. TI “Patient Safety” OR AB “**Patient Safety” (9589)
48. TI “Clinical judgement” OR AB “Clinical judgement” (327)
49. TI “Patient care” OR AB “Patient care” (18319)
50. TX “Quality Assurance, Health Care” (38)
51. TI “Quality assurance” OR AB “Quality assurance” (3894)
52. TX CPD OR “Continuing professional development” (5258)
53. TX (Inadequate W3 (supervision or train* OR support OR preparedness)) (3657)
54. TX ((Inadequate OR clinical) W3 (supervision OR train* OR support OR preparedness)) (26663)
55. TI “clinical performance” OR AB “clinical performance” (1280)
56. TI (Situation W3 uncertainty) OR AB (Situation W3 uncertainty)(20)
57. TI (Emergency W3 judgement) OR AB (Emergency W3 judgement) (I)
58. TI “Safe prescribing” OR AB “Safe prescribing” (90)
59. TI “Reflection” OR AB “Reflection” (7175)
60. TX “Feedback" (70168)
61. TI (Work W3 autonomously) OR AB (Work W3 autonomously) (13)
62. TI (Assistantship OR Mentoring) OR AB (Assistantship OR Mentoring) (3024)
63. TX “psychology knowledge” (10)
64. (MH "Psychology, Occupational") (411)
65. S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 (509,723)
66. (MH "Great Britain+") (72,023)
67. (MH "Scotland") (11,985)
68. (MH "Northern Ireland") (2,556)
69. (MH "Wales") (5,894)
70. TI ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) OR AB ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) (75,158)
71. S66 OR S67 OR S68 OR S69 OR S70 (127,706)
72. S9 AND S65 AND S71 (191)

Database: ERIC

1540879 Results

1. AB,TI(Junior doctor*1) (51)
2. ab,ti(pre-registration house officer) (1)
3. ab,ti("foundation doctor*" OR F1 OR FY1 OR F2 OR FY2 OR "foundation year 1" OR "foundation year one" OR "foundation year 2" OR "foundation year two") (125)
4. AB,TI(PRHO* OR "houseman*" OR “house man*” OR “house officer*” OR intern) (2796)
5. AB,TI(new* qualif* doctor*) (81)
6. AB,TI(SHO OR “senior house officer*”) (11)
7. AB,TI(medic* NEAR/3 graduat*) (786)
8. AB,TI(Internship and Residency) (82)
9. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 (3893)
10. SU.EXACT.EXPLODE(“Professional Competence”) (3)
11. SU.EXACT.EXPLODE(“Clinical Competence”) (13)
12. SU.EXACT.EXPLODE(“Self Efficacy”) (6944)
13. AB,TI((Confidence NEAR/3 practice)) (88)
14. Professional AND Practice (30366)
15. SU.EXACT.EXPLODE("Resilience (Psychology)") (755)
16. SU.EXACT.EXPLODE("Coping") (9243)
17. SU.EXACT.EXPLODE("Competency Based Education") (10649)
18. AB,TI("Education, Medical, Graduate") (718)
19. AB,TI("Education, Medical") (7166)
20. AB,TI("Education, Medical, Continuing") (853)
21. AB,TI((prepar* NEAR/3 practi*)) (1893)
22. AB,TI readiness OR ready NEAR/3 practi* (60)
23. AB,TI((transition* NEAR/3 pract*)) (528)
24. AB,TI((Competence OR prepare* OR confiden* OR ready) NEAR/3 (practise OR purpose OR employab*)) (921)
25. AB,TI((resilien* NEAR/3 medical)) (4)
26. AB,TI(effective* NEAR/3 “medical curriculum”) (2)
27. AB,TI("foundation train")[27]
28. AB,TI("medical education") (2345)
29. AB,TI("professionalism") (3226)
30. AB,TI("prescribing skill*") (4)
31. AB,TI("scientific knowledge") (1168)
32. AB,TI(fitness NEAR/3 practise) (35)
33. AB,TI(fitness NEAR/3 purpose) (71)
34. ("defin* NEAR/3 "practi*") (1434)
35. ("asses*" NEAR/3 "prepar*") (1106)
36. AB,TI(toler* NEAR/3 uncert*) (46)
37. "Leadership" (56817)
38. "Ethical manner" (26)
39. "Clinical analysis" (30)
40. "Clinical* effective*" (50)
41. "(Communicate effectively)" (483)
42. "*Communication" (129322)
43. "Communicate appropriately*" (6)
44. "Clinical responsibil**" (6)
45. Adapt NEAR/3 chang* (573)
46. "*Patient Safety" (79)
47. "Clinical judgement" (14)
48. "Patient care" (811)
49. "*Quality Assurance", "Health Care" (53)
50. "Quality assurance" (2883)
51. CPD OR "Continuing professional development" (846)
52. AB,TI (Inadequate NEAR/3 (supervision or train* or support or preparedness) (648)
53. (Inadequate OR clinical) NEAR/3 (supervision OR train* OR support OR preparedness) (2523)
54. "clinical performance" (173)
55. Situation NEAR/3 uncertainty (36)
56. Emergency OR judgement (19881)
57. Safe prescribing (5)
58. Reflection (22435)
59. "Feedback" (25970)
60. Work NEAR/3 autonomously (11)
61. Assistantship OR Mentoring (7302)
62. “psychology knowledge” (15)
63. Psychology (122587)
64. S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 (409300)
65. "Great Britain" (9473)
66. "Scotland" (4290)
67. "Northern Ireland" (1270)
68. "Wales" (4909)
69. AB,TI (Great Britain OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR United Kingdom OR welsh OR english OR scottish OR irish) (1540880)
70. S35 OR S35 OR S37 OR S38 OR S39 (1540879)

Database: HMIC

71 Results

| 1 | Junior doctor*1.mp. (883) |
| 2 | pre-registration house officer.tw. (20) |
| 3 | (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (43) |
| 4 | (PRHO* or houseman* or house man* or house officer* or intern).tw. (452) |
| 5 | new* qualif* doctor*.tw. (31) |
| 6 | (SHO or senior house officer*).tw. (269) |
| 7 | (medic* adj3 graduat*).tw. (263) |
| 8 | "Internship and Residency"/ (1) |
| 9 | or/1-8 (1543) |
| 10 | exp Professional Competence/ (536) |
| 11 | exp Students/ or exp Assessment/ or exp Clinical practice/ or exp Professional competence/ or exp medical staff/ or exp Skills/ or exp Competence assessment/ (37158) |
Self Efficacy.mp. / (346)
(exp Professional Practice/ (15225)
(exp Stress/ or exp Mental health/ or exp Depression/ (9267)
(exp Occupational stress/ or exp Statistical data/ or exp Students/ or exp behaviour/ (48128)
(exp Competence based learning/ 29
"Education, Medical, Graduate"/ (0)
"Education, Medical"/ (0)
"Education, Medical, Continuing"/ (0)
(prepar* adj3 practi*).tw. (247)
((readiness or ready) adj3 practi*).tw. (25)
(transition* adj3 pract*).tw. (37)
((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*)),tw. (29)
(resilien* adj3 medical),tw. (4)
(effective* adj3 medical curriculum),tw. (0)
(foundation train*).tw. (16)
medical education.tw. (1308)
(professionalism.tw. (458)
prescribing skill*1.tw. (3)
scientific knowledge.tw. (103)
(fitness adj3 practise),tw. (75)
(fitness adj3 purpose),tw. (51)
(defin* adj3 practi*).tw. (242)
(asses* adj3 prepar*),tw. (88)
(toler* adj3 uncert*).tw. (8)
Leadership.tw. (3328)
(Ethical manner.tw. (6)
Clinical analysis.tw. (9)
Clinical* effective*.tw. (1089)
Communicate effectively.tw. (40)
"Communication"/ (10086)
Communicate appropriately.tw. (1)
Clinical responsibil*.tw. (59)
(Adapt adj3 chang*).tw. (82)
Patient safety.tw. (1687)
exp Patient Safety/ (2553)
Clinical judgement.tw. (149)
Patient care.tw. (4919)
exp Quality assurance in health services/ (15975)
Quality assurance.tw. (2746)
(CPD or Continuing professional development).tw. (458)
(Inadequate adj3 (supervision or train* or support or preparation)).tw. (186)
((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)),tw. (1469)
clinical performance.tw. (204)
(Situation adj3 uncertainty),tw. (2)
(Emergency adj3 judgement),tw. (0)
Safe prescribing.tw. (5)
Reflection.tw. (759)
"Feedback"/ (148)
(Work adj3 autonomously),tw. (9)
(Asstistanship or Mentoring),tw. (246)
psychology knowledge.mp. (1)
Psychology/ (349)
or/10-64 (118047)
66 exp Great Britain/ (443)
67 exp Scotland/ (5016)
68 exp Northern Ireland/ (1368)
69 exp Wales/ (3558)
70 (Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (51863)
71 or/66-70 (54958)
72 9 and 65 and 71 (340)
73 limit 72 to yr="2009 -Current" (71)

Database: Ovid PsychINFO

51 Results

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<td>1</td>
<td>Junior doctor*1.mp. (227)</td>
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<td>2</td>
<td>pre-registration house officer.tw. (10)</td>
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<td>(foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (1316)</td>
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<td>or/1-8 (3126)</td>
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<td>(Confidence adj3 practice).tw. (107)</td>
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<td>exp coping behavior/ (16976)</td>
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<td>exp Competency-Based Education/ (55)</td>
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<td>Clinical analysis.tw. (151)</td>
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Clinical* effective*.tw. (874)
Communicate effectively.tw. (258)
*Communication*/ (6804)
Communicate appropriately.tw. (8)
Clinical responsibil*.tw. (68)
(Adapt adj3 chang*).tw. (571)
Patient safety.tw. (1348)
*Patient Safety/ (0)
Clinical judgement.tw. (160)
Patient care.tw. (4238)
*Quality Assurance, Health Care/ (0)
Quality assurance.tw. (1033)
(CPD or Continuing professional development).tw. (709)
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (494)
((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (5392)
clinical performance.tw. (298)
(Situation adj3 uncertainty).tw. (36)
(Emergency adj3 judgement).tw. (0)
Safe prescribing.tw. (16)
Reflection.tw. (13071)
"Feedback"/ (5164)
(Work adj3 autonomously).tw. (8)
(Assistantship or Mentoring).tw. (4412)
psychology knowledge.mp. (38)
Psychology/ (9476)
or/10-64 (115354)
exp Great Britain/ (755)
exp Scotland/ (2039)
exp Northern Ireland/ (1173)
exp Wales/ (3294)
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United
Kingdom or welsh or english or scottish or irish).tw. (63028)
or/66-70 (63037)
9 and 65 and 71 (92)
limit 72 to yr="2009 -Current" (51)

Database: Web of Science

253 Results

1. TS=(Junior doctor*) [580]
2. TS="pre-registration house officer" [3]
3. TS="foundation doctor** OR (F1 NEAR/3 doctor) OR (FY1 NEAR/3 doctor) OR
   (F2 N/3 doctor) OR (FY2 N/3 doctor) OR “foundation year 1” OR “foundation year one” OR
   “foundation year 2” OR “foundation year two”) [67]
4. TS=((PRHO* OR “houseman**” OR “house man**” OR “ house officer**” OR intern))
   [1367]
5. TS=(new* qualifi* doctor*) [77]
6. TS=((SHO OR “senior house officer**”)) [232]
7. TS=((medic* NEAR/3 graduat*)) [1829]
8. TS="(Internship and Residency") [167]
9. #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1 [3948]
10. TS="Professional Competence" [1365]
11. TS="Clinical Competence" [2359]
12. TS="Self Efficacy" [9869]
13. TS=(Confidence NEAR/3 practice) [171]
14. TS="Professional Practice" [10843]
15. TS=(Resilience AND Psychological) [360]
16. TS=(coping behavio$) [2835]
17. TS="Competency-Based Education" [117]
18. TS=("Education, Medical, Graduate") [12]
19. TS=("Education, Medical") [144]
20. TS="Education, Medical, Continuing" [12]
21. TS=(prepar* NEAR/3 practi*) [1061]
22. TS=((readiness OR ready) NEAR/3 practi*) [154]
23. TS=(transition* NEAR/3 pract*) [351]
24. TS=((Competence OR prepare* OR confidence OR ready) NEAR/3 (practise OR purpose OR employab*) [1079]
25. TS=(resilien* NEAR/3 medical) [11]
26. TS="effective* N/3 "medical curriculum"]. [2]
27. TS="foundation train*" [40]
28. TS="medical education" [15569]
29. TS=professionalism [1440]
30. TS="prescribing skill*" [30]
31. TS="scientific knowledge" [1432]
32. TS=(fitness NEAR/3 practice) [91]
33. TS=(fitness NEAR/3 purpose) [166]
34. TS=(defin* NEAR/3 pract*) [1150]
35. TS=(asses* NEAR/3 prepar*) [834]
36. TS=(toler* NEAR/3 uncert*) [213]
37. TS="Leadership" [5677]
38. TS="Ethical manner" [14]
39. TS="Clinical analysis" [806]
40. TS="Clinical* effective*" [2393]
41. TS="Communicate effectively" [116]
42. TS=("Communication") [103616]
43. TS=(Communicate AND appropriately) [102]
44. TS="Clinical responsibil*" [64]
45. TS=(Adapt NEAR/3 chang*) [3195]
46. TS="Patient safety" [5936]
47. TS="Patient Safety" [5943]
48. TS="Clinical judgement" [171]
49. TS="Patient care" [7543]
50. TS=("Quality Assurance" AND "Health Care") [313]
51. TS="Quality assurance" [5810]
52. TS=(CPD OR "Continuing professional development") [1358]
53. TS=(Inadequate NEAR/3 (supervision OR train* OR support OR preparedness)) [522]
54. TS=((Inadequate OR clinical) NEAR/3 (supervision OR train* OR support OR preparedness)) [8204]
55. TS="clinical performance" [1566]
56. TS=(Situation NEAR/3 uncertainty) [193]
57. TS=(Emergency NEAR/3 judgement) [11]
58. TS="Safe prescribing" [45]
59. TS="Reflection" [35439]
60. TS="Feedback" [66710]
61. TS=(Work NEAR/3 autonomously) [73]
62. TS=(Assistantship OR Mentoring) [2370]
63. TS="psychology knowledge" [3]
64. TS=Psychology [5855]
65. #64 OR #63 OR #62 OR #61 OR #60 OR #59 OR #58 OR #57 OR #56 OR #55 OR #54 OR #53 OR #52 OR #51 OR #50 OR #49 OR #48 OR #47 OR #46 OR #45 OR
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<td>TS=Wales [6836]</td>
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<td>70.</td>
<td>TS= (&quot;Great Britain&quot; OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR &quot;United Kingdom&quot; OR welsh OR english OR scottish OR irish) [127342]</td>
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<td>71.</td>
<td>#70 OR #69 OR #68 OR #67 OR #66 [127342]</td>
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<td>72.</td>
<td>9 and 65 and 71 [253]</td>
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Database SCOPUS

199 RESULTS

1. “Junior doctor*” [ALL] 8201
2. “pre-registration house officer” [ABS, TITLE, KEYWORD] 176
3. “foundation doctor*” or “F1 W/3 doctor” or “FY1 W/3 doctor” or “F2 W/3 doctor” or “FY2 W/3 doctor” or “foundation year 1” or “foundation year one” or “foundation year 2” or “foundation year two” [ABS, TITLE, KEYWORD] 7915
4. (“PRHO*” or “houseman*” or “house man*” or “house officer*” or “intern”) [ABS, TITLE, KEYWORD] 2401
5. new* qualif* doctor* [ABS, TITLE, KEYWORD] 684
6. (“SHO” or “senior house officer*”) [ABS, TITLE, KEYWORD] 734
7. (medic* W/3 graduat*) [ABS, TITLE, KEYWORD] 30,467
8. “Internship and Residency” [ALL] 32,262
9. #1 OR #2 etc (can only search a certain amount of characters, need to add in fields) 72,517
10. “Professional Competence” [ALL] 90,912
12. “Self Efficacy” [ALL] 250,195
13. (Confidence W/3 practice) [ABS, TITLE, KEYWORD] 1,479
15. “Resilience, Psychological” [ALL] 1,156
17. “Competency-Based Education” [ALL] 8,151
18. "Education, Medical, Graduate"[ALL] 20,251
19. **"Education, Medical"[ALL] 154,535
20. "Education, Medical, Continuing"[ALL] 19,735
21. (prepar* W/3 practi*)[ABS, TITLE, KEYWORD] 7,666
22. ((readiness or ready) W/3 practi*) [ABS, TITLE, KEYWORD] 844
23. (transition* W/3 practi*)[ABS, TITLE, KEYWORD] 2216
24. ((Competence or prepare* or confiden* or ready) W/3 (practise or purpose or employab*))[ABS, TITLE, KEYWORD] 2,181
25. (resilien* W/3 medical) [ABS, TITLE, KEYWORD] 59
26. (effective* W/3 medical curriculum) [ABS, TITLE, KEYWORD] 298
27. “foundation train*” [ABS, TITLE, KEYWORD] 9,217
29. professionalism[ABS, TITLE, KEYWORD] 11,239
30. “prescribing skill*”[ABS, TITLE, KEYWORD] 733
31. “scientific knowledge” [ABS, TITLE, KEYWORD] 9213
32. (fitness W/3 practise) [ABS, TITLE, KEYWORD] 129
33. (fitness W/3 purpose) [ABS, TITLE, KEYWORD] 1,065
34. (defin* W/3 practi*)[ABS, TITLE, KEYWORD] 8483
Database: CINAHL

Search strategy:

1. TX "Junior doctor*" (3720)
2. TX "pre-registration house officer" (155)
3. TX “foundation doctor*” OR “F1 w/3 doctor” OR “FY1 w/3 doctor” OR “F2 w/3
doctor” OR “FY2 w/3 doctor” OR “foundation year 1” OR “foundation year one” OR
“foundation year 2” OR “foundation year two” (255)
4. TX PRHO* OR “houseman*” OR “house man*” OR “house officer*” OR
intern (3215)
5. TX “new* qualif* doctor*” (297)
6. TX SHO OR “senior house officer*” (1608)
7. TX medic* W3 graduat* (7207)
8. TX Internship AND TX Residency (9851)
9. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR 8 (21334)
10. (MH "Professional Competence+") (41883)
11. (MH "Clinical Competence+") (26193)
12. (MM "Self-Efficacy") (4168)
13. AB confidence OR AB practice OR AB “junior doctor*” (174421)
14. (MH "Professional Practice+") (177623)
15. (MH "Adaptation, Psychological+") (22476)
16. TX “coping behaviour” (458)
17. TX “Competency-Based Education” (391)
18. TX *Education, Medical, Graduate (3981)
19. (MH "Education, Medical+") (22777)
20. (MM "Education, Medical, Continuing") (2423)
21. AB (prepar* W3 practi*) (1085)
22. TX (readiness W3 practi*) OR (ready W3 practi*) (719)
23. TX (transition* W3 practi*) (2581)
24. TX ((Competence OR prepare* OR confiden* OR ready) W3 (practise OR purpose OR
employab*)), (711)
25. TX (resilien* W3 medical) (194)
26. TX (effective* W3 medical curriculum) (58)
27. TI "foundation train*" OR AB "foundation train*" (34)
28. TI medical education OR AB medical education (8282)
29. TI professionalism OR AB professionalism (2722)
30. TI “prescribing skill*” OR AB “prescribing skill*” (23)
31. TI “scientific knowledge” OR AB “scientific knowledge” (883)
32. TI (fitness W3 practise) OR AB (fitness W3 practise) (180)
33. TI (fitness W3 purpose) OR AB (fitness W3 purpose) (67)
34. TI (defin* W3 practi*) OR AB (defin* W3 practi*) (906)
35. TI (asses* W3 prepar*) OR AB(asses* W3 prepar*) (405)
36. TI (toler* W3 uncert*) OR AB (toler* W3 uncert*) (42)
37. TI “Leadership” OR AB “Leadership” (17773)
38. TI “Ethical manner” OR AB “Ethical manner” (37)
39. TI “Clinical analysis” OR AB “Clinical analysis” (230)
40. TI “Clinical* effective*” OR AB “Clinical* effective*” (2310)
41. TI “Communicate effectively” OR AB “Communicate effectively” (262)
42. TI (“Communication”) OR AB (“Communication”) (43123)
43. TI “Communicate appropriately” OR AB “Communicate appropriately” (1)
44. TI “Clinical responsibil*” OR AB “Clinical responsibil*” (94)
45. TI (Adapt W3 chang*) OR AB (Adapt W3 chang*) (340)
46. TI “Patient safety” OR AB “Patient safety” (10414)
47. TI *“Patient Safety” OR AB *“Patient Safety” (10414)
48. TI “Clinical judgement” OR AB “Clinical judgement” (350)
49. TI “Patient care” OR AB “Patient care” (19170)
50. TX “Quality Assurance, Health Care” (36)
51. TI “Quality assurance” OR AB “Quality assurance” (4020)
52. TX CPD OR “Continuing professional development” (5800)
53. TX (Inadequate W3 (supervision or train* OR support OR preparedness)) (3750)
54. TX ((Inadequate OR clinical) W3 (supervision OR train* OR support OR preparedness)) (28272)
55. TI “clinical performance” OR AB “clinical performance” (1383)
56. TI (Situation W3 uncertainty) OR AB (Situation W3 uncertainty)(22)
57. TI (Emergency W3 judgement) OR AB (Emergency W3 judgement) (1)
58. TI “Safe prescribing” OR AB “Safe prescribing” (95)
59. TI “Reflection” OR AB “Reflection” (7641)
60. TX “Feedback” (75211)
61. TI (Work W3 autonomously) OR AB (Work W3 autonomously) (14)
62. TI (Assistantship OR Mentoring) OR AB (Assistantship OR Mentoring) (3235)
63. TX “psychology knowledge” (11)
64. (MH "Psychology, Occupational") (439)
65. S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 (545500)
66. (MH "Great Britain+") (77696)
67. (MH "Scotland") (12716)
68. (MH "Northern Ireland") (2739)
69. (MH "Wales") (6239)
70. TI ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) OR AB ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) (80206)
71. S66 OR S67 OR S68 OR S69 OR S70 (138861)
72. S9 AND S65 AND S71 (47)

Database: Ovid EMBASE(R) 1947-Present
Search Strategy: 06.05.2014 LJG

1  Junior doctor*1.mp. (2476)
2  pre-registration house officer.tw. (65)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (48839)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (4303)
5  new* qualif* doctor*.tw. (148)
6  (SHO or senior house officer*).tw. (1465)
7  (medic* adj3 graduat*).tw. (9249)
8  "Internship and Residency"/ (180644)
9  or/1-8 (238589)
10  exp Professional Competence/ (23677)
11  exp Clinical Competence/ (42143)
12  exp Self Efficacy/ (136749)
13  (Confidence adj3 practice).tw. (341)
14  exp Professional Practice/ (272344)
15  exp Resilience, Psychological/ (36889)
16  exp coping behavior/ (36889)
17  exp Competency-Based Education/ (62398)
18  "Education, Medical, Graduate"/ (98906)
19  "Education, Medical"/ (98906)
20  "Education, Medical, Continuing"/ (180644)
(prepar* adj3 practi*).tw. (3439)
((readiness or ready) adj3 practi*).tw. (357)
(transition* adj3 practi*).tw. (719)
((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or
employab*)).tw. (637)
(resilien* adj3 medical).tw. (21)
(effective* adj3 medical curriculum).tw. (4)
foundation train*.tw. (104)
medical education.tw. (32012)
professionalism.tw. (5300)
prescribing skill*.tw. (86)
scientific knowledge.tw. (4260)
(fitness adj3 practise).tw. (134)
(fitness adj3 purpose).tw. (253)
(defin* adj3 practi*).tw. (3494)
(asses* adj3 prepar*).tw. (2814)
(toler* adj3 uncert*).tw. (221)
Leadership.tw. (24025)
Ethical manner.tw. (71)
Clinical analysis.tw. (7764)
Clinical* effective*.tw. (13804)
Communicate effectively.tw. (543)
**"Communication"/ (37059)
Communicate appropriately.tw. (8)
Clinical responsibil*.tw. (380)
(Adapt adj3 chang*).tw. (2251)
Patient safety.tw. (18628)
*Patient Safety/ (5694)
Clinical judgement.tw. (1917)
Patient care.tw. (50138)
*Quality Assurance, Health Care/ (60714)
Quality assurance.tw. (24449)
(CPD or Continuing professional development).tw. (5720)
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (2224)
((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (26515)
clinical performance.tw. (6184)
(Situation adj3 uncertainty).tw. (83)
(Emergency adj3 judgement).tw. (7)
Safe prescribing.tw. (201)
Reflection.tw. (39746)
"Feedback"/ (58578)
(Work adj3 autonomously).tw. (33)
(Assistantship or Mentoring).tw. (4114)
psychology knowledge.mp. (6)
Psychology/ (48268)
or/10-64 (1042319)
exP Great Britain/ (336473)
exP Scotland/ (336473)
exP Northern Ireland/ (336473)
exP Wales/ (336473)
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United
Kingdom or welsh or english or scottish or irish).tw. (475954)
or/66-70 (685221)
9 and 65 and 71 (15373)
limit 72 to yr="2013 -Current" (64)
Database: ERIC

1. AB, TI (Junior doctor*) (954)
2. AB, TI (pre-registration house officer) (2)
3. AB, TI ("foundation doctor*" OR F1 OR FY1 OR F2 OR FY2 OR "foundation year 1" OR "foundation year one" OR "foundation year 2" OR "foundation year two") (5495)
4. AB, TI (PRHO* OR "houseman*" OR "house man*" OR "house officer*" OR intern) (7965)
5. AB, TI (new* qualif* doctor*) (474)
6. AB, TI (SHO OR "senior house officer") (982)
7. AB, TI (medic* NEAR/3 graduat*) (2343)
8. AB, TI (Internship and Residency) (141)
9. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 (17694)
10. SU.EXACT.EXPLODE ("Professional Competence") (897)
11. SU.EXACT.EXPLODE ("Clinical Competence") (369)
12. SU.EXACT.EXPLODE ("Self Efficacy") (10280)
13. AB, TI (Confidence NEAR/3 practice) (502)
14. Professional AND Practice (63593)
15. SU.EXACT.EXPLODE ("Resilience (Psychology)") (1076)
16. SU.EXACT.EXPLODE ("Coping") (59278)
17. SU.EXACT.EXPLODE ("Competency Based Education") (15661)
18. AB, TI ("Education, Medical, Graduate") (1730)
19. AB, TI ("Education, Medical") (24162)
20. AB, TI (Education, Medical, Continuing) (1966)
21. AB, TI (prepar* NEAR/3 practi*) (5186)
22. AB, TI readiness OR ready NEAR/3 practi* (8491)
23. AB, TI (transition* NEAR/3 practi*) (1991)
24. AB, TI (Competence OR prepare* OR confiden* OR ready NEAR/3 (practise OR purpose OR employab*)) (4292)
25. AB, TI (resilienc* NEAR/3 medical) (28)
26. AB, TI (effective* NEAR/3 “medical curriculum”) (2)
27. AB, TI ("foundation train*") (77)
28. AB, TI ("medical education") (7589)
29. AB, TI ("professionalism") (16620)
30. AB, TI ("prescribing skill*") (9)
31. AB, TI ("scientific knowledge") (7688)
32. AB, TI (fitness NEAR/3 practise) (366)
33. AB, TI (fitness NEAR/3 purpose) (364)
34. ("defin* NEAR/3 "practi*") (27872)
35. ("asses*" NEAR/3 "prepar*") (8065)
36. AB, TI (toler* NEAR/3 uncert*) (315)
37. "Leadership" (822513)
38. "Ethical manner" (1702)
39. "Clinical analysis" (623)
40. "Clinical* effective*" (4568)
41. ("Communicate effectively") (8216)
42. "Communication" (1425140)
43. "Communicate appropriately" (136)
44. "Clinical responsibil*" (362)
45. Adapt NEAR/3 chang* (33273)
46. "Patient Safety" (16302)
47. "Clinical judgement" (663)
48. "Patient care" (50466)
49. "Quality Assurance", "Health Care" (9435)
50. "Quality assurance" (70852)
51. CPD OR "Continuing professional development" (17447)
52. AB,TI (Inadequate NEAR/3 (supervision or train* or support or preparedness))(86)
53. (Inadequate OR clinical) NEAR/3 (supervision OR train* OR support OR preparedness) (33272)
54. "clinical performance" (2268)
55. Situation NEAR/3 uncertainty (6776)
56. Emergency OR judgement (1356587)
57. Safe presciring (6719)
58. Reflection (656099)
59. "Feedback" (349919)
60. Work NEAR/3 autonomously (746)
61. Assistantship OR Mentoring (57680)
62. “psychology knowledge” (129)
63. Psychology (905693)
64. 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 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR
   34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44 OR 45 OR
   46 OR 47 OR 48 OR 49 OR 50 OR 51 OR 52 OR 53 OR 54 OR 55 OR
   56 OR 57 OR 58 OR 59 OR 60 OR 61 OR 62 OR 63 (4347109)
65. "Great Britain" (1671223)
66. "Scotland" (696621)
67. "Northern Ireland" (74072)
68. "Wales" (528864)
69. AB,TI(Great Britain OR Britain OR England OR Scotland OR Wales OR Ireland OR
   UK OR United Kingdom OR welsh OR english OR scottish OR irish) (1661384)
70. 65 OR 66 OR 67 OR 68 OR 69 (3942223)
71. 9 AND 64 AND 70 (43)

Database: HMIC Health Management Information Consortium

Search Strategy:

1 Junior doctor*1.mp. (939)
2 pre-registration house officer.tw. (22)
3 (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one
   or foundation year 2 or foundation year two).tw. (59)
4 (PRHO* or houseman* or house man* or house officer* or intern).tw. (454)
5 new* qualif* doctor*.tw. (35)
6 (SHO or senior house officer*).tw. (273)
7 (medic* adj3 graduat*).tw. (273)
8 "Internship and Residency"/ (0)
9 or/1-8 (1622)
10 exp Professional Competence/ (563)
11 exp Clinical Competence/ (0)
12 exp Self Efficacy/ (0)
13 (Confidence adj3 practice).tw. (34)
14 exp Professional Practice/ (15582)
15 exp Resilience, Psychological/ (0)
16 exp coping behavior/ (0)
17 exp Competence based education/ (0)
18 "Education, Medical, Graduate"/ (0)
19 "Education, Medical"/ (0)
20 "Education, Medical, Continuing"/ (0)
21 (prepar* adj3 practi*).tw. (260)
22 ((readiness or ready) adj3 practise*).tw. (27)
23 (transition* adj3 practise*).tw. (42)
24 ((Competence or prepare* or confident* or ready) adj3 (practise or purpose or employab*)).tw. (29)
25 (resilien* adj3 medical).tw. (4)
26 (effective* adj3 medical curriculum).tw. (0)
27 foundation train*.tw. (20)
28 medical education.tw. (1347)
29 professionalism.tw. (476)
30 prescribing skill*1.tw. (4)
31 scientific knowledge.tw. (106)
32 (fitness adj3 practise).tw. (79)
33 (fitness adj3 purpose).tw. (49)
34 (defin* adj3 practi*).tw. (250)
35 (asses* adj3 prepar*).tw. (93)
36 (toler* adj3 uncert*).tw. (8)
37 Leadership.tw. (3668)
38 Ethical manner.tw. (6)
39 Clinical analysis.tw. (10)
40 Clinical* effective*.tw. (1115)
41 Communicate effectively.tw. (45)
42 "Communication"/ (0)
43 Communicate appropriately.tw. (1)
44 Clinical responsibil*.tw. (59)
45 (Adapt adj3 chang*).tw. (84)
46 Patient safety.tw. (1860)
47 exp Patient Safety/ (0)
48 Clinical judgement.tw. (157)
49 Patient care.tw. (5089)
50 exp Quality assurance in health services/ (0)
51 Quality assurance.tw. (2772)
52 (CPD or Continuing professional development).tw. (476)
53 (Inadequate adj3 (supervision or train* or support or preparedness)).tw. (199)
54 ((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (1529)
55 clinical performance.tw. (206)
56 (Situation adj3 uncertainty).tw. (2)
57 (Emergency adj3 judgement).tw. (0)
58 Safe prescribing.tw. (5)
59 Reflection.tw. (805)
60 "Feedback"/ (161)
61 (Work adj3 autonomously).tw. (9)
62 (Assistantship or Mentoring).tw. (266)
63 psychology knowledge.mp. (1)
64 Psychology/ (364)
65 or/10-64 (33640)
66 exp Great Britain/ (446)
67 exp Scotland/ (5156)
68 exp Northern Ireland/ (1405)
69 exp Wales/ (3676)
70 (Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (53492)
71 or/66-70 (56659)
72 9 and 65 and 71 (124)
73 limit 72 to yr="2013 -Current" (11)
Database: Ovid MEDLINE(R) 1946 to April Week 4 2014

Search Strategy: 06.05.2014 LJG

1  Junior doctor*1.mp. (1549)
2  pre-registration house officer.tw. (55)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (39891)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (2837)
5  new* qualif* doctor*.tw. (103)
6  (SHO or senior house officer*).tw. (993)
7  (medic* adj3 graduat*).tw. (7205)
8  "Internship and Residency"/ (34671)
9  or/1-8 (82493)
10  exp Professional Competence/ (83895)
11  exp Clinical Competence/ (64430)
12  exp Self Efficacy/ (11765)
13  (Confidence adj3 practice).tw. (233)
14  exp Professional Practice/ (216900)
15  exp Resilience, Psychological/ (1438)
16  exp coping behavior/ (101559)
17  exp Competency-Based Education/ (2735)
18  *"Education, Medical, Graduate"/ (14646)
19  *"Education, Medical"/ (34727)
20  "Education, Medical, Continuing"/ (20956)
21  (prepar* adj3 practi*).tw. (2438)
22  ((readiness or ready) adj3 practi*).tw. (263)
23  (transition* adj3 pract*).tw. (524)
24  ((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*)).tw. (368)
25  (resilien* adj3 medical).tw. (15)
26  (effective* adj3 medical curriculum).tw. (3)
27  foundation train*.tw. (47)
28  medical education.tw. (24600)
29  professionalism.tw. (4154)
30  prescribing skill*1.tw. (52)
31  scientific knowledge.tw. (2965)
32  (fitness adj3 practise).tw. (84)
33  (fitness adj3 purpose).tw. (158)
34  (defin* adj3 practi*).tw. (2423)
35  (asses* adj3 prepar*).tw. (1945)
36  (toler* adj3 uncert*).tw. (172)
37  Leadership.tw. (18973)
38  Ethical manner.tw. (52)
39  Clinical analysis.tw. (5065)
40  Clinical* effective*.tw. (9576)
41  Communicate effectively.tw. (398)
42  *"Communication"/ (26490)
43  Communicate appropriately.tw. (5)
44  Clinical responsibil*.tw. (267)
45  (Adapt adj3 chang*).tw. (1757)
46  Patient safety.tw. (12343)
47  *Patient Safety/ (2456)
48  Clinical judgement.tw. (1261)
49  Patient care.tw. (35541)
50  *Quality Assurance, Health Care/ (27790)
Quality assurance.tw. (17239)
(CPD or Continuing professional development).tw. (3838)
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (1597)
([Inadequate or clinical] adj3 (supervision or train* or support or preparedness)).tw. (18433)
clinical performance.tw. (4921)
(Situation adj3 uncertainty).tw. (54)
(Emergency adj3 judgement).tw. (9)
Reflection.tw. (105)
"Feedback"/ (26406)
(Work adj3 autonomously).tw. (19)
(Assistanship or Mentoring).tw. (3153)
psychology knowledge.mp. (4)
Psychology/ (20375)
or/10-64 (691572)
exp Great Britain/ (300335)
exp Scotland/ (21051)
exp Northern Ireland/ (3890)
exp Wales/ (11889)
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (236538)
or/66-70 (454501)
9 and 65 and 71 (1520)
limit 72 to yr="2013 -Current" (98)

Database: Ovid MEDLINE In progress
Search Strategy: 06.05.2014 LJG

Junior doctor*1.mp. (169)
(pre-registration house officer.tw. (1)
(foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (2958)
(PRHO* or houseman* or house man* or house officer* or intern).tw. (181)
new* qualif* doctor*.tw. (11)
(SHO or senior house officer*).tw. (49)
(medic* adj3 graduat*).tw. (844)
"Internship and Residency"/ (1)
or/1-8 (49)
exp Professional Competence/ (4143)
exp Clinical Competence/ (0)
exp Self Efficacy/ (0)
(Confidence adj3 practice).tw. (0)
exp Professional Practice/ (29)
exp Resilience, Psychological/ (1)
exp coping behavior/ (0)
exp Competency-Based Education/ (1)
*"Education, Medical, Graduate"/ (0)
*"Education, Medical"/ (1)
"Education, Medical, Continuing"/ (0)
(prepar* adj3 practi*).tw. (238)
([readiness or ready] adj3 practi*).tw. (25)
(transition* adj3 pract*).tw. (70)
([Competence or prepare* or confiden* or ready] adj3 (practise or purpose or employab*)).tw. (45)
(resilien* adj3 medical).tw. (5)
(effective* adj3 medical curriculum).tw. (1)
foundation train*.tw. (10)
medical education.tw. (2354)
professionalism.tw. (345)
prescribing skill*.tw. (10)
scientific knowledge.tw. (302)
(fitness adj3 practise).tw. (1.5)
(fitness adj3 purpose).tw. (25)
(defin* adj3 practi*).tw. (207)
(asses* adj3 prepar*).tw. (172)
(roler* adj3 uncert*).tw. (23)
Leadership.tw. (1590)
Ethical manner.tw. (6)
Clinical analysis.tw. (379)
Clinical* effective*.tw. (776)
Communicate effectively.tw. (34)
"Communication"/ (0)
Communicate appropriately.tw. (0)
Clinical responsibil*.tw. (16)
(Adapt adj3 chang*).tw. (209)
Patient safety.tw. (1577)
*Patient Safety/ (0)
Clinical judgement.tw. (70)
Patient care.tw. (2793)
*Quality judgement, Health Care/ (0)
Quality assurance.tw. (1052)
(CPD or Continuing professional development).tw. (285)
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (150)
((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (1718)
clinical performance.tw. (389)
(Situation adj3 uncertainty).tw. (5)
(Emergency adj3 judgement).tw. (0)
Safe prescribing.tw. (16)
Reflection.tw. (8669)
"Feedback"/ (0)
(Work adj3 autonomously).tw. (2)
(Asstanship or Mentoring).tw. (312)
psychology knowledge.mp. (0)
Psychology/ (0)
or/10-64 (22503)
exp Great Britain/ (0)
exp Scotland/ (0)
exp Northern Ireland/ (0)
exp Wales/ (0)
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (25832)
or/66-70 (25832)
9 and 65 and 71 (47)
limit 72 to yr="2013 -Current" (0)
Search Strategy: 06.05.2014 LJG

1  Junior doctor*1.mp. (1257)
2  pre-registration house officer.tw. (44)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (18567)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (1692)
5  new* qualif* doctor*.tw. (87)
6  (SHO or senior house officer*).tw. (750)
7  (medic* adj3 graduat*).tw. (4874)
8  "Internship and Residency"/ (21468)
9  or/1-8 (45403)
10  exp Professional Competence/ (67836)
11  exp Clinical Competence/ (52286)
12  exp Self Efficacy/ (206)
13  (Confidence adj3 practice).tw. (107159)
14  exp Professional Practice/ (1384)
15  exp Resilience, Psychological/ (64664)
16  exp coping behavior/ (2309)
17  exp Competency-Based Education/ (8759)
18  *"Education, Medical, Graduate"/ (13520)
19  *"Education, Medical"/ (12122)
20  "Education, Medical, Continuing"/ (1758)
21  (prepar* adj3 practi*).tw. (214)
22  ((readiness or ready) adj3 practi*).tw. (447)
23  (transition* adj3 pract*).tw. (291)
24  ((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*)).tw. (15)
25  (resilien* adj3 medical).tw. (3)
26  (effective* adj3 medical curriculum).tw. (46)
27  foundation train*.tw. (14611)
28  medical education.tw. (3303)
29  professionalism.tw. (48)
30  prescribing skill*.tw. (2387)
31  scientific knowledge.tw. (82)
32  (fitness adj3 practise).tw. (147)
33  (fitness adj3 purpose).tw. (1898)
34  (defin* adj3 practi*).tw. (1381)
35  (asses* adj3 prepar*).tw. (133)
36  (toler* adj3 uncert*).tw. (14346)
37  Leadership.tw. (45)
38  Ethical manner.tw. (2888)
39  Clinical analysis.tw. (7088)
40  Clinical* effective*.tw. (313)
41  Communicate effectively.tw. (16021)
42  *"Communication"/ (3)
43  Communicate appropriately.tw. (162)
44  Clinical responsibil*.tw. (1462)
45  (Adapt adj3 chang*).tw. (11742)
46  Patient safety.tw. (2401)
47  *Patient Safety/ (845)
48  Clinical judgement.tw. (25210)
Database: PsycINFO 1806 to April Week 5 2014

Search Strategy:

1 Junior doctor*1.mp. (311)
2 pre-registration house officer.tw. (15)
3 (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (2313)
4 (PRHO* or houseman* or house man* or house officer* or intern).tw. (1151)
5 new* qualif* doctor*.tw. (25)
6 (SHO or senior house officer*).tw. (159)
7 (medic* adj3 graduat*).tw. (1692)
8 "Internship and Residency"/ (0)
9 or/1-8 (5442)
10 exp Professional Competence/ (4655)
11 exp Clinical Competence/ (0)
12 exp Self Efficacy/ (14655)
13 (Confidence adj3 practice).tw. (165)
14 exp Professional Practice/ (0)
15 exp Resilience, Psychological/ (6649)
16 exp coping behavior/ (37294)
17 exp Competence based learning/ (0)
18 *"Education, Medical, Graduate"/ (0)
19 *"Education, Medical"/ (0)
20 "Education, Medical, Continuing"/ (0)
21 (prepar* adj3 pract*).tw. (1380)
22 ((readiness or ready) adj3 pract*).tw. (203)
(transition* adj3 pract*).tw. (555)  
((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*)).tw. (194)  
(resilien* adj3 medical).tw. (16)  
(effective* adj3 medical curriculum).tw. (3)  
(foundation train*.tw. (23)  
(medical education.tw. (6965)  
(professionalism.tw. (3093)  
(prescribing skill*1.tw. (7)  
scientific knowledge.tw. (2791)  
(fitness adj3 practise).tw. (23)  
(fitness adj3 purpose).tw. (54)  
(defin* adj3 practi*).tw. (1631)  
(asses* adj3 prepar*).tw. (568)  
(toler* adj3 uncert*).tw. (223)  
Leadership.tw. (40701)  
Ethical manner.tw. (79)  
Clinical analysis.tw. (465)  
Clinical* effective*.tw. (1517)  
"Communication"/ (12660)  
Communicate appropriately.tw. (10)  
Clinical responsibil*.tw. (129)  
(Adapt adj3 chang*).tw. (851)  
Patient safety.tw. (1613)  
exp Patient Safety/ (0)  
Clinical judgement.tw. (251)  
exp Quality assurance in health services/ (0)  
Quality assurance.tw. (1830)  
(CPD or Continuing professional development).tw. (982)  
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (907)  
(Inadequate or clinical) adj3 (supervision or train* or support or preparedness).tw. (10407)  
clinical performance.tw. (472)  
(Situation adj3 uncertainty).tw. (80)  
(Emergency adj3 judgement).tw. (0)  
Safe prescribing.tw. (21)  
Reflection.tw. (21411)  
"Feedback"/ (12544)  
(Work adj3 autonomously).tw. (14)  
(Assistantship or Mentoring).tw. (6048)  
psychology knowledge.mp. (84)  
Psychology/ (26959)  
or/10-64 (213638)  
exp Great Britain/ (0)  
exp Scotland/ (0)  
exp Northern Ireland/ (0)  
exp Wales/ (0)  
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (176578)  
or/66-70 (176578)  
9 and 65 and 71 (115)  
(limit 72 to yr="2013 -Current" (15))
SCOPUS SEARCH

203 RESULTS

1. “Junior doctor*” [ALL] 9390
2. “pre-registration house officer” [ABS, TITLE, KEYWORD] 177
3. “foundation doctor*” or “F1 W/3 doctor” or “FY1 W/3 doctor” or “F2 W/3 doctor” or “FY2 W/3 doctor” or “foundation year 1” or “foundation year one” or “foundation year 2” or “foundation year two” [ABS, TITLE, KEYWORD] 134
4. (“PRHO*” or “houseman*” or “house man*” or “house officer*” or “intern”) [ABS, TITLE, KEYWORD] 2498
5. new* qualif* doctor*[ABS, TITLE, KEYWORD] 725
6. (“SHO” or “senior house officer*”) [ABS, TITLE, KEYWORD] 747
7. (medic* W/3 graduat*) [ABS, TITLE, KEYWORD] 31943
8. “Internship and Residency” [ALL] 33997
9. #1 OR #2 etc (can only search a certain amount of characters, need to add in fields) 68726
10. “Professional Competence” [ALL] 102101
11. “Clinical Competence” [ALL] 194097
12. “Self Efficacy” [ALL] 290294
13. (Confidence W/3 practice) [ABS, TITLE, KEYWORD] 1,577
15. “Resilience, Psychological” [ALL] 33991
16. “coping behaviɔr” [ALL] 183890
17. “Competency-Based Education” [ALL] 9369
18. **“Education, Medical, Graduate” [ALL] 21129
19. **“Education, Medical” [ALL] 161417
20. "Education, Medical, Continuing" [ALL] 20434
21. (prepar* W/3 practi*)[ABS, TITLE, KEYWORD] 26739
22. (readiness or ready) W/3 practi*) [ABS, TITLE, KEYWORD] 3245
23. (transition* W/3 pract*)[ABS, TITLE, KEYWORD] 9748
24. ((Competence or prepare* or confiden* or ready) W/3 (practise or purpose or employab*)) [ABS, TITLE, KEYWORD] 2947
25. (resilien* W/3 medical) [ABS, TITLE, KEYWORD]369
26. (effective* W/3 medical curriculum) [ABS, TITLE, KEYWORD] 2241
27. “foundation train*”[ABS, TITLE, KEYWORD] 131572
29. professionalism[ABS, TITLE, KEYWORD] 12520
30. “prescribing skill*”[ABS, TITLE, KEYWORD] 796
31. “scientific knowledge” [ABS, TITLE, KEYWORD] 48823
32. (fitness W/3 practise) [ABS, TITLE, KEYWORD] 143
33. (fitness W/3 purpose) [ABS, TITLE, KEYWORD] 1,165
34. (assess* W/3 practi*)[ABS, TITLE, KEYWORD] 9281
35. (asses* W/3 practi*)[ABS, TITLE, KEYWORD] 26414
36. (toler* W/3 uncert*][ABS, TITLE, KEYWORD] 1460
37. Leadership [ABS, TITLE, KEYWORD] 97738
38. “Ethical manner”[ABS, TITLE, KEYWORD] 1715
40. “Clinical* effective*”[ABS, TITLE, KEYWORD] 668111
41. “Communicate effectively”[ABS, TITLE, KEYWORD] 3949
42. "Communication" [ALL] 1,229,380
43. “Communicate appropriately”[ABS, TITLE, KEYWORD] 323
44. “Clinical responsibil*”[ABS, TITLE, KEYWORD] 21895
45. (Adapt W/3 chang*)[ABS, TITLE, KEYWORD] 11189
46. “Patient safety”[ABS, TITLE, KEYWORD] 316241
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</tr>
<tr>
<td>Ethical issues</td>
<td>Were all relevant ethical issues addressed? If not, what wasn’t addressed?</td>
</tr>
</tbody>
</table>

#### Quality Indicator for QUALITATIVE studies

<table>
<thead>
<tr>
<th>Quality Indicator</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research question</td>
<td>Is the research question(s) clearly stated?</td>
</tr>
<tr>
<td>Study Participants</td>
<td>Is the participant group appropriate for the study being carried out (number, characteristics, selection and homogeneity/diversity)? Are the participants from more than one location?</td>
</tr>
<tr>
<td>Theoretical Perspective</td>
<td>What is the theory? Is it explicit? Is it a priori or post hoc?</td>
</tr>
<tr>
<td>‘Data’ collection method</td>
<td>Are the methods used reliable and valid for the research question, context and theory?</td>
</tr>
<tr>
<td>Completeness of ‘data’</td>
<td>Have participants dropped out? Is this attrition rate less than 50%?</td>
</tr>
<tr>
<td>Analysis of results</td>
<td>Are the analytical methods appropriately used? Was there more than one person developing the thematic coding framework (if there was one)? If not, why not?</td>
</tr>
<tr>
<td>Conclusions</td>
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</tr>
<tr>
<td>Clear explanation of methods of data collection and analysis</td>
<td>Is there a clear account of the process of data collection and analysis? Is there sufficient data (quotations) to judge whether the authors’ interpretation is adequately supported? Alternatively, do the researchers rely too heavily on verbatim quotes with little of their own description of themes?</td>
</tr>
</tbody>
</table>
Fair dealing

Does the research design explicitly incorporate a range of different perspectives so one group is not presented as if it represents the whole truth about a situation.

Ethical issues

Were all relevant ethical issues addressed? If not, what wasn't addressed?

Attention to negative cases

As well exploring alternative explanations for the data, have the authors discussed elements in the data that (apparently) contradict the 'main trend' of the phenomena under study.

Reflexivity

Have the authors reflected on their role(s) in the study? What is the relationship between the researcher and the participants?

Quality Indicator for MIXED METHODS studies

Use both sets of indices depending on the part of the study you are assessing – and also consider the issue of ‘Triangulation’ - are the results from either two or more different methods of data collection (for example, interviews and questionnaires) comparable? Did the researchers look for patterns of convergence to develop or corroborate their interpretation?
Online Supplement C: Full list of codes developed for data extraction

01. Conceptualising and measuring preparedness

01.01. Defining preparedness

01.01.01. Synonyms for preparedness
01.01.01.01. Transition to practice
01.01.01.02. Readiness to practice
01.01.01.03. Fitness of purpose
01.01.01.04. Fitness to practice
01.01.02. As an immediate skills-based competency concept
01.01.02.01. Practical skills
01.01.02.02. Diagnostic skills
01.01.02.03. Prescribing skills
01.01.02.04. Knowledge
01.01.03. As a personal development concept
01.01.03.01. Resilience
01.01.03.02. Uncertainty/Ambiguity
01.01.03.03. Interpersonal skills

01.02. Assessing preparedness

01.02.01. Self-reported measures of confidence via likert scales (survey/questionnaire)
01.02.02. Medical Graduates qualitative interviews
01.02.03. Supervisor-reported measures of confidence via likert scales (survey/questionnaire)
01.02.04. Supervisor qualitative interviews
01.02.06. Patient qualitative interviews
01.02.11. Observation
01.02.15. Assessment
01.02.19. Repertory grid technique
01.02.20. Policy Makers Qualitative Interviews
01.02.21. Health Service Staff Qualitative Interviews
01.02.22. Desk-Based Research

02. What is the effectiveness of formal Y5 to F1 transition interventions?
02.01. Induction
02.02. Shadowing
02.03. Assistantship
02.04. Mentoring
02.04.03. Data is unclear regarding mentoring
02.05. Simulation
02.06. GMC registration
02.07. Training

03. To what extent individual graduates prepared for specific task/skill or knowledge based capabilities?

03.01. Practical Skills
03.01.01. Perform a full physical examination
03.01.02. Perform a mental-state examination
03.01.03. Carry out practical procedures safely and effectively
03.01.04. Take and record a patient's medical history, including family and social history
03.01.05. Elicit patients' questions, their understanding of their condition and treatment options, and their views, concerns, values and preferences
03.01.06. Assess a patient's capacity to make a particular decision in accordance with legal requirements and the GMC's guidance
03.01.07. Provide explanation, advice, reassurance and support to patient
03.01.08. Contribute to the care of patients and their families at the end of life
03.01.09. Diagnose and manage clinical presentations
03.01.10. Interpret findings from the history, physical examination and mental-state examination
03.01.11. Clinical judgements and decisions
03.01.12. Able to write appropriate certificates
03.01.13. Perform general activities
03.01.14. Perform clinical activities

03.02. Prescribing Skills
03.02.01. Understand prescribing procedures
03.02.02. Prescribe drugs safely, effectively and economically
03.02.03. Establish an accurate drug history, covering both prescribed and other medication
03.02.04. Provide a safe and legal prescription
03.02.05. Calculate appropriate drug doses and record the outcome accurately
03.02.06. Provide patients with appropriate information about their medicines
03.02.07. Access reliable information about medicines
03.02.08. Detect and report adverse drug reactions
03.02.09. Demonstrate awareness of complementary and alternative therapies
03.02.10. Demonstrate knowledge of drug actions
03.02.11. Plan appropriate drug therapy for common indications
03.02.12. Plan appropriate drug therapy for common indications

03.03. Knowledge

03.03.01. Psychology
03.03.01.01. Understand psychological concepts of health, illness and disease
03.03.01.02. Understand patients with dependence issues and other demonstrations of self-harm
03.03.01.03. Understand adaptation to major life changes
03.03.01.04. Understand psychological aspects of behavioural change and treatment compliance
03.03.01.05. Understand psychological factors that contribute to illness, the course of the disease and the success of treatment
03.03.01.06. Apply psychological theoretical frameworks to individuals, groups and societies to disease

03.03.02. Sociology
03.03.02.01. Understand normal human behaviour at a societal level
03.03.02.02. Apply social science principles, method and knowledge to medical practice
03.03.02.03. Understand sociological concepts of health, illness and disease
03.03.02.04. Apply sociological theoretical frameworks to individuals, groups and societies to disease
03.03.02.05. Understand sociological factors that contribute to illness
03.03.02.06. Understand sociological aspects of behavioural change and treatment compliance

03.03.03. Scientific Knowledge
03.03.03.01. Understand the adequacy of scientific knowledge
03.03.03.02. Understand normal human structure and functions
03.03.03.03. Understand the scientific bases for common disease presentations
03.03.03.04. Justify the selection of appropriate investigations for common clinical cases
03.03.03.05. Understand the fundamental principles underlying such investigative techniques
03.03.03.06. Select appropriate forms of management for common diseases
03.03.03.07. Make accurate observations of clinical phenomena and appropriate critical analysis of clinical data

03.03.03.08. Understand normal human behaviour at an individual level

03.03.03.09. Understand the role of nutrition in health

03.03.03.10. Have adequate knowledge of statistics

03.03.03.11. Apply scientific method and approaches to medical research

03.03.03.12. Critically appraise the results of relevant research

03.03.03.13. Formulate simple relevant research questions and study design

03.03.03.14. Apply findings from the literature to answer questions raised by specific clinical problems

03.03.03.15. Understand ethical/governance issues involved in medical research

03.03.04. Epidemiology and health provision knowledge

03.03.04.01. Apply to medical practice the principles, method and knowledge of population health and the improvement of health and healthcare.

03.03.04.02. Understand basic principles of health improvement

03.03.04.03. Understand how health behaviours and outcomes are affected by the diversity of patient populations

03.03.04.04. Understand measurement methods relevant to the improvement of clinical effectiveness and care

03.03.04.05. Understand the principles underlying the development of health and health service policy

03.03.04.06. Apply basic principles of communicable disease control in hospital and community settings

03.03.04.07. Apply epidemiological data in managing healthcare for the individual and the community

03.03.04.08. Recognise the role of environmental and occupational hazards in ill-health and discuss ways to mitigate their effects

03.03.04.09. Understand principles and application of primary, secondary and tertiary prevention of disease

03.03.04.10. Understand a global perspective of health determinants

03.03.05. Knowledge of Acute/Emergency care

03.03.05.01. Provide immediate care in medical emergencies.

03.03.05.02. Assess and recognise the severity of a clinical presentation and a need for immediate emergency care.

03.03.05.03. Diagnose and manage acute medical emergencies.

03.03.05.04. Provide basic first aid.

03.03.05.05. Provide immediate life support.

03.03.05.06. Provide cardio-pulmonary resuscitation or direct other team members to carry out resuscitation.

03.03.05.07. Emergency judgement

03.03.06. Governance Knowledge
03.03.06.01. Use information effectively in a medical context.
03.03.06.02. Keep accurate, legible and complete clinical records.
03.03.06.03. Make effective use of computers
03.03.06.04. Maintain confidentiality
03.03.06.05. Access information sources
03.03.06.06. Apply the principles, method and knowledge of health informatics to medical practice.
03.03.07. Safeguarding skills
03.03.07.01. Identify the signs of abuse
03.03.08. Knowledge of ethics
03.03.08.01. Act according to ethical and legal principles
03.03.08.02. Understand and adhere to the GMC’s ethical guidance and standards
03.03.08.03. Demonstrate clinical responsibility
03.03.08.04. Act in accordance to the ethical duties of a doctor
03.03.09. Medico-Legal knowledge
03.03.09.01. Understand and accept the legal, moral and ethical responsibilities
03.03.09.02. Demonstrate knowledge of laws, and systems of professional regulation
03.03.09.03. Understand the framework, in which medicine is practiced in the UK
03.03.10. Prepared to provide palliative/end of life care
03.03.11. Knowledge and experience of the ward
03.03.11.01. Understands ward logistics such as where special equipment (catheters etc) or forms are
03.03.11.02. Understands how the clinical environment works
03.03.11.03. Trainees are prepared to work on call and during Hospital at night

04. To what extent individual graduates prepared for interactional/interpersonal capabilities?

04.01. Communication and team work
04.01.01. Communication with clinicians
04.01.02. Communication interprofessional
04.01.03. Handover
04.01.04. Discharge
04.01.05. Learn and work effectively within a multi-professional team
04.01.06. Understand and respect the roles and expertise of health and social care professionals
04.01.07. Understand the beneficial effect of working in interdisciplinary team working
04.01.08. Work with colleagues to put patients first
04.01.09. Build positive working relationships
04.01.10. Understand the role of doctors as managers
04.01.11. Involve patients in their care
04.01.12. Involve patient's carers/families with care
04.01.13. Attitude, Respect, Equality
04.01.13.01. Preserve patient dignity and act with integrity
04.01.13.02. Act with respect
04.01.13.03. Acknowledge equality and diversity

04.02. Communication with patients/relatives
04.02.01. Effective communication across patient diversity
04.02.02. Effective communication across language barriers
04.02.03. Effective communication across a range of media
04.02.04. Effective communication about topics
04.02.05. Effective communication in difficult circumstances
04.02.06. Effective communication in various roles
04.02.07. Effective communication around patient-involvement in decision-making
04.02.08. Formulate a plan of investigation, treatment, management in partnership
04.02.09. Obtain informed consent

04.03. Continuing Professional Development
04.03.01. Acquire new knowledge
04.03.02. Lifelong learning
04.03.03. Reflect
04.03.04. Appraisal
04.03.05. Teaching and Leadership
04.03.05.01. Reflect, learn and teach others
04.03.05.02. Function effectively as a mentor and teacher
04.03.06. Limitations
04.03.06.01. Recognise own personal and professional limits
04.03.06.02. Recognise own personal health needs
04.03.07. Time Management
04.03.07.01. Prioritise
04.03.07.02. Work-Life Balance
04.03.07.03. European Working Time Directive Knowledge
04.03.07.04. Manage time and prioritise tasks
04.03.07.05. Recognise the duty to take action if a colleague’s health, performance or conduct is putting patients at risk.

04.04. Clinical Supervision

05. To what extent individual graduates prepared for cultural, systemic and technological based capabilities?

05.01. Protect patients and improve care.

05.02. Place patients’ needs and safety at the centre of the care process.

05.03. Health and Safety

05.03.01. Promote, monitor and maintain health and safety in the clinical setting

05.03.02. Understanding how errors can happen in practice

05.03.03. Understand risk management and prevention

05.03.04. Understanding responsibilities within the current systems for raising concerns about safety and quality.

05.03.05. Understand and have experience of the principles and methods of improvement

05.03.06. Understand infection control

06. To what extent are individual graduates prepared for practice on a personal level?

06.01. Resilience

06.02. Uncertainty/Ambiguity

06.02.01. Deal effectively with uncertainty and change

06.02.02. Tolerance of uncertainty

06.02.03. Adaptation to change

06.02.04. Situation uncertainty

06.03. Coping behaviour

06.04. Responsibility

06.05. Support seeking behaviour
07. Do demographic factors contribute to variations in preparedness?

07.01. Age
07.02. Ethnicity
07.03. Gender
07.04. English second language
07.05. Undergraduate training location
07.06. Disability
07.07. Personality
07.08. Degree status
07.09. PBL course
07.10. Traditional course
<table>
<thead>
<tr>
<th>Section/topic</th>
<th>#</th>
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</tr>
<tr>
<td>Title</td>
<td>1</td>
<td>Identify the report as a systematic review, meta-analysis, or both.</td>
<td>7</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Structured summary</td>
<td>2</td>
<td>Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rationale</td>
<td>3</td>
<td>Describe the rationale for the review in the context of what is already known.</td>
<td>5-6</td>
</tr>
<tr>
<td>Objectives</td>
<td>4</td>
<td>Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).</td>
<td>8</td>
</tr>
<tr>
<td>METHODS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol and registration</td>
<td>5</td>
<td>Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.</td>
<td>3, 7</td>
</tr>
<tr>
<td>Eligibility criteria</td>
<td>6</td>
<td>Specify study characteristics (e.g., PICO(S), length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.</td>
<td>7</td>
</tr>
<tr>
<td>Information sources</td>
<td>7</td>
<td>Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.</td>
<td>7-8</td>
</tr>
<tr>
<td>Search</td>
<td>8</td>
<td>Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.</td>
<td>Supplement A</td>
</tr>
<tr>
<td>Study selection</td>
<td>9</td>
<td>State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).</td>
<td>8, Supplement B</td>
</tr>
<tr>
<td>Data collection process</td>
<td>10</td>
<td>Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.</td>
<td>8-10</td>
</tr>
<tr>
<td>Data items</td>
<td>11</td>
<td>List and define all variables for which data were sought (e.g., PICO(S), funding sources) and any assumptions and simplifications made.</td>
<td>8</td>
</tr>
<tr>
<td>Risk of bias in individual studies</td>
<td>12</td>
<td>Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.</td>
<td>9-10; Supplement B-C</td>
</tr>
<tr>
<td>Summary measures</td>
<td>13</td>
<td>State the principal summary measures (e.g., risk ratio, difference in means).</td>
<td>N/A</td>
</tr>
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## PRISMA 2009 Checklist

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<tr>
<td>Synthesis of results</td>
<td>14</td>
<td>Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., (I^2)) for each meta-analysis.</td>
<td>9</td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>15</td>
<td>Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).</td>
<td>9-11</td>
</tr>
<tr>
<td>Additional analyses</td>
<td>16</td>
<td>Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### RESULTS

| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | Tables 1-2 |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | 11-17; Tables 1-2 |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | 11-17 |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | N/A |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | 11-17 |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | N/A |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | N/A |

### DISCUSSION

| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | 17 |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | 20-21 |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | 21-22 |

### FUNDING

| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | 22 |
PRISMA 2009 Checklist


For more information, visit: www.prisma-statement.org.

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How prepared are UK medical graduates for practice? A rapid review of the literature 2009-2014

<table>
<thead>
<tr>
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<th>BMJ Open</th>
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<td>Research</td>
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<tr>
<td>Date Submitted by the Author:</td>
<td>09-Nov-2016</td>
</tr>
<tr>
<td>Complete List of Authors:</td>
<td>Monrouxe, Lynn V; Chang Gung Memorial Hospital Taoyuan Branch, Chang Gung Medical Education Research Centre Grundy, Lisa; Aberdeen Royal Infirmary Mann, Maia; Cardiff University School of Medicine John, Zoe; Cardiff University, School of Social Science Panagoulas, Eleni; Cardiff University School of Medicine Bullock, Alison; Cardiff University, Division of Medical Education Mattick, Karen</td>
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<tr>
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<td>Medical education and training</td>
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<tr>
<td>Secondary Subject Heading:</td>
<td>Evidence based practice</td>
</tr>
<tr>
<td>Keywords:</td>
<td>BASIC SCIENCES, EDUCATION &amp; TRAINING (see Medical Education &amp; Training), GENERAL MEDICINE (see Internal Medicine), INTENSIVE &amp; CRITICAL CARE</td>
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How prepared are UK medical graduates for practice? A rapid review of the literature 2009-2014


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KEYWORDS
Transitions; Medical Students; Junior Doctors; Review Method; Rapid Review.

WORD COUNT 6,022 (excluding references and tables)
ABSTRACT

OBJECTIVE
To understand how prepared UK medical graduates are for practice and the effectiveness of workplace transition interventions.

DESIGN
A rapid review of the literature (registration #CRD42013005305).

DATA SOURCES
Nine major databases (and key websites) were searched in two timeframes (July–September 2013; updated May–June 2014): Cinahl, Embase, Educational Resources Information Centre, Health Management Information Consortium, Medline, Medline in Process, Psychinfo, Scopus and Web of Knowledge.

ELIGIBILITY CRITERIA FOR SELECTING STUDIES
Primary research or studies reporting UK medical graduates’ preparedness between 2009-2014: Manuscripts in English; all study types; participants who are final year medical students, medical graduates, clinical educators, patients or NHS employers; all outcome measures.

DATA EXTRACTION
At time 1, three researchers screened manuscripts (for duplicates, exclusion/inclusion criteria, quality). Remaining 81 manuscripts were coded. At time 2, one researcher repeated the process for 2013-2014 (adding 6 manuscripts). Data were analysed using a narrative synthesis and mapped against Tomorrow’s Doctors (2009) graduate outcomes.

RESULTS
Most studies comprised junior doctors’ self-reports (65/87, 75%), few defined preparedness and a programmatic approach was lacking. Six themes were highlighted: individual skills/knowledge, interactional competence, systemic/technological competence, personal preparedness, demographic factors and transitional interventions. Graduates appear prepared for history taking, physical examinations and some clinical skills, but unprepared for other aspects including prescribing, clinical reasoning/diagnoses, emergency management, multidisciplinary
team-working, handover, error/safety incidents, understanding ethical/legal issues and ward environment familiarity. Shadowing and induction smooth transition into practice, but there is a paucity of evidence around assistantship efficacy.

CONCLUSIONS

Educational interventions are needed to address areas of unpreparedness (e.g. multidisciplinary team-working, prescribing, clinical reasoning). Future research in areas we are unsure about should adopt a programmatic and rigorous approach, with clear definitions of preparedness, multiple stakeholder perspectives along with multi-site and longitudinal research designs to achieve a joined-up, systematic, approach to understanding future educational requirements for junior doctors.

Article Summary

STRENGTHS AND LIMITATIONS OF THIS STUDY

1. A rigorous review using nine major databases resulting in a comprehensive narrative synthesis of 87 manuscripts.
2. Our rigorous approach has clearly identified areas where research is lacking and the need for programmatic research in this area.
3. The broad scope of what comprises preparedness, the lack of definitions in the literature and diversity in study designs and quality led to difficulties in ascertaining firm generalisable conclusions in some areas.
4. Many studies collected data immediately after graduation and focused purely on preparedness for graduates’ first days as a junior doctor.
5. Although we address this issue in the Discussion section, our review was undertaken in 2014; research and practice in some areas may have moved on.
Introduction

Society and healthcare are changing fast. An ageing population means increasingly complex patient co-morbidity and chronic healthcare and social needs. Medical knowledge and ways of treating disease are also rapidly expanding, and there is an increasing requirement to provide a greater proportion of healthcare provision in the community setting, close to patients. Healthcare delivery must change to meet the needs of patients both now and in the future. In order to keep pace with such challenges, high quality education and training of healthcare workforce is essential. Furthermore, as patients’ lives are at stake, our healthcare workforce need to be prepared for practice from the very start of their working lives. But how prepared are today’s medical graduates to practice as doctors?

Over the past decade there has been a steep rise in the number of research papers published on the subject of medical graduates’ preparedness for practice for certain clinical domains (e.g. safe prescribing). Given this increase of literature, and that most educators lack the time to find and critically evaluate original articles, review papers play a vital role in our understanding and evidence-based decision-making in medical education. Reviews identify, evaluate and synthesise research findings, making available evidence highly accessible to those who require it.

A systematic review of research examining medical graduates’ preparedness for practice was published in 2014. Problems identified in the review include graduates’ prescribing skills and practical procedures along with their personal issues such as high levels of neuroticism and low levels of confidence impacting negatively on preparedness. Poor supervisory interactions were identified as having a negative effect on preparedness with early clinical experience and shadowing opportunities appearing to have a positive impact. More recently, Ferguson et al. reported their systematic review of the literature relating to the educational provision for medical students’ preparedness specifically for ear, nose and throat (ENT) surgery in the UK. They found that medical students’ training in ENT was extremely short (around 8 days, with some receiving no training at all) and lacked educational value, and both final year medical students and clinicians lacked confidence in their own ability to assess and manage ENT patients.
However, despite these reviews, evidence of UK graduates’ preparedness for practice is still lacking, mainly due to limitations within current studies. For example, Cameron and his colleagues identified only 9 research papers (from 218 potentially relevant articles) published over the past 10 years that examined preparedness to practice across the undergraduate to junior doctor transition. Examining their accompanying online supplementary documents further, it appears the search strategy was rather narrow: only two databases (Medline and Scopus) were searched using minimal items (only 8 terms comprising: teaching, education, medical education, medical undergraduate students, medical teaching, transition, clinical clerkship and patient safety). Furthermore, 192 papers were excluded based only on their title with the exclusion criteria used in this process being unclear. This is problematic as not only does the process lack transparency but also it is often difficult to know about the contents of a manuscript based on title alone. The study by Ferguson and his colleagues, whilst being more rigorous and transparent, is limited in scope, focusing on a very small area of preparedness (ENT surgery). What is needed therefore is a study that critically examines the literature around medical graduates’ preparedness for practice that has both greater transparency and scope than previous studies.

Our research aims to address this gap in the literature by synthesising studies published between 2009-14 that seek to evaluate the success of undergraduate medical education in preparing the next generation of doctors. Given the large amount of literature published since Tomorrow’s Doctors 2009 the start date of 2009 was selected. Further, within this time frame notable changes have occurred, partly in response to Tomorrow’s Doctors 2009, including: the introduction of new curricula and transition interventions such as assistantships (where students are integrated within a clinical team and undertake specified duties under supervision), shadowing (where students observe their specific first job prior to taking it on) and induction. Synthesis of this literature is important in order to identify good practice in education and training, identify areas of practice requiring improvement, and to set the agenda for future research priorities.

**Aim and Research Questions**

The aim of this review is to understand how prepared UK medical graduates are for practice and to inform policy. Our specific research questions are:
RQ1: How prepared are UK medical graduates for practice?

RQ2: How effective are transitional interventions addressing the final year medical undergraduates’ move into the workplace as a junior doctor?

Method

A Rapid Review (RR) was conducted using streamlined systematic review methods and reported in accordance with the PRISMA guidelines, and registered with PROSPERO (registration number CRD42013005305). As the name implies, a RR is designed to answer a question swiftly, thus addresses urgent demands for synthesized evidence. RRs utilise the rigor of a systematic review, but do so in a shorter time frame. To undertake a high quality review within these deadlines, RRs are clearly focused.

Procedure

The time frame for this review comprised an initial 3-month period for the main review (July-August 2013) and a subsequent 6-week period for the update review 10 months later (April-May 2014). The inclusion/exclusion criteria used for the RR were: (1) manuscripts published from 2009-2013 (initial review) and 2013-2014 (follow up review); (2) manuscripts published in English; (3) all types of research studies; (4) participant groups: final year medical students, medical graduates, clinical educators, patients, NHS employers; (5) all outcome measures.

In July 2013, three researchers (LG, EP, ZJ) searched the following databases: Cinahl, Embase, Educational Resources Information Centre (ERIC), Health Management Information Consortium – Grey literature (HMC), Medline, Medline in Process, Psychinfo, Scopus and Web of Knowledge (WOK). A comprehensive search strategy was developed in Ovid Medline using a combination of Medical subject headings and free text terms. The Medline search strategy was modified according to the indexing systems of the other databases.

Across three stages the strategy combined: Boolean operators, adjacency operators, wildcard symbols, truncation and subject headings and free text search terms. Firstly, terms representing the population were combined using ‘OR’. Secondly, 54 searches representing variables of preparedness (developed from Tomorrow’s Doctors outcomes) were combined using the ‘OR’ Boolean command. Finally, the geographic
inclusion areas for the research were added and combined. These three combined ‘OR’ searches were selected and submitted with the ‘AND’ function and the data were limited by timeframe. To identify research reported in the grey literature a range of relevant websites were searched. In addition, to identify published resources that have not yet been catalogued in the electronic databases, recent editions of key journals were searched (strategies for each database and websites along with exact numbers of identified manuscripts for each combination are available in the online supplement A).

**Study selection, quality assessment and data extraction**

The initial search yielded 3,762 results, Figure 1 shows the flow of studies through the review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.\(^{20}\)

**BOX 1: PICO INCLUSION CRITERIA**

<table>
<thead>
<tr>
<th>Participants/ population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of participants include all graduates from UK Medical Schools.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention(s), exposure(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interventions relating to undergraduate education in the UK.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comparator(s)/ control</th>
</tr>
</thead>
<tbody>
<tr>
<td>No comparator group.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Context</th>
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<tbody>
<tr>
<td>Medical graduates working as Foundation 1 or 2 trainees in the UK.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary outcomes:</strong> The effectiveness of formal Y5 to F1 transition interventions.</td>
</tr>
</tbody>
</table>

After screening manuscripts for duplicates and removing manuscripts that did not meet our exclusion and inclusion criteria (Box 1), we quality assessed 163 manuscripts using standards specific to their methodology: for quantitative manuscripts we adapted criteria from the Medical Education Research Study Quality Inventory\(^{23}\) and for qualitative designs we followed Mays & Pope\(^{24}\) guidance. Both
indices were used for mixed methodology studies (see Online Supplement B for full criteria used). To ensure a cohesive assessment, a second researcher crosschecked 30% of the manuscripts. Following quality assessment, the remaining 81 manuscripts were managed using Atlas.ti software.25 These were coded using a framework developed by the researchers (855 codes) and data were extracted for synthesis (see Online Supplement C).

Using exactly the same methodology and process, in May 2014, one of the researchers (LG) updated the review to include manuscripts published between April 2013 and May 2014 (Figure 2). After quality assessment, 6 manuscripts were added to the original Atlas.ti database resulting in 87 manuscripts being included in this RR overall: n=5 reviews, n=50 quantitative studies, n=17 qualitative studies and n=15 mixed methods studies. As the review comprises a secondary analysis of published data, no ethical approval was needed.

**Analysis**

Synthesis of literature on this topic was challenging since it is diverse (different methodologies used, different contexts studied, and different cohorts of graduates), sometimes of low quality and often contradictory. Ideally study quality influences how much weighting it should be given in drawing conclusions.26 Due to the variability in study design across the manuscripts, we were unable use meta-analysis to depict trends in the literature. Instead we report our narrative synthesis by theme and then map findings from the various studies against the outcomes outlined in the GMCs Outcomes for Graduates, grouping them according to whether their data indicate preparedness or not.27 This mapping provides a useful rubric for those involved in curriculum development, offering an at-a-glance understanding of the literature to date for each outcome. Our narrative synthesis presents a second way of thinking about graduates’ preparedness by theming the data in terms of the different aspects involved in preparedness for practice. In doing so, we have needed to judge whether data indicate ‘preparedness’, and we have done that as follows:

**Quantitative Studies:** When Likert scale data are reported as categorical data, at least 20% of the respondents had to indicate preparedness at the highest level in order for us to conclude that this demonstrated ‘preparedness’. This rubric was chosen to avoid an assumption of preparedness in situations where
respondents clustered around a mid-point – ‘neither prepared nor unprepared’ – category. When Likert data were treated as parametric data, the mean level of preparedness is above the mid-point (or equivalent, as some researchers employed a 4-point scale).

**Qualitative Studies:** A theme (or subtheme) in which participants verbally reported a high level of preparedness had to be reported for us to conclude that this demonstrated ‘preparedness’.

**Mixed Methodology Studies:** The process for quantitative and qualitative studies was amalgamated. There were no studies where different data types contradicted.

### Results

#### Overview of included studies

A programmatic approach to studying preparedness was lacking: studies varied greatly in terms of design and measures used to determine preparedness. The majority of the studies (66/87, 76%) comprised junior doctors’ self-reports of preparedness via questionnaires or interviews that may not reflect actual preparedness. Eighteen of these (18/65, 28%) also collected data from trainers and/or used more than one data-collection method. Trainer reports were in 21/87 (24%) of the studies, via questionnaires (15/21, 71%) or qualitative interviews (6/21, 29%). Of these, only 3 (14%) did not also contain self-report data. Other groups, such as NHS employees or policy makers were involved in 5/87 (6%) studies, and only 1/87 (1%) involved patients as participants. The number of participants within the studies varied greatly, even within the same methodology. For example, qualitative research studies comprised as few as seven or eight participants from a single location, to 152 participants across three different locations. Questionnaire studies comprised as few as 89 participants from a single location, to thousands of participants across multiple locations.

Even studies with similar methods of data collection varied substantially in how they conceptualised preparedness and measuring the concept varied greatly. For example, some asked a simple broad question such as “how well did your
undergraduate course prepare you for examining patients\textsuperscript{39} and provided five categories from ‘unprepared’ to ‘extremely well prepared’. Others provided a general statement such as “my experience at [medical school] prepared me well for the jobs I have undertaken so far\textsuperscript{37,40} using five categories from ‘strongly agree’ to ‘strongly disagree’ or a scaled response from ‘generally not at all’ to ‘generally very well prepared’. Another approach required junior doctors to rate their preparedness for practice at the point of graduation (a more specific question) against curricula outcomes with a four-point scale from ‘poor’ to ‘very good’.\textsuperscript{41} One used a five-point scale (‘not at all prepared’ to ‘fully prepared’) for 53 of the outcomes.\textsuperscript{42} However, this study failed to specify all points on their scale, meaning the reader was unable to pinpoint the exact place that ‘unpreparedness’ commences. Not all studies measured confidence or competence. Some tested knowledge (e.g. a short test using ‘essential’ and ‘useful’ scenarios) based on topics considered as important for medical graduates.\textsuperscript{43}

**Narrative synthesis**

To address Research Question 1, we synthesise the studies identified, discussing our findings in order according to the following themes: medical graduates’ preparedness for specific tasks, skills and knowledge; interactional and interpersonal aspects of their preparedness; preparedness for systemic and technological aspects of practice; personal preparedness for practice and the contribution of personal and situational demographic factors to preparedness variation. We then address Research Question 2, in the final section: the effectiveness of transitional interventions for final year medical undergraduates’ move to become junior doctors.

**Preparedness for specific tasks, skills and knowledge**

The area of medical graduates’ preparedness for tasks, skills and knowledge received a great deal of research attention between 2009 and 2014: 34/87 (39\%) of the studies identified provided information on this aspect. Our synthesis suggests that graduates are reasonably well prepared for history-taking\textsuperscript{30,39-42,44-46} and performing full physical examinations.\textsuperscript{39-42,45} However, they are generally unprepared for prescribing safely and legally\textsuperscript{9-11,13,14,30,38-40,42,44-47,56} clinical reasoning and making diagnoses\textsuperscript{41,42,43-46} and the early management of patients with emergency conditions.\textsuperscript{30,31,39,41,42,49-58}
The GMC graduate outcomes list 32 specific practical procedures that graduates should be prepared to perform. To date there has been no study (or set of studies) that has examined all 32. Only 14 studies identified graduates’ preparedness when mapped across these (Table 1). When we consider Table 1, this mapping suggests that graduates are prepared for around one-third of the 32 procedures (34%, n=11). For example, we found unanimous evidence that graduates were prepared for venepuncture; yet for other skills, such as wound suturing and central venous line insertion, all the available evidence unanimously suggested they were unprepared. Table 1 also identifies 11 practical procedures that are absent in the GMC outcomes, yet data suggest graduates have a level of preparedness for them (e.g. central venous line and chest drain insertions).

Data are sometimes inconclusive in terms of preparedness with similar numbers of studies supporting on each side (Table 1). These disparities, to an extent, are due to different participant groups reporting different preparedness levels (e.g. educational supervisors’ reports are generally lower than trainees’ self-reports or to studies evaluating different curricula. Most of the data suggesting preparedness came from a limited study range using self-reports, whereas the reports of unpreparedness are from a wider range of studies/methodologies.

**Preparedness for interactional and interpersonal aspects of practice**

A small proportion of studies (12/87, 14%) researched preparedness at an interactional and interpersonal level, and the results were mixed. For almost all of the interactional and interpersonal aspects of practice domains identified by the GMC outcomes, there are contradictory results. Where there are data, by purely adding up the number of studies we might think that graduates are prepared for communication with colleagues and patients. Although there are few studies of preparedness for multidisciplinary team working, the evidence is relatively robust and indicates unpreparedness of graduates: thus, two of the three manuscripts suggesting problems in this area had multidisciplinary team-working as the sole focus of their work. Both concluded that medical graduates have preparedness problems. This contrasts with scant data suggesting trainees’ preparedness based on simple questions in two large-scale studies focusing on the wider issue of preparedness.
For breaking bad news, equal number of studies provide evidence for preparedness and unpreparedness. In terms of preparedness, the evidence comprises three questionnaire studies containing a single self-report. However, of these, one also found supervisor reports differed considerably, suggesting serious concerns. Furthermore, two other studies highlighted the breaking of bad news as complex and considered by trainees to be more distressing than other upsetting duties, giving potential for them getting quickly out of their depth. Finally, only three papers reported on handover preparedness for trainees, all suggesting trainees’ unpreparedness.

Preparedness for systemic and technological aspects of practice

Preparedness for systemic and technological aspects of practice is generally an under researched area (13/87, 15%), again providing very mixed results. For example, the same studies found evidence that graduates have knowledge of, and are able to use, audit to improve patient care, but they also lack such knowledge. This contradiction can be understood in terms of there being different cohorts under study (e.g. self-reports from the ‘old’ curriculum suggesting unprepared and the ‘new’ suggesting prepared) and self-report/other-report differences (suggesting prepared and unprepared respectively).

Other aspects within this theme suggest a clearer picture. For example, three studies provided self- and patient-reported data suggesting medical graduates’ unpreparedness for reporting and dealing with error and safety incidents. Studies also strongly suggest that graduates are ill prepared for understanding how the clinical environment works: both junior doctors and their educational supervisors thought that familiarity with the ward environment was an important missing component of transition, with feelings of preparedness being contingent on understanding ward culture and practices.

Personal preparedness for practice

Personal preparedness refers to individual aspects of preparedness. Only 11 (13%) of the manuscripts reported data regarding trainees’ personal preparedness for practice. As with earlier sections, the evidence is complex. Medical graduates often have problems with time-management, but seem to understand their own limitations with inconclusive data on trainees’ abilities to identify and
organize their learning needs and reflective practice.\textsuperscript{40} \textsuperscript{44} \textsuperscript{45} For this latter aspect, perhaps graduates from older curricula are less well prepared than those learning in a more contemporary way.\textsuperscript{40} Finally, there is reasonably strong evidence (multi-centre studies and knowledge measures) that graduates have problems of preparedness around ethical and legal issues,\textsuperscript{42} including for complex ethical situations (e.g. caring for dying patients)\textsuperscript{65} and understanding mental health law.\textsuperscript{72}

\textbf{The impact of personal and situational demographic factors on preparedness variation}

This issue of whether personal or situational demographic factors affected preparedness for practice was not included in many of the manuscripts identified in this review. In terms of personal demographics, only ethnicity, gender and personality ‘traits’ are addressed in the studies found. In terms of ethnicity, an extremely large cohort study (with 11,610 trainees 1-year post-graduation and 8,427 3-years post-graduation) found ethnicity to be a statistically significant predictor of general feelings of preparedness in both cohorts, but gender only at the 3-year post graduate time: white doctors reporting higher levels than non-white doctors and males higher than females.\textsuperscript{38} Furthermore, another study using the same measurement also found no significant effect of gender on graduation.\textsuperscript{73} From this we might conclude that any effect of gender in self-reported preparedness might well be due to an interaction between gender and the workplace environment. One further personal factor that has been demonstrated to have an effect on levels of preparedness is personality ‘traits’: with positive correlations between ‘agreeableness’ and ‘conscientiousness’ and preparedness, and a negative correlation between ‘neuroticism’ and preparedness.\textsuperscript{73} However, although statistically significant, effect sizes are very low (all well below $r=.20$) suggesting these findings might have limited practical use.

In terms of situational factors, this was generally researched using self-reported data. Evidence suggests the following factors influence higher self-ratings of preparedness: medical school,\textsuperscript{14} \textsuperscript{37-39} \textsuperscript{42} \textsuperscript{70} graduates from more recent cohorts,\textsuperscript{30} \textsuperscript{37} \textsuperscript{38} \textsuperscript{40} graduate-entry students,\textsuperscript{38} \textsuperscript{73} shadowing and other attachments,\textsuperscript{73} problem-based learning courses,\textsuperscript{30} \textsuperscript{73} UK-trained vs non-UK trained graduates working in UK,\textsuperscript{35} \textsuperscript{63} graduates with an intercalated degree,\textsuperscript{38} and experience since starting work.\textsuperscript{73} Further, there is some evidence that suggests that school is not a factor.\textsuperscript{14} \textsuperscript{30} Looking at the studies further we can see that medical school does not appear to make a big
difference for self-reported preparedness when the broad question ‘Experience at 
medical school prepared me well for the jobs I have undertaken so far’ is asked. 
However, when the more nuanced question of ‘preparedness for what?’ is asked, 
differences between schools for certain domains of activities are revealed.\textsuperscript{39,42} As 
such, research examining the detail tends to provide more practical data for us to 
develop future curricula.

\textit{Effectiveness of final-year undergraduate to junior doctor transition 
interventions}

Few of the papers (15/87; 17\%) in this review contributed to our 
understandings of the efficacy of assistantships, induction and shadowing.

\textbf{Assistantships}

Assistantships have been defined as a period of hands-on learning enabling medical 
students to become fully integrated in a clinical team to practise their clinical skills 
and to take on some responsibilities under supervision.\textsuperscript{18} Only one paper reported data 
on assistantships\textsuperscript{47} which considered them beneficial in relieving anxieties and 
providing invaluable opportunities for incorporating students into multi-disciplinary 
teams. Although not the focus of their research, authors of other papers appeared 
hopeful that assistantships could help with many preparedness problems.\textsuperscript{10,14,38,42,49,74}

\textbf{Shadowing}

Since early 2012, shadowing has comprised a compulsory 4-day paid period 
immediately prior to becoming a junior doctor in which they are able to become 
familiar with future working environments and expectations. It should provide 
protected time for graduates to develop relationships with their clinical and 
educational supervisors alongside their future colleagues.\textsuperscript{18} Prior to this time, 
shadowing was variable. A total of 11/87 (13\%) of manuscripts in this review 
reported relevant data on shadowing:\textsuperscript{8,10,12,33,45,49,67,73-75} of which 8/11 (73\%) were 
dated prior to the compulsory change in 2012\textsuperscript{8,10,33,45,66,73-78} and 9/11 (82\%) presented 
self-reported data (all except\textsuperscript{49,74}). For the pre-2012 studies, what was meant by the 
term ‘shadowing’ was not defined.\textsuperscript{8,10,33,45,67,73-76} Further, not all participants in the 
studies experienced shadowing: in one study it comprised a compulsory component to 
the course being studied,\textsuperscript{76} in others there were reports of ‘some’ shadowing.\textsuperscript{10,33,73,74 a}
lack of shadowing opportunities, and shadowing of variable durations: 2 days, 1-2 weeks and 4+ weeks.

Generally, these data suggest that shadowing is considered an efficacious method for developing graduates’ preparedness. However, whilst some shadowing is considered better than none, it should be reflective of the new post, and reinforced with related teaching. Finally, a prolonged shadowing period can be ineffectual due to repetitive tasks undertaken with little opportunity for new learning.

**INDUCTION**

Induction is a mandatory process whereby a medical graduate is introduced to the junior doctors’ work environment and employment policies by the human resources team. Despite a clear definition, researchers and participants sometimes confused shadowing with induction. Moreover, induction varies: it can comprise face-to-face meetings, information packs and online courses. The majority of studies in this section comprised self-report data (only one exception), often being large-scale, across multiple sites and suggesting a high level of efficacy for the process. However, despite this, the inconsistent nature of induction across trusts or wards is problematic. This includes problems of insufficient induction stemming from timetable difficulties and staff shortages, with researchers suggesting a possible correlation between feeling unprepared and inadequate (or no) induction breeding errors alongside feelings of unpreparedness, disorganization, frustration and anxiety.

**Mapping preparedness to graduate outcomes**

We now present our findings by mapping the included papers to the graduate outcomes as represented in the GMC Outcomes for Graduates document (Table 2). This comprises three main sub-headings for outcomes: Doctor as *scientist and scholar*, as *practitioner* and as *professional*. Given that we have already discussed specific preparedness issues by topic, we now highlight the amount of evidence present for each of these aspects of practice. As we can see from Table 2, only 5 studies presented data relating to the doctor as *scientist and scholar* outcomes, and the vast majority of studies considered the doctor as *practitioner* and *professional* outcomes. Data mainly suggest that graduates are prepared for the *scientist and scholar* aspect.
Within the doctor as practitioner outcomes, some aspects (e.g. drugs and prescribing) receive more attention than others (e.g. keeping accurate medical records). Furthermore, many more studies suggest graduates are unprepared than those suggesting they are prepared. Most studies providing evidence of graduates’ preparedness also provide evidence of graduates’ unpreparedness (only four do not); such studies include different cohorts of graduates (e.g. new vs old curricula), or differing perspectives (e.g. trainee vs trainer). Similarly, the studies mapping to the doctor as professional show more contributing evidence to suggest graduates unprepared than prepared, with only one study contributing data purely suggesting graduates are prepared.

Finally, in the last section of Table 2 we set out where studies in our review provide data on graduates’ relative preparedness for aspects of their work that do not feature in the outcomes for graduates. For example, understanding how the clinical environment works and clinical handover (sometimes called handoff). Once again the pattern of preparedness shows far more studies providing evidence that graduates are unprepared than those providing evidence they are prepared, with no studies purely contributing to the latter.

Discussion

Through our rapid review (RR) we have assimilated the literature published after the introduction of the Tomorrow’s Doctors 2009 outcomes to investigate questions around UK graduates’ preparedness to practise as junior doctors. The majority of studies comprised self-reports, although over one quarter also included other-reports (e.g. trainers, policy-makers). The concept of preparedness was variously defined and measured making quantitative synthesis problematic. We therefore presented a qualitative synthesis of the studies. Many studies provided evidence of both preparedness and unpreparedness of graduates, although overall, a greater number of studies in our review provided data to suggest that graduates are more unprepared for practice than they are prepared.

Studies in our review suggested that junior doctors appear well prepared for history taking, physical examinations, venepuncture, audit and understanding their own limitations. Studies were inconclusive regarding levels of preparedness for
communication with colleagues and patients: problem areas seem to include multidisciplinary team-working, handovers, breaking bad news to patients, learning needs and reflective practice. There is also much evidence to suggest that graduates are underprepared for safe and legal prescribing, and some evidence for clinical reasoning and diagnoses, early management of emergency patients, wound suturing, central venous line and chest drain insertion, dealing with safety and error reporting, ethical and legal issues and understanding how the clinical environment works. However, it must be noted that some of these aspects do not fall within the GMCs outcomes for graduates (e.g. central venous line and chest drain insertion) and this must be taken into account when assessing overall preparedness.

Clearly the issue of preparedness is not clear-cut. One reason for this is that we identified clear contradictions in the literature regarding the level of self-reported preparedness compared with expert assessment of their skills whereby graduates rate themselves as more prepared than their seniors rate them.\textsuperscript{39, 41, 44, 54} For example, this discrepancy was identified in assessing communication skills: whilst graduates rated themselves as prepared for breaking bad news and communicating with a multidisciplinary team, their experienced senior colleagues reported that this was not the case.\textsuperscript{54} Such an overestimation of preparedness could be an example of illusory superiority.\textsuperscript{84} This increased perception could be a protective mechanism, whereby graduates do not want to acknowledge that they are less than well prepared as a way of maintaining positivity.\textsuperscript{85, 86} Alternatively, this could be due to a discrepancy in experience: seniors viewing everyone below their own level as being less competent, therefore graduates are deemed unprepared for the reality of everyday work as known by their seniors. As graduates can only assess their preparedness against their own experiences, they are therefore unlikely to be aware of the nuances of preparedness that only comes with experience: the so-called unknown unknowns.\textsuperscript{87} Together, these two perceptions of what comprises preparedness can explain the apparent contradictions found in the literature.

In addition to differing perspectives on levels of preparedness, we identified numerous studies reporting differences in preparedness due to personal or situational demographics that also contribute to the lack of clarity around graduates’ preparedness for specific factors (i.e. why some studies suggest graduates are both prepared and unprepared). Regarding personal factors, we found weak evidence to
suggest that ethnicity, gender and personality ‘traits’ impact upon self-reported levels of preparedness. The evidence regarding the impact of situational factors, however, is stronger. Following the extensive transformation of medical education curricula in the UK since the 1990’s, numerous studies are beginning to shed light onto how changes might affect levels of preparedness: higher levels have been recorded for graduates of ‘new’ (versus ‘traditional’) curricula, graduate-entry students, graduates of problem-based learning courses and those who have intercalated. However, this issue of curricula brings forth a concern around the issue of publication bias – since researchers might be loathe to publish null or even negative results on this issue; particularly if they have been through a great deal of organizational strife to achieve changes in their curricula. The evidence is mixed, however, in terms of whether different medical schools in the UK graduate more prepared students, generalised self-reports of preparedness by school are consistent over time and some schools fare better than others across different activity domains.

Our findings around preparedness are often contradictory. However, we found areas of preparedness where the evidence was strong and we now consider those areas where conclusions can be drawn with some confidence. For example, we have strong evidence to suggest that graduates are unprepared in their understanding of the issues around prescribing and emergency care (including their clinical reasoning skills). Not only have there been numerous studies in these areas, all pointing to similar issues, but also studies have utilized more robust methodologies, including having multiple sources of data across more than one location. From studies such as these, researchers have been able to unpick the various individual and contextual factors related to the issue of unpreparedness: for example, in terms of prescribing, preparedness is no longer considered as an individual ‘skill’ in isolation, but rather has been re-framed to include the consideration of a wider range of interpersonal, cultural and environmental aspects that impact on medical graduates’ abilities to prescribe safely.

Our second research question focused on the different types of transitional interventions that might affect graduates’ preparedness: namely assistantships, shadowing and induction. We found very little evidence with which to draw any firm conclusions around the efficacy of assistantships due to the paucity of data, although
some evidence suggesting that they might alleviate anxieties and provide
opportunities for team working. More recent research (outside the scope of this RR)
focusing on student assistantships suggests how they might facilitate transitions into
practice (practically and psychologically). Additionally, assistantships in
placements aligned and misaligned with their future junior doctor post sheds further
light on these findings; suggesting that alignment with students’ first post can enhance
confidence, team belonging and workplace acclimatisation. Thus, aligning final
student placements with their first post as a junior doctor is effectively providing them
with an extended shadowing period. This latter finding therefore builds on the
evidence in our review around the efficacious effect of the trainee shadowing their
first post so long as appropriate teaching is in place. Finally, studies examining the
induction period provide further evidence of the importance of the organisational
factors involved in graduates’ preparedness: when induction is insufficient (either
inadequate or absent) graduates can feel unprepared, disorganised, frustrated and
anxious. Taken together, this suggests that carefully designed and implemented
transitional interventions, on both the undergraduate and postgraduate sides, is an
essential component to junior doctors’ wellbeing as well as patient safety. Indeed,
preliminary data from two studies (n=12 & n=33) around the benefits and challenges
of students’ proactive participation in prescribing in the workplace through the novel
intervention of pre-prescribing – in which students make prescribing judgements
under supervision – suggests a potential way forward for this specific aspect of
preparedness.

**Study limitations and strengths**

This study has a number of limitations. Although our methodology has enabled us to
quickly assimilate the literature to provide an overview of the current climate of
graduates’ preparedness, the broad scope of preparedness, wide variability in
conceptualising preparedness for practice, diverse study designs and quality led to
difficulties in ascertaining firm conclusions as to whether or not graduates are
generally prepared for practice. This is not a black and white issue: for example,
whilst the list of procedures was current when the study was planned, there are some
procedures that junior doctors are no longer expected to undertake and the context of
healthcare (e.g. team structure, digital systems) is changing fast, so preparedness for
practice will be an ever changing construct.
Additionally, many studies collected data immediately after graduation, so focused purely on short-term aspects of preparedness: preparedness for graduates’ *first days* as a junior doctor. Many papers failed to state when the data were collected e.g. how far into practice, as those first few weeks are a steep learning curve and data might change substantially one week in, to one month in, to one year in. By contrast, Goldacre and his colleagues\(^{38}\) undertook the largest scale longitudinal study in the UK to date (examining graduate cohorts from 1999, 2000, 2002 and 2005), with some being followed one or three years post qualification.\(^ {38}\) Many participants in the earlier cohorts were asked the simple broad-brush question ‘*Experience at medical school prepared me well for the jobs I have undertaken so far*’ requiring a 1-5 Likert scale response. Additional items in latter years only included questions on clinical knowledge, procedures, administrative tasks, interpersonal skills and physical, emotional and/or mental demands; again requiring simple Likert-scale responses. However, not only are the data reported in this study now over 10-years old, it measured very few aspects of preparedness highlighted in our review. Due to the paucity of longitudinal studies, there are currently no data following graduates throughout their career and measuring aspects of their preparedness for lifelong learning and adaptation to their roles as doctors.

The majority of manuscripts did not define the concept of *preparedness* but tended to focus on knowledge and skills required immediately upon graduation rather than researching longer-term preparedness for becoming a doctor, or behaviours and patient outcomes. The effect of this is to downplay the important remit of medical schools in preparing graduates for life-long learning and development. There are also important issues to consider with regards all published literature, such as the influence of publication bias.

Another limitation to our study is that this review was undertaken in 2014; it is therefore likely that research and practice in some areas may have moved on. For example, recent research around the newly developed assistantship programme that was somewhat lacking pre-2014 has begun to unpack issues to do with how they might facilitate transitions into practice (practically and psychologically) and the relative efficacy of different assistantship models (e.g. benefits and challenges in when aligning / misaligning assistantship experiences with subsequent junior doctor posts).\(^{6, 91-95}\) Such recent intervention strategies are not well-served in our review.
Although this review might benefit from being updated, we are of the opinion that a full systematic review update will not necessarily generate a great deal of additional papers: the last update we did (taking 3 weeks) looking at a 2-year period and reported fully here, only led to 6 additional papers being found. As such, we do not believe that another update so soon will greatly alter the validity of the findings reported here.

Finally, we recognise that this RR is limited by stringent time constraints. However, due to the concentrated effort of the research team, we were able to undertake the same rigorous steps as other systematic reviews. We therefore believe that our findings are credible. Indeed, research comparing RR and systematic review methodologies suggest that, despite the differences between them, their essential conclusions do not differ extensively. As such, we believe that our research has a number of strengths, including the robustness of our search strategy and methodological rigour. This has enabled us to identify a greater range of relevant manuscripts than previous studies examining the issue of UK graduates’ preparedness, leading to a synthesis of the current literature on medical graduates’ preparedness to practise in the UK that we hope provides policy makers and educational developers with a strong overview of the current climate of preparedness.

**Recommendations for future practice and research**

Based on our analysis of the studies undertaken so far we make methodological and topic focused recommendations. In terms of topic-focused recommendations, the data are clear that graduates are unprepared in certain areas, for example, prescribing. For these areas we need educational interventions in order to address them and then further research. For example, the prescribing safety assessment (PSA) was piloted in the UK in 2013, and by 2014 most medical students graduating in the UK sat it for the first time. We would therefore expect to see research arising from the PSA implementation in the near future given that success in the PSA is becoming a requirement for completion of the Foundation 1 year.

It is also easy to see from our review where further research is needed (e.g. where data are unclear). For the latter, future research should adopt a more programmatic and rigorous approach to understanding the issues at hand and clear definitions of preparedness. Self-report data alone are insufficient and multiple stakeholder
perspectives are recommended. Furthermore, we suggest future research employs multi-site and longitudinal research designs using a range of research methods (e.g. observational, questionnaire, action research) to understand the concept and process of preparedness alongside the variety of individual, cultural and organizational issues that might impact on this. In short, a more joined-up, systematic, approach to understanding the educational requirements for junior doctors, and how to achieve this, is required.

**Conclusion**

Graduates appear to be well prepared for some of the basic clinical procedures (e.g. venepuncture) and other aspects of clinical practice (e.g. history taking) that will be required of them as new graduates. Through this research we have identified some areas in which graduates are clearly underprepared and where educational and support interventions will be required, either during medical school and/or in the clinical environment in which the junior doctor will work. Some interventions have already been introduced to address these areas (e.g. the Prescribing Safety Assessment for fifth year medical students) and future research should explore the impact they have made. Through this research we have also identified other areas in which the degree of preparedness of graduates is unclear and these require further research. We have also identified ways in which the quality of research in this area can be improved and so we believe that researchers interested in exploring this important topic should be very well positioned to make a significant research contribution.

**AUTHOR’S CONTRIBUTIONS**

LVM, MM, AB and KM conceived the idea and designed the study. LG, EP and ZJ developed the search strategy for the study and undertook the search and screening process at Time 1 under the supervision of MM, LVM and AB. LG undertook the search and screening process at Time 2 under the supervision of LVM. All authors developed the thematic coding and subsequent data analysis. LVM, LG and KM undertook the first draft of the manuscript. All authors reviewed and revised the manuscript and all authors approved the final version.

**COMPETING INTERESTS**

None declared.
FUNDING STATEMENT

This research was commissioned and funded by the General Medical Council who gave feedback on clarity and approved the manuscript for publication.

DATA SHARING STATEMENT

The raw data for this research comprises data available to others through peer-reviewed journals, some of which is copyright, we therefore are not at liberty to share.

ACKNOWLEDGEMENTS

The authors would like to thank Prof Charlotte Rees, Dr Gerry Gormley, Dr Judith Cole, Dr Kathrin Kaufhold, Dr Narcie Kelly, Dr Grit Scheffler, Mr Christopher Jefferies and Ms Camille Kostov for their work on the wider study and comments on the original report to the funders.
<table>
<thead>
<tr>
<th>Practical procedure</th>
<th>Prepared: number &amp; reference(s)</th>
<th>Unprepared: number &amp; reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‡ Venepuncture</td>
<td>4 Bleakley and Brennan (2011)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Matheson and Matheson (2009)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Iling et al. (2013)</td>
<td></td>
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<tr>
<td></td>
<td>Morrow et al. (2012)</td>
<td></td>
</tr>
<tr>
<td>‡ Urinary catheterisation</td>
<td>3 Bleakley and Brennan (2011)</td>
<td>3 Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td>Matheson and Matheson (2009)</td>
<td>Illing et al. (2013)</td>
</tr>
<tr>
<td>‡ Wound sutting</td>
<td>0</td>
<td>3 Matheson and Matheson (2009)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naghavi and Sanati (2009)</td>
</tr>
<tr>
<td>‡ Administering intramuscular and subcutaneous injections</td>
<td>1 Bleakley and Brennan (2011)</td>
<td>3 Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)</td>
</tr>
<tr>
<td>‡ Carry out basic respiratory function tests</td>
<td>1 Bleakley and Brennan (2011)</td>
<td>4 Matheson and Matheson (2009)</td>
</tr>
<tr>
<td></td>
<td>Brown et al. (2011)</td>
<td>Brown et al. (2011)</td>
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<td></td>
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<td>Naghavi and Sanati (2009)</td>
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<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)</td>
</tr>
<tr>
<td>‡ Blood cultures from peripheral and central sites</td>
<td>1 Bleakley and Brennan (2011)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Matheson and Matheson (2009)</td>
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</tr>
<tr>
<td>‡ Use of local anaesthetics</td>
<td>1 Brown et al. (2010)</td>
<td>2 Brown et al. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)</td>
</tr>
<tr>
<td>‡ Making up drugs for parenteral administration</td>
<td>1 Bleakley and Brennan (2011)</td>
<td>4 Brown et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>Matheson and Matheson (2009)</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)</td>
</tr>
<tr>
<td>‡ Perform and interpret electrocardiograms (ECG)</td>
<td>2 Brown et al. (2010)</td>
<td>1 Brown et al. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)</td>
</tr>
<tr>
<td>‡ Administer oxygen therapy</td>
<td>2 Bleakley and Brennan (2011)</td>
<td>2 Brown et al. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)</td>
</tr>
<tr>
<td></td>
<td>Brown et al. (2010)</td>
<td></td>
</tr>
<tr>
<td>‡ Estabishing peripheral intravenous access and setting up an infusion</td>
<td>3 Bleakley and Brennan (2011)</td>
<td>2 Brown et al. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)</td>
</tr>
<tr>
<td></td>
<td>Brown et al. (2010)</td>
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<tr>
<td>Nasogastric tube insertion</td>
<td>2 Bleakley and Brennan (2011)</td>
<td>4 Bleakley and Brennan (2011)</td>
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<td>Matheson and Matheson (2009)</td>
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<tr>
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<td>Brown et al. (2010)</td>
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<td>Task</td>
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<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
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<tr>
<td>Establish IV access for patient with broken veins</td>
<td>1 Wijnen-RMeijer et al. (2012)\textsuperscript{44++}</td>
<td></td>
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<td></td>
<td>1 Wijnen-RMeijer et al. (2012)\textsuperscript{44++}</td>
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<tr>
<td>Arterial blood sampling</td>
<td>3 Bleakley and Brennan (2011)\textsuperscript{38Δ}</td>
<td></td>
</tr>
<tr>
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<td>Brown et al. (2010)\textsuperscript{44}</td>
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<tr>
<td></td>
<td>Matheson and Matheson (2009)\textsuperscript{45}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Morrow et al. (2012)\textsuperscript{42*}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naghavi and Sanati (2009)\textsuperscript{61}</td>
<td></td>
</tr>
<tr>
<td>Inserting a central venous line</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Goldacre et al. (2010)\textsuperscript{38*}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naghavi and Sanati (2009)\textsuperscript{61}</td>
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</tr>
<tr>
<td>Inserting a chest drain</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Goldacre et al. (2010)\textsuperscript{38*}</td>
<td></td>
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<tr>
<td></td>
<td>Elsayed et al. (2010)\textsuperscript{65}</td>
<td></td>
</tr>
<tr>
<td>Correct use of a nebuliser</td>
<td>2 Bleakley and Brennan (2011)\textsuperscript{38Δ}</td>
<td></td>
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<tr>
<td></td>
<td>Morrow et al. (2012)\textsuperscript{42*}</td>
<td></td>
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<tr>
<td></td>
<td>3 Bleakley and Brennan (2011)\textsuperscript{38Δ}</td>
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<td>Matheson and Matheson (2009)\textsuperscript{45}</td>
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<tr>
<td></td>
<td>Morrow et al. (2012)\textsuperscript{42*}</td>
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</tr>
<tr>
<td>Basic CPR (TD09 16e)</td>
<td>2 Bleakley and Brennan (2011)\textsuperscript{38Δ}</td>
<td></td>
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<tr>
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<td>Matheson and Matheson (2009)\textsuperscript{45}</td>
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</tr>
<tr>
<td></td>
<td>1 Morrow et al. (2012)\textsuperscript{42*}</td>
<td></td>
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<tr>
<td>Control of haemorrhage</td>
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</tr>
<tr>
<td></td>
<td>1 Bleakley and Brennan (2011)\textsuperscript{38Δ}</td>
<td></td>
</tr>
</tbody>
</table>

| Total number of different studies                                     | 5                                                                       | 9 |

Note: Blue text = self-report only; Red text = mixed participants/methods; Green text = observational data; Black text = trainer report only; ‡ = skills specifically identified in TD09 Appendix A; * = partial evidence; Δ = Different cohorts, newer evidencing greater preparedness; ++ = self-report measures differ from supervisor-report.
TABLE 2: MANUSCRIPTS SUGGESTING PREPAREDNESS VERSUS UNPREPAREDNESS OF MEDICAL GRADUATES FROM 2009-2014 MAPPED AGAINST THE OUTCOMES FOR GRADUATES.

<table>
<thead>
<tr>
<th>Specific Outcome</th>
<th>Prepared: number &amp; reference(s)</th>
<th>Unprepared: number &amp; reference(s)</th>
</tr>
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<tr>
<td><strong>DOCTOR AS SCIENTIST AND SCHOLAR (8-12)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of anatomy (TD09 8*)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Understanding disease processes (TD09 8e*)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Apply scientific principles, method and knowledge to medical practice and research (TD09 9*)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Knowledge of clinical, behavioral and social sciences for medicine (TD09 9* &amp; 10*)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Basic nutritional care/knowledge (TD09 11h)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total number of different studies</strong></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td><strong>DOCTOR AS PRACTITIONER (13-19)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking a history (TD09 13a)</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Communicate sensitively, clearly and effectively with patients and relatives (TD09 13b*)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Performing a full physical examination (TD09 13c)</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Perform a mental-state examination (TD09 13d)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Task</td>
<td>Level</td>
<td>References</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hold conversation with patient and family to explain a mistake</td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)</td>
</tr>
<tr>
<td>Using evidence and guidelines for patient care (including</td>
<td>1</td>
<td>Watmough et al. (2012)</td>
</tr>
<tr>
<td>Recognising the social and emotional factors in illness and treatment</td>
<td>3</td>
<td>Wijnen-RMeijer et al. (2012)</td>
</tr>
<tr>
<td>To draw up an examination plan for a new patient at the outpatient</td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)</td>
</tr>
<tr>
<td>Protecting patients’ rights</td>
<td>1</td>
<td>Matheson and Matheson (2009)</td>
</tr>
<tr>
<td>Planning discharge for patients</td>
<td>1</td>
<td>Bleakley and Brennan (2011)</td>
</tr>
<tr>
<td>Identifying signs of abuse</td>
<td>0</td>
<td>Estcourt et al. (2009)</td>
</tr>
<tr>
<td>End of life care</td>
<td>0</td>
<td>Gibbins et al. (2011)</td>
</tr>
<tr>
<td>Writing out Part A of a cremation form</td>
<td>0</td>
<td>Morrow et al. (2012)</td>
</tr>
<tr>
<td>Communicate effectively in a medical context</td>
<td>1</td>
<td>Tallentire et al. (2011b)</td>
</tr>
<tr>
<td>Topic</td>
<td>Score</td>
<td>Authors (Year)</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>Dealing with difficult or violent patients (TD09 15e)</td>
<td>0</td>
<td>Matheson and Matheson (2009)⁵⁵</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)⁵²</td>
</tr>
<tr>
<td>Treating acutely ill patients (TD09 item 16)</td>
<td>3</td>
<td>Illing et al. (2013)⁷⁹</td>
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<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)⁷⁰</td>
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<tr>
<td>Diagnose and manage acute medical emergencies (TD09 16b)</td>
<td>3</td>
<td>Bleakley and Brennan (2011)⁵⁶</td>
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<tr>
<td></td>
<td></td>
<td>Gordon et al. (2012)⁵⁹</td>
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<td></td>
<td></td>
<td>Hobson et al. (2011)¹¹, Δ</td>
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<td></td>
<td></td>
<td>Iling et al. (2013)³⁰</td>
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<tr>
<td></td>
<td></td>
<td>Kavanagh et al. (2011)⁸⁰</td>
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<td></td>
<td></td>
<td>Mastoridis et al. (2011)⁸⁰</td>
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<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)⁵²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tallentire et al. (2011b)⁸⁰</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tallentire et al. (2012)⁵³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)⁵³</td>
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<tr>
<td>Explain drug prescription choice to a pharmacist (TD09 17b)</td>
<td>1</td>
<td>Wijnen-Meijer et al. (2012)⁵⁴</td>
</tr>
<tr>
<td>Prescribing safely (TD09 17c)</td>
<td>5</td>
<td>Ahmed et al. (2012)³⁷</td>
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<td></td>
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<td>Brown et al. (2010)⁴⁴</td>
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<td></td>
<td>Bertels et al. (2013)⁹</td>
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<tr>
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<td></td>
<td>Bleakley and Brennan (2011)⁵⁶</td>
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<tr>
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<td></td>
<td>Brennan et al. (2010)⁴⁷</td>
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<td>Dornan et al. (2009)¹⁰, Δ</td>
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<td>Franklin et al. (2011)⁴⁸</td>
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<td>Goldacre et al. (2010)³⁸</td>
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<tr>
<td></td>
<td></td>
<td>Harding et al. (2010)¹¹</td>
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<tr>
<td></td>
<td></td>
<td>Illing et al. (2013)³⁰</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kavanagh et al. (2012)⁸⁰</td>
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<td>Kilminster et al. (2011)⁵⁰</td>
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<td></td>
<td></td>
<td>Lewis and Tully (2009)⁶⁴</td>
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<td></td>
<td></td>
<td>Mattick et al. (2013)¹³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)³²</td>
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<tr>
<td></td>
<td></td>
<td>Ross et al. (2012)⁹⁰</td>
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<tr>
<td></td>
<td></td>
<td>Rothwell et al. (2012)¹⁴</td>
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<td></td>
<td></td>
<td>Ryan et al. (2013)³²</td>
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<td></td>
<td>Seden et al. (2013)⁵⁶</td>
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<td>Tallentire et al. (2012)³⁵</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watmough et al. (2012)⁵³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wijnen-Meijer et al. (2012)⁵⁴</td>
</tr>
<tr>
<td>Calculate drug dosage and record outcome (TD09 17d)</td>
<td>0</td>
<td>Bleakley and Brennan (2011)⁵⁶</td>
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<tr>
<td></td>
<td></td>
<td>Dornan et al. (2009)¹⁰</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matheson and Matheson (2009)⁵⁵</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mattick et al. (2013)¹³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morrow et al. (2012)³²</td>
</tr>
<tr>
<td>Apply knowledge of alternative and</td>
<td>0</td>
<td>Morrow et al. (2012)³²</td>
</tr>
</tbody>
</table>
complementary therapies and how these may affect other treatments (TD09 17b)

| Keeping an accurate and relevant medical record (TD09 19a) | 2 | 3 | Brown et al. (2010) |
| Maintaining confidentiality (TD2009 19c*) | 1 | 1 | Matheson and Matheson (2009) |
| Using informatics as a tool in medical practice (TD09 19e) | 2 | 2 | Bleakley and Brennan (2011) |

**Total number of different studies** 15 37

<p>| DOCTOR AS PROFESSIONAL (20-23) |
| Overall patient-centred practice and humane care/recognizes all aspects of care (TD09 20b*) | 1 | 1 | Bleakley and Brennan (2011) |
| Acting in a professional manner (with honesty and probity) (TD09 20c*) | 2 | 0 | Matheson and Matheson (2009) |
| Providing appropriate care for people of different cultures (TD09 20d*) | 2 | 1 | Bleakley and Brennan (2011) |
| Knowledge of key mental health legislation (TD09 20f*) | 1 | 0 | Wadoo et al. (2011) |
| Understanding ethical and legal issues (such as confidentiality and consent) (TD09 20g*) | 6 | 4 | Linklater et al. (2010) |
| Sickness certification (TD09 20h*) | 0 | 1 | Walters et al. (2010) |
| Identifying and organizing own learning needs, reflective practice (TD09 21b*) | 3 | 3 | Bleakley and Brennan (2011) |
| Time management (TD09 21d*) | 1 | 4 | Bleakley and Brennan (2011) |
| Asking for help (TD09 21e*) | 2 | 0 | |
| Being aware of their limitations (TD09 21f*) | 4 | 1 |△Watmough et al. (2012) |</p>
<table>
<thead>
<tr>
<th>Task Description</th>
<th>Study References</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undertaking a teaching role (TD09 21f*)</td>
<td>Matheson and Matheson (2009)^45 Wijmough et al. (2012)^46</td>
<td>2</td>
</tr>
<tr>
<td>Working effectively in a team (TD09 22*)</td>
<td>Bleakley and Brennan (2011) ^38Δ Wijnen-Meijer et al. (2012)^54‡</td>
<td>6</td>
</tr>
<tr>
<td>Understanding roles of other healthcare professionals (TD09 22a*)</td>
<td>WijnenRMeijer et al. (2012)^54‡</td>
<td>1</td>
</tr>
<tr>
<td>Reporting and dealing with error and safety incidents (TD09 23d*)</td>
<td>Ahmed et al. (2012)^59 Bleakley and Brennan (2011)^38Δ Cresswell et al. (2013)^69</td>
<td>3</td>
</tr>
<tr>
<td>Clinical governance (TD09 23d*)</td>
<td>Bleakley and Brennan (2011)^38Δ</td>
<td>1</td>
</tr>
<tr>
<td>Knowledge/ Using audit to improve patient care (TD09 23e*)</td>
<td>Bleakley and Brennan (2011)^38Δ Brown et al. (2010)^44‡ Wijmough et al. (2012)^49Δ</td>
<td>3</td>
</tr>
<tr>
<td>Dealing appropriately, effectively, and in patients’ interests with problems in the performance, conduct or health of colleagues (TD09 23d*, i*)</td>
<td>Matheson and Matheson (2009)^45</td>
<td>1</td>
</tr>
<tr>
<td>Reducing the risk of cross-infection (TD09 23h)</td>
<td>Bleakley and Brennan (2011)^38Δ</td>
<td>1</td>
</tr>
<tr>
<td>Managing their health, including stress (TD09 23i*)</td>
<td>Bleakley and Brennan (2011)^38Δ</td>
<td>1</td>
</tr>
<tr>
<td>Total number of different studies</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

<p>| Items not directly mapped to outcomes for graduates                   |                           |       |
| To give a presentation at the clinical team meeting after a night shift | Wijnen-Meijer et al. (2012)^44‡ | 1     |
| Write letter of referral to colleague                                | Wijnen-Meijer et al. (2012)^54‡ | 1     |</p>
<table>
<thead>
<tr>
<th>Ability/skill</th>
<th>Count</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to participate in effective handover</td>
<td>0</td>
<td>Burns (2011)¹⁰⁰¹, Cleland et al. (2009)⁴⁶, Raduma Tomas et al. (2011)⁵⁸</td>
</tr>
<tr>
<td>Understanding how the clinical environment works (not an outcome for graduates but appears in TD09 106, p.54)</td>
<td>1</td>
<td>Matheson and Matheson (2009)⁴⁵ ‡³, Ibling et al. (2013)⁴³, Kilmminster et al. (2011)⁵⁰, Mattick et al. (2013)¹³, Tallentire et al. (2011b)⁴¹, Van Hamel &amp; Jenner (2011)⁵⁰</td>
</tr>
<tr>
<td>Understanding the relationship between primary/social care and hospital care</td>
<td>0</td>
<td>Bleakley and Brennan (2011)⁷²Δ, Watmough et al. (2012)⁴⁰</td>
</tr>
<tr>
<td>Knowledge and understanding of rehabilitation and care within institutions and the community</td>
<td>1</td>
<td>Matheson and Matheson (2009)⁴⁵ ‡³, Matheson and Matheson (2009)⁴⁵ ‡³</td>
</tr>
<tr>
<td>Understanding the purpose and practice of appraisal</td>
<td>0</td>
<td>Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td>Use information and technology effectively in medical context</td>
<td>1</td>
<td>Tallentire et al. (2011b)⁴¹</td>
</tr>
<tr>
<td>Organisational decision making</td>
<td>0</td>
<td>Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td>Applying clinical pharmacology and therapeutics (CPT) to prescribing</td>
<td>0</td>
<td>Harding et al. (2010)¹¹, Mattick et al. (2013)¹³</td>
</tr>
<tr>
<td>To ask a representative critical questions about the pharmaceutical product</td>
<td>0</td>
<td>Wijnen-RMeijer et al. (2012)⁵⁴</td>
</tr>
<tr>
<td>Pre-operative assessment of patients</td>
<td>0</td>
<td>Morrow et al. (2012)⁴²</td>
</tr>
<tr>
<td>Taking part in advanced life support</td>
<td>1</td>
<td>Bleakley and Brennan (2011)⁷²Δ, Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td>Functioning safely in an acute ‘take’ team</td>
<td>0</td>
<td>Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td>Educating patients (health and public health) promotion</td>
<td>1</td>
<td>Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td>Maintaining good quality care</td>
<td>1</td>
<td>Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td>Carrying out a literature search</td>
<td>1</td>
<td>Watmough et al. (2012)⁴⁰Δ, Watmough et al. (2012)⁴⁰Δ</td>
</tr>
<tr>
<td>Skills of close observation</td>
<td>0</td>
<td>Bleakley and Brennan (2011)⁷²Δ</td>
</tr>
<tr>
<td><strong>Total number of different studies</strong></td>
<td><strong>5</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

**Note:** Blue text = Self-report only; Red text = Mixed participants/methods; Black text = Trainer report only; * = Partially relevant to the specified outcome; ‡ = trainees suggest preparedness where supervisors do not; Δ = Different cohorts, newer evidencing greater preparedness; † = self-reports suggest prepared, observational data suggests unprepared.
References


13. Mattick K, Rees C, Kelly N. "By junior doctors for junior doctors": A project to develop educational interventions to support junior doctor's antimicrobial prescribing, 2013.


31. Hobson J. will our junior doctors be ready for the next major incident? A questionnaire audit on major accident awareness across three NHS Trusts in Wales. 2011.


FIGURE 1: STUDY SELECTION PROCESS 2009-2013

Records identified through database searching (n = 1,705)

Additional records identified through other sources (n = 2,057)

Records after duplicates removed (n = 1,817)

Records screened (titles/abstract against inclusion) (n = 1,817)

Records excluded (n = 1,468)

Full-text articles assessed for eligibility (n = 237) plus additional records identified from reference lists (n=48)

Full-text articles excluded (n = 93)

Quality assessment (n=163)

Studies in synthesis:
- Reviews (n=6)
- Quantitative (n=70)
- Qualitative (n=17)
- Mixed methods (n=14)
FIGURE 2: STUDY SELECTION PROCESS 2013-2014

209x297mm (300 x 300 DPI)
Online supplement A: Searches and Results

2009-2013

Database: Ovid MEDLINE(R) <1946 to June Week 4 2013>

436 Results

1  Junior doctor*1.mp. (1519)
2  pre-registration house officer.tw. (57)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (40696)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (2826)
5  new* qualif* doctor*.tw. (97)
6  (SHO or senior house officer*).tw. (1005)
7  (medic* adj3 graduat*).tw. (7127)
8  "Internship and Residency"/ (34048)
9  or/1-8 (82614)
10  exp Professional Competence/ (82404)
11  exp Clinical Competence/ (63261)
12  exp Self Efficacy/ (11734)
13  (Confidence adj3 practice).tw. (232)
14  exp Professional Practice/ (215546)
15  exp Resilience, Psychological/ (1272)
16  exp coping behavior/ (100563)
17  exp Competency-Based Education/ (2705)
18  *"Education, Medical, Graduate"/ (14401)
19  *"Education, Medical"/ (34246)
20  "Education, Medical, Continuing"/ (20783)
21  (prepar* adj3 practi*).tw. (2393)
22  ((readiness or ready) adj3 practi*).tw. (253)
23  (transition* adj3 pract*).tw. (502)
24  ((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*)).tw. (361)
25  (resilien* adj3 medical).tw. (18)
26  (effective* adj3 medical curriculum).tw. (4)
27  foundation train*.tw. (43)
28  medical education.tw. (24142)
29  professionalism.tw. (4052)
30  prescribing skill*1.ti. (58)
31  scientific knowledge.tw. (3028)
32  (fitness adj3 practise).tw. (76)
33  (fitness adj3 purpose).tw. (156)
34  (defin* adj3 practi*).tw. (2392)
35  (asses* adj3 prepar*).tw. (1922)
36  (toler* adj3 uncert*).tw. (174)
37  Leadership.tw. (18613)
38  Ethical manner.tw. (50)
39  Clinical analysis.tw. (4760)
40  Clinical* effective*.tw. (9746)
41  Communicate effectively.tw. (392)
42  *"Communication"/ (26239)
43  Communicate appropriately.tw. (4)
44  Clinical responsibil*.tw. (258)
45  (Adapt adj3 chang*).tw. (1810)
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
20. (MM "Education, Medical, Continuing") (2286)
21. AB (prepar* W3 pract*) (1024)
22. TX (readiness W3 pract*) OR (ready W3 pract*) (670)
23. TX (transition* W3 pract*) (2367)
24. TX (Competence OR prepare* OR confiden* OR ready W3 (practise OR purpose OR employab*). (672)
25. TX (resilien* W3 medical) (195)
26. TX (effective* W3 medical curriculum) (10)
27. TI "foundation train*" OR AB "foundation train*" (29)
28. TI medical education OR AB medical education (5841)
29. TI professionalism OR AB professionalism (2555)
30. TI "prescribing skill*" OR AB "prescribing skill*" (22)
31. TI "scientific knowledge" OR AB "scientific knowledge" (834)
32. TI fitness W3 practise) OR AB (fitness W3 practise) (163)
33. TX (fitness W3 purpose) OR AB (fitness W3 purpose) (64)
34. TI (defin* W3 pract*) OR AB (defin* W3 pract*) (867)
35. TI (asses* W3 prepar*) OR AB (asses* W3 prepar*) (374)
36. TI (toler* W3 uncert*) OR AB (toler* W3 uncert*) (39)
37. TI "Leadership" OR AB "Leadership" (16780)
38. TI "Ethical manner" OR AB "Ethical manner" (1)
39. TI "Clinical analysis" OR AB "Clinical analysis" (205)
40. TI "Clinical* effective*" OR AB "Clinical* effective*" (2166)
41. TI "Communicate effectively" OR AB "Communicate effectively" (248)
42. TI (*"Communication") OR AB (*"Communication") (40288)
43. TI "Communicate appropriately" OR AB "Communicate appropriately" (1)
44. TI "Clinical responsibil*" OR AB "Clinical responsibil*" (91)
45. TI (Adapt W3 chang*) OR AB (Adapt W3 chang*) (323)
46. TI "Patient safety" OR AB "Patient safety" (9589)
47. TI "Patient Safety" OR AB "Patient Safety" (9589)
48. TI "Clinical judgement" OR AB "Clinical judgement" (327)
49. TI "Patient care" OR AB "Patient care" (18319)
50. TX "Quality Assurance, Health Care" (38)
51. TI "Quality assurance" OR AB "Quality assurance" (3894)
52. TX CPD OR "Continuing professional development" (5258)
53. TX (Inadequate W3 (supervision or train* OR support OR preparedness)) (3657)
54. TX (Inadequate OR clinical) W3 (supervision or train* OR support OR preparedness)) (26663)
55. TI "clinical performance" OR AB "clinical performance" (1280)
56. TI (S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64) (509,723)
56. (MH "Great Britain") (72,023)
57. (MH "Scotland") (11,985)
58. (MH "Northern Ireland") (2,556)
69. (MH "Wales") (5,894)
70. TI ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) OR AB ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) (75,158)
71. S66 OR S67 OR S68 OR S69 OR S70 (127,706)
72. S9 AND S65 AND S71 (191)

Database: ERIC
1540879 Results

1. AB,TI(Junior doctor*1) (51)
2. ab,ti(pre-registration house officer) (1)
3. ab,ti("foundation doctor*" OR F1 OR FY1 OR F2 OR FY2 OR "foundation year 1" OR "foundation year one" OR "foundation year two") (125)
4. AB,TI(PRHO* OR “houseman*” OR “house man*” OR “house officer*” OR intern) (2796)
5. AB,TI(new* qualif* doctor*) (81)
6. AB,TI(SHO OR “senior house officer*”) (11)
7. AB,TI(medic* NEAR/3 graduat*) (786)
8. AB,TI(Internship and Residency) (82)
9. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 (3893)
10. SU.EXACT.EXPLODE("Professional Competence") (3)
11. SU.EXACT.EXPLODE("Clinical Competence") (13)
12. SU.EXACT.EXPLODE("Self Efficacy") (6944)
13. AB,TI((Confidence NEAR/3 practice)) (88)
14. Professional AND Practice (30366)
15. SU.EXACT.EXPLODE("Resilience (Psychology)") (755)
16. SU.EXACT.EXPLODE("Coping") (9243)
17. SU.EXACT.EXPLODE("Competency Based Education") (10649)
18. AB,TI("Education, Medical, Graduate") (718)
19. AB,TI("Education, Medical") (7166)
20. AB,TI("Education, Medical, Continuing") (853)
21. AB,TI(prepar* NEAR/3 practi*)) (1893)
22. AB,TI readiness OR ready NEAR/3 practi* (60)
23. AB,TI((transition* NEAR/3 pract*)) (528)
24. AB,TI((Competence OR prepare* OR confiden* OR ready) NEAR/3 (practise OR purpose OR employab*)) (921)
25. AB,TI((resilien* NEAR/3 medical) (4)
26. AB,TI(effective* NEAR/3 “medical curriculum") (2)
27. AB,TI("foundation train") (17)
28. AB,TI("medical education") (2345)
29. AB,TI("professionalism") (3226)
30. AB,TI("prescribing skill") (4)
31. AB,TI("scientific knowledge") (1168)
32. AB,TI(fitness NEAR/3 practise) (35)
33. AB,TI(fitness NEAR/3 purpose) (71)
34. ("defin*" NEAR/3 "practi") (1434)
35. ("asses*" NEAR/3 "prepar") (1106)
36. AB,TI(toler* NEAR/3 uncert*) (46)
37. "Leadership" (56817)
38. "Ethical manner" (26)
39. "Clinical analysis" (30)
40. "Clinical* effective*" (50)
41. ("Communicate effectively") (483)
42. "*Communication" (129322)
43. "Communicate appropriately" (6)
44. "Clinical responsibil*" (6)
45. Adapt NEAR/3 chang* (573)
46. "*Patient Safety" (79)
47. "Clinical judgement" (14)
48. "Patient care" (811)
49. "Quality Assurance", "Health Care" (53)
50. "Quality assurance" (2883)
51. CPD OR "Continuing professional development" (846)
52. AB,TI (Inadequate NEAR/3 (supervision or train* or support or preparedness))(648)
53. (Inadequate OR clinical) NEAR/3 (supervision OR train* OR support OR preparedness) (2523)
54. "clinical performance" (173)
55. Situation NEAR/3 uncertainty (36)
56. Emergency OR judgement (19881)
57. Safe prescribing (5)
58. Reflection (22435)
59. "Feedback" (25970)
60. Work NEAR/3 autonomously (11)
61. Assistantship OR Mentoring (7302)
62. “psychology knowledge” (15)
63. Psychology (122587)
64. S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 (409300)
65. "Great Britain" (9473)
66. "Scotland" (4290)
67. "Northern Ireland" (1270)
68. "Wales" (4909)
69. AB,TI (Great Britain OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR United Kingdom OR welsh OR english OR scottish OR irish) (1540880)
70. S35 OR S35 OR S37 OR S38 OR S39 (1540879)

Database: HMIC

71 Results

1 Junior doctor*1.mp. (883)
2 pre-registration house officer.tw. (20)
3 (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (43)
4 (PRHO* or houseman* or house man* or house officer* or intern).tw. (452)
5 new* qualifi* doctor*.tw. (31)
6 (SHO or senior house officer*).tw. (269)
7 (medic* adj3 graduat*).tw. (263)
8 "Internship and Residency"/ (1)
9 or/1-8 (1543)
10 exp Professional Competence/ (536)
11 exp Students/ or exp Assessment/ or exp Clinical practice/ or exp Professional competence/ or exp medical staff/ or exp Skills/ or exp Competence assessment/ (37158)
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
exp Great Britain/ (443)  
exp Scotland/ (5016)  
exp Northern Ireland/ (1368)  
exp Wales/ (3558)  
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (51863)  
or/66-70 (54958)  
9 and 65 and 71 (340)  
limit 72 to yr="2009 -Current" (71)

Database: Ovid PsychINFO

51 Results

1 Junior doctor*.mp. (227)  
2 pre-registration house officer.tw. (10)  
3 (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (1316)  
4 (PRHO* or houseman* or house man* or house officer* or intern).tw. (545)  
5 new* qualif* doctor*.tw. (20)  
6 (SHO or senior house officer*).tw. (104)  
7 (medic* adj3 graduat*).tw. (1057)  
8 "Internship and Residency"/ (14)  
9 or/1-8 (3126)  
10 exp Professional Competence/ (3549)  
11 exp Clinical Competence/ (314)  
12 exp Self Efficacy/ (8479)  
13 (Confidence adj3 practice).tw. (107)  
14 exp Professional Practice/ (2368)  
15 exp Resilience, Psychological/ (5149)  
16 exp coping behavior/ (16976)  
17 exp Competency-Based Education/ (55)  
18 *"Education, Medical, Graduate"/ (0)  
19 *"Education, Medical"/ (0)  
20 "Education, Medical, Continuing"/ (0)  
21 (prepar* adj3 practi*).tw. (906)  
22 (readiness or ready) adj3 practi*.tw. (129)  
23 (transition* adj3 practi*).tw. (392)  
24 ((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*)).tw. (126)  
25 (resilien* adj3 medical).tw. (13)  
26 (effective* adj3 medical curriculum).tw. (0)  
27 foundation train*.tw. (12)  
28 medical education.tw. (4777)  
29 professionalism.tw. (2017)  
30 prescribing skill*1.tw. (5)  
31 scientific knowledge.tw. (1494)  
32 (fitness adj3 practi*).tw. (20)  
33 (fitness adj3 purpose).tw. (40)  
34 (defin* adj3 practi*).tw. (994)  
35 (asses* adj3 prepar*).tw. (351)  
36 (toler* adj3 uncert*).tw. (125)  
37 Leadership.tw. (23242)  
38 Ethical manner.tw. (57)  
39 Clinical analysis.tw. (151)
Clinical* effective*.tw. (874)
Communicate effectively.tw. (258)
*"Communication"*/ (6804)
Communicate appropriately.tw. (8)
Clinical responsibil*.tw. (68)
(Adapt adj3 chang*).tw. (571)
Patient safety.tw. (1348)
*Patient Safety/ (0)
Communicate appropriately.tw. (8)
Clinical judgement.tw. (160)
Patient care.tw. (4238)
*Quality Assurance, Health Care/ (0)
(QCPD or Continuing professional development).tw. (709)
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (494)
[(Inadequate or clinical) adj3 (supervision or train* or support or preparedness)].tw. (5392)
clinical performance.tw. (298)
(Situation adj3 uncertainty).tw. (36)
(Emergency adj3 judgement).tw. (0)
Safe prescribing.tw. (16)
Reflection.tw. (13071)
"Feedback"*/ (5164)
(Work adj3 autonomously).tw. (8)
(Assistantship or Mentoring).tw. (4412)
psychology knowledge.mp. (38)
Psychology/ (9476)
or/10-64 (115354)
exp Great Britain/ (755)
exp Scotland/ (2039)
exp Northern Ireland/ (1173)
exp Wales/ (3294)
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (63028)
or/66-70 (63037)
9 and 65 and 71 (92)
limit 72 to yr="2009 -Current" (51)

Database: Web of Science

253 Results

1. TS=(Junior doctor*) [580]
2. TS=("pre-registration house officer") [3]
3. TS="foundation doctor*" OR (F1 NEAR/3 doctor) OR (FY1 NEAR/3 doctor) OR (F2 N/3 doctor) OR (FY2 N/3 doctor) OR “foundation year 1” OR “foundation year one” OR “foundation year 2” OR “foundation year two”) [67]
4. TS=((PRHO* OR “houseman*” OR “house man*” OR “ house officer*” OR intern)) [1367]
5. TS=(new* qualifi* doctor*) [77]
6. TS=((SHO OR “senior house officer*”)) [232]
7. TS=(medic* NEAR/3 graduat*)) [1829]
8. TS="(Internship and Residency")" [167]
9. #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1 [3948]
10. TS="Professional Competence" [1365]
11. TS="Clinical Competence" [2359]
12. TS="Self Efficacy" [9869]
13. TS=(Confidence NEAR/3 practice) [171]
14. TS="Professional Practice" [10843]
15. TS=(Resilience AND Psychological) [360]
16. TS=(coping behaviour) [2835]
17. TS="Competency-Based Education" [117]
18. TS="Education, Medical, Graduate") [12]
19. TS="Education, Medical") [144]
20. TS="Education, Medical, Continuing" [12]
21. TS=(preparation NEAR/3 practice) [1061]
22. TS=((readiness OR ready) NEAR/3 practice) [154]
23. TS=(transition* NEAR/3 practice) [351]
24. TS=((Competence OR preparation OR confidence OR ready) NEAR/3 (practice OR purpose OR employability)) [1079]
25. TS=(resilience NEAR/3 medical) [11]
26. TS="medical education"
27. TS="foundation train"
28. TS="effective* medical curriculum") [2]
29. TS="prescribing skills"
30. TS="scientific knowledge"
31. TS="leadership"
32. TS="ethical manner"
33. TS="Clinical analysis"
34. TS="Adaptation"
35. TS="Emergency judgement"
36. TS="Safe prescribing"
37. TS="Reflection"
38. TS="Feedback"
39. TS="Work autonomously"
40. TS="psychological knowledge"
41. TS=Psychology [5855]
42. #64 OR #63 OR #62 OR #61 OR #60 OR #59 OR #58 OR #57 OR #56 OR #55 OR #54 OR #53 OR #52 OR #51 OR #50 OR #49 OR #48 OR #47 OR #46 OR #45 OR #44
Database SCOPUS
199 RESULTS

1. “Junior doctor*” [ALL] 8201
2. “pre-registration house officer” [ABS, TITLE, KEYWORD] 176
3. “foundation doctor*” or “F1 W/3 doctor*” or “FY1 W/3 doctor*” or “FY2 W/3 doctor*” or “foundation year 1” or “foundation year one” or “foundation year 2” or “foundation year two” [ABS, TITLE, KEYWORD] 7915
4. (“PRHO*” or “houseman*” or “house man*” or “house officer*” or “intern”) [ABS, TITLE, KEYWORD] 2401
5. new* qualif* doctor*[ABS, TITLE, KEYWORD] 684
6. (“SHO” or “senior house officer*”) [ABS, TITLE, KEYWORD] 734
7. (medic* W/3 graduat*) [ABS, TITLE, KEYWORD] 30,467
8. "Internship and Residency" [ALL] 32,262
9. #1 OR #2 etc (can only search a certain amount of characters, need to add in fields) 72,517
10. “Professional Competence” [ALL] 90,912
12. “Self Efficacy” [ALL] 250,195
13. (Confidence W/3 practice) [ABS, TITLE, KEYWORD] 1,479
15. “Resilience, Psychological” [ALL] 1,156
17. “Competency-Based Education” [ALL] 8,151
18. **“Education, Medical, Graduate”[ALL] 20,251
19. **“Education, Medical”[ALL] 154,535
20. "Education, Medical, Continuing”[ALL] 19,735
21. (prepar* W/3 pract*)[ABS, TITLE, KEYWORD] 7,666
22. (readiness or ready) W/3 pract* [ABS, TITLE, KEYWORD] 844
23. (transition* W/3 pract*)[ABS, TITLE, KEYWORD] 2216
24. ((Competence or prepare* or confiden* or ready) W/3 (practise or purpose or employab*))[ABS, TITLE, KEYWORD] 2,181
25. (resilien* W/3 medical) [ABS, TITLE, KEYWORD] 59
26. (effective* W/3 medical curriculum) [ABS, TITLE, KEYWORD] 298
27. “foundation train*”[ABS, TITLE, KEYWORD] 9,217
29. professionalism[ABS, TITLE, KEYWORD] 11,239
30. “prescribing skill*”[ABS, TITLE, KEYWORD] 733
31. “scientific knowledge” [ABS, TITLE, KEYWORD] 9213
32. (fitness W/3 practise) [ABS, TITLE, KEYWORD] 129
33. (fitness W/3 purpose) [ABS, TITLE, KEYWORD] 1,065
34. (defin* W/3 practi*)[ABS, TITLE, KEYWORD] 8483
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
3. TX “foundation doctor*” OR “F1 w/3 doctor” OR “FY1 w/3 doctor” OR “F2 w/3
doctor” OR “FY2 w/3 doctor” OR “foundation year 1” OR “foundation year one” OR
“foundation year 2” OR “foundation year two” (255)
4. TX PRHO* OR “houseman*” OR “house man*” OR “house officer*” OR
intern (3215)
5. TX ”new* qualif* doctor*” (297)
6. TX SHO OR ”senior house officer*” (1608)
7. TX medic* W3 graduat* (7207)
8. TX Internship AND TX Residency (9851)
9. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 (21334)
10. (MH "Professional Competence+") (41883)
11. (MH "Clinical Competence+") (26193)
12. (MM "Self-Efficacy") (4168)
13. AB confidence OR AB practice OR AB “junior doctor*” (174421)
14. (MH "Professional Practice+") (177623)
15. (MH "Adaptation, Psychological+") (22476)
16. TX “coping behaviour” (458)
17. TX “Competency-Based Education” (391)
18. TX *Education, Medical, Graduate (3981)
19. (MH "Education, Medical+") (27777)
20. (MM "Education, Medical, Continuing") (2423)
21. AB (prepar* W3 pract*) (1085)
22. TX (readiness W3 pract*) OR (ready W3 pract*) (719)
23. TX (transition* W3 pract*) (2581)
24. TX ((Competence OR prepare* OR confiden* OR ready) W3 (practise OR purpose
OR employab*)), (711)
25. TX (resilien* W3 medical) (194)
26. TX (effective* W3 medical curriculum) (58)
27. TI "foundation train*" OR AB "foundation train*" (34)
28. TI medical education OR AB medical education (8282)
29. TI professionalism OR AB professionalism (2722)
30. TI “prescribing skill*” OR AB “prescribing skill*” (23)
31. TI “scientific knowledge” OR AB “scientific knowledge” (883)
32. TI (fitness W3 practise) OR AB (fitness W3 practise) (180)
33. TI (fitness W3 purpose) OR AB (fitness W3 purpose) (67)
34. TI (defin* W3 pract*) OR AB (defin* W3 pract*) (906)
35. TI (asses* W3 prepar*) OR AB (asses* W3 prepar*) (405)
36. TI (toler* W3 uncer*) OR AB (toler* W3 uncer*) (42)
37. TI “Leadership” OR AB “Leadership” (17773)
38. TI “Ethical manner” OR AB “Ethical manner” (37)
39. TI “Clinical analysis” OR AB “Clinical analysis” (230)
40. TI “Clinical* effective*” OR AB “Clinical* effective*” (2310)
41. TI “Communicate effectively” OR AB “Communicate effectively” (262)
42. TI (**Communication") OR AB (**Communication") (43123)
43. TI “Communicate appropriately” OR AB “Communicate appropriately” (1)
44. TI “Clinical responsibil*” OR AB “Clinical responsibil*” (94)
45. TI (Adapt W3 chang*) OR AB (Adapt W3 chang*) (340)
46. TI “Patient safety” OR AB “Patient safety” (10414)
47. TI “Patient Safety” OR AB “Patient Safety” (10414)
48. TI “Clinical judgement” OR AB “Clinical judgement” (350)
49. TI “Patient care” OR AB “Patient care” (19170)
50. TX “Quality Assurance, Health Care” (36)
51. TI “Quality assurance” OR AB “Quality assurance” (4020)
52. TX CPD OR “Continuing professional development” (5800)
53. TX (Inadequate W3 (supervision or train* OR support OR preparedness)) (3750)
54. TX ((Inadequate OR clinical) W3 (supervision OR train* OR support OR preparedness)) (28272)
55. TI “clinical performance” OR AB “clinical performance” (1383)
56. TI (Situation W3 uncertainty) OR AB (Situation W3 uncertainty) (22)
57. TI (Emergency W3 judgement) OR AB (Emergency W3 judgement) (1)
58. TI “Safe prescribing” OR AB “Safe prescribing” (95)
59. TI “Reflection” OR AB “Reflection” (7641)
60. TX "Feedback" (75211)
61. TI (Work W3 autonomously) OR AB (Work W3 autonomously) (14)
62. TI (Assistantship OR Mentoring) OR AB (Assistantship OR Mentoring) (3235)
63. TX "psychology knowledge" (11)
64. (MH "Psychology, Occupational") (439)
65. S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 (545500)
66. (MH "Great Britain") (77696)
67. (MH "Scotland") (12716)
68. (MH "Northern Ireland") (2739)
69. (MH "Wales") (6239)
70. TI ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) ) OR AB ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) ) (80206)
71. S66 OR S67 OR S68 OR S69 OR S70 (138861)
72. S9 AND S65 AND S71 (47)

Database: Ovid EMBASE(R) 1947-Present

Search Strategy: 06.05.2014 LJG
group.bmj.com on August 5, 2017 - Published by http://bmjopen.bmj.com/  
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
Database: ERIC

1. AB,TI(Junior doctor*1) (954)
2. AB,TI(pre-registration house officer) (2)
3. AB,TI("foundation doctor*" OR F1 OR FY1 OR F2 OR FY2 OR "foundation year 1" OR "foundation year one" OR "foundation year 2" OR "foundation year two") (5495)
4. AB,TI(PRHO* OR “houseman*” OR “house man*” OR “house officer*” OR intern) (7965)
5. AB,TI(new* qualif* doctor*) (474)
6. AB,TI(SHO OR "senior house officer*") (982)
7. AB,TI(medic* NEAR/3 graduat*) (2343)
8. AB,TI(Internship and Residency) (141)
9. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 (17694)
10. SU.EXACT.EXPLODE("Professional Competence") (897)
11. SU.EXACT.EXPLODE("Clinical Competence") (369)
12. SU.EXACT.EXPLODE("Self Efficacy") (10280)
13. AB,TI((Confidence NEAR/3 practice)) (502)
14. Professional AND Practice (635593)
15. SU.EXACT.EXPLODE("Resilience (Psychology)") (1076)
16. SU.EXACT.EXPLODE("Coping") (59278)
17. SU.EXACT.EXPLODE("Competency Based Education") (15661)
18. AB,TI(*Education, Medical, Graduate) (1730)
19. AB,TI(*Education, Medical) (24162)
20. AB,TI(Education, Medical, Continuing) (1966)
21. AB,TI((prepar* NEAR/3 practi*)) (5186)
22. AB,TI readiness OR ready NEAR/3 practi* (8491)
23. AB,TI((transition* NEAR/3 practi*)) (1991)
24. AB,TI((Competence OR prepare* OR confiden* OR ready) NEAR/3 (practise OR purpose OR employab*)) (4292)
25. AB,TI((resilien* NEAR/3 medical)) (28)
26. AB,TI(effective* NEAR/3 "medical curriculum") (2)
27. AB,TI("foundation train*") (77)
28. AB,TI("medical education") (7589)
29. AB,TI("professionalism") (16620)
30. AB,TI("prescribing skill*") (9)
31. AB,TI("scientific knowledge") (7688)
32. AB,TI(fitness NEAR/3 practise) (366)
33. AB,TI(fitness NEAR/3 purpose) (364)
34. ("defin*" NEAR/3 "practi**") (27872)
35. ("asses*" NEAR/3 "prepar*") (8065)
36. AB,TI(toler* NEAR/3 uncert*) (315)
37. "Leadership" (822513)
38. "Ethical manner" (1702)
39. "Clinical analysis" (623)
40. "Clinical* effective**" (4568)
41. ("Communicate effectively") (8216)
42. **" Communication" (1425140)
43. "Communicate appropriately" (136)
44. "Clinical responsibil*" (362)
45. Adapt NEAR/3 chang* (33273)
46. "*Patient Safety" (16302)
47. "Clinical judgement" (663)
48. "Patient care" (50466)
49. "*Quality Assurance", "Health Care" (9435)
50. "Quality assurance" (70852)
51. CPD OR "Continuing professional development" (17447)
52. AB, TI (Inadequate NEAR/3 (supervision or train* or support or preparedness))(86)
53. (Inadequate OR clinical) NEAR/3 (supervision OR train* OR support OR preparedness)
   (33272)
54. "clinical performance" (2268)
55. Situation NEAR/3 uncertainty (6776)
56. Emergency OR judgement (1356587)
57. Safe prescribing (6719)
58. Reflection (656099)
59. "Feedback" (349919)
60. Work NEAR/3 autonomously (74)
61. Assistantship OR Mentoring (57680)
62. “psychology knowledge” (129)
63. Psychology (905693)
64. 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 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR
   34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44 OR 45 OR
   46 OR 47 OR 48 OR 49 OR 50 OR 51 OR 52 OR 53 OR 54 OR 55 OR 56 OR 57 OR 58 OR 59 OR 60 OR 61 OR 62 OR 63 (4347109)
65. "Great Britain" (1671223)
66. "Scotland" (696621)
67. "Northern Ireland" (74072)
68. "Wales" (528864)
69. AB, TI (Great Britain OR Britain OR England OR Scotland OR Wales OR Ireland OR
   UK OR United Kingdom OR welsh OR english OR scottish OR irish) (1661384)
70. 65 OR 66 OR 67 OR 68 OR 69 (3942223)
71. 9 AND 64 AND 70 (43)

Database: HMIC Health Management Information Consortium

Search Strategy:
1 Junior doctor*1.mp. (939)
2 pre-registration house officer.tw. (22)
3 (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one
   or foundation year 2 or foundation year two).tw. (59)
4 (PRHO* or houseman* or house man* or house officer* or intern).tw. (454)
5 new* qualif* doctor*.tw. (35)
6 (SHO or senior house officer*).tw. (273)
7 (medic* adj3 graduat*).tw. (273)
8 "Internship and Residency"/ (0)
9 or/1-8 (1622)
10 exp Professional Competence/ (563)
11 exp Clinical Competence/ (0)
12 exp Self Efficacy/ (0)
13 (Confidence adj3 practice).tw. (34)
14 exp Professional Practice/ (15582)
15 exp Resilience, Psychological/ (0)
16 exp coping behavior/ (0)
17 exp Competence based education/ (0)
18 "Education, Medical, Graduate"/ (0)
19 "Education, Medical"/ (0)
20 "Education, Medical, Continuing"/ (0)
21 (prepar* adj3 pract*).tw. (260)
((readiness or ready) adj3 practise).tw. (27)
(transition* adj3 pract*).tw. (42)
((Competence or prepare* or confidence or ready) adj3 (practise or purpose or
employable)).tw. (29)
(resilien* adj3 medical).tw. (4)
(effective* adj3 medical curriculum).tw. (0)
foundation train*.tw. (20)
medical education.tw. (1347)
professionalism.tw. (476)
30 prescribing skill*1.tw. (4)
scientific knowledge.tw. (106)
(fitness adj3 practise).tw. (79)
(fitness adj3 purpose).tw. (49)
(defin* adj3 practi*).tw. (250)
(asses* adj3 prepar*).tw. (93)
(toler* adj3 uncert*).tw. (8)
Leadership.tw. (3668)
Ethical manner.tw. (6)
Clinical analysis.tw. (10)
Clinical* effective*.tw. (1115)
Communicate effectively.tw. (45)
"Communication"/ (0)
Communicate appropriately.tw. (1)
Clinical responsibil*.tw. (59)
(Adapt adj3 chang*).tw. (84)
Patient safety.tw. (1860)
exp Patient Safety/ (0)
Clinical judgement.tw. (157)
Patient care.tw. (5089)
exp Quality assurance in health services/ (0)
Quality assurance.tw. (2772)
(CPD or Continuing professional development).tw. (476)
(Inadequate adj3 (supervision or train* or support or preparedness)).tw. (199)
((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (1529)
clinical performance.tw. (206)
(Situation adj3 uncertainty).tw. (2)
(Emergency adj3 judgement).tw. (0)
Safe prescribing.tw. (5)
Reflection.tw. (805)
"Feedback"/ (161)
(Work adj3 autonomously).tw. (9)
(Assistantship or Mentoring).tw. (266)
psychology knowledge.mp. (1)
Psychology/ (364)
or/10-64 (33640)
exp Great Britain/ (446)
exp Scotland/ (3156)
exp Northern Ireland/ (1405)
exp Wales/ (3676)
(Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United
Kingdom or welsh or english or scottish or irish).tw. (53492)
or/66-70 (56659)
9 and 65 and 71 (124)
(limit 72 to yr="2013 -Current" (11)
Database: Ovid MEDLINE(R) 1946 to April Week 4 2014

Search Strategy: 06.05.2014 LJG

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1  Junior doctor*1.mp. (1549)
2  pre-registration house officer.tw. (55)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one
   or foundation year 2 or foundation year two).tw. (39891)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (2837)
5  new* qualif* doctor*.tw. (103)
6  (SHO or senior house officer*).tw. (993)
7  (medic* adj3 graduat*).tw. (7205)
8  "Internship and Residency"/ (34671)
9  or/1-8 (82493)
10 exp Professional Competence/ (83895)
11 exp Clinical Competence/ (64430)
12 exp Self Efficacy/ (11765)
13 (Confidence adj3 practice).tw. (233)
14 exp Professional Practice/ (216900)
15 exp Resilience, Psychological/ (1438)
16 exp coping behavior/ (101559)
17 exp Competency-Based Education/ (2735)
18 *"Education, Medical, Graduate"/ (14646)
19 *"Education, Medical"/ (34727)
20 "Education, Medical, Continuing"/ (20956)
21 (prepar* adj3 practi*).tw. (2438)
22 ((readiness or ready) adj3 practi*).tw. (263)
23 (transition* adj3 pract*).tw. (524)
24 ((Competence or prepare* or confidence or ready) adj3 (practise or purpose or
   employab*).).tw. (368)
25 (resilien* adj3 medical).tw. (15)
26 (effective* adj3 medical curriculum).tw. (3)
27 foundation train*.tw. (47)
28 medical education.tw. (24600)
29 professionalism.tw. (4154)
30 prescribing skill*1.tw. (52)
31 scientific knowledge.tw. (2965)
32 (fitness adj3 practise).tw. (84)
33 (fitness adj3 purpose).tw. (158)
34 (defin* adj3 practi*).tw. (2423)
35 (asses* adj3 prepar*).tw. (1945)
36 (toler* adj3 uncert*).tw. (172)
37 Leadership.tw. (18973)
38 Ethical manner.tw. (52)
39 Clinical analysis.tw. (5065)
40 Clinical* effective*.tw. (9576)
41 Communicate effectively.tw. (398)
42 "Communication"/ (26490)
43 Communicate appropriately.tw. (5)
44 Clinical responsibil*.tw. (267)
45 (Adapt adj3 chang*).tw. (1757)
46 Patient safety.tw. (12343)
47 *Patient Safety/ (2456)
48 Clinical judgement.tw. (1261)
49 Patient care.tw. (35541)
50 *Quality Assurance, Health Care/ (27790)
51 Quality assurance.tw. (17239)
52 (CPD or Continuing professional development).tw. (3838)
53 (Inadequate adj3 (supervision or train* or support or preparedness)).tw. (1597)
54 ((Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (18433)
55 clinical performance.tw. (4921)
56 (Situation adj3 uncertainty).tw. (54)
57 (Emergency adj3 judgement).tw. (9)
58 Safe prescribing.tw. (105)
59 Reflection.tw. (27461)
60 "Feedback"/ (26406)
61 (Work adj3 autonomously).tw. (19)
62 (Assistantship or Mentoring).tw. (3153)
63 psychology knowledge.mp. (4)
64 Psychology/ (20375)
65 or/10-64 (691572)
66 exp Great Britain/ (300335)
67 exp Scotland/ (21051)
68 exp Northern Ireland/ (3890)
69 exp Wales/ (11889)
70 (Great Britain or Britain or England or Scotland or Wales or Ireland or UK or United Kingdom or welsh or english or scottish or irish).tw. (236538)
71 or/66-70 (454501)
72 9 and 65 and 71 (1520)
73 limit 72 to yr="2013 -Current" (98)

Database: Ovid MEDLINE In progress
Search Strategy: 06.05.2014 LJG

1 Junior doctor*1.mp. (169)
2 pre-registration house officer.tw. (1)
3 (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (2958)
4 (PRHO* or houseman* or house man* or house officer* or intern).tw. (181)
5 new* qualif* doctor*.tw. (11)
6 (SHO or senior house officer*).tw. (49)
7 (medic* adj3 graduat*).tw. (844)
8 "Internship and Residency"/ (1)
9 or/1-8 (49)
10 exp Professional Competence/ (4143)
11 exp Clinical Competence/ (0)
12 exp Self Efficacy/ (0)
13 (Confidence adj3 practice).tw. (0)
14 exp Professional Practice/ (29)
15 exp Resilience, Psychological/ (1)
16 exp coping behavior/ (0)
17 exp Competency-Based Education/ (1)
18 *"Education, Medical, Graduate"*/ (0)
19 *"Education, Medical"*/ (1)
20 "Education, Medical, Continuing"/ (0)
21 (prepar* adj3 practi*).tw. (238)
22 ((readiness or ready) adj3 practi*).tw. (25)
23 (transition* adj3 pract*).tw. (70)
24 ((Competence or prepare* or confidence or ready) adj3 (practise or purpose or employab*)).tw. (45)
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<td>9 and 65 and 71</td>
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Database: Ovid MEDLINE(R) without Revisions 1996 to April Week 4 2014

Search Strategy: 06.05.2014 LJG

1  Junior doctor*1.mp. (1257)
2  pre-registration house officer.tw. (44)
3  (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (18567)
4  (PRHO* or houseman* or house man* or house officer* or intern).tw. (1692)
5  new* qualif* doctor*.tw. (87)
6  (SHO or senior house officer*).tw. (750)
7  (medic* adj3 graduat*).tw. (4874)
8  "Internship and Residency"/ (21468)
9  or/1-8 (45403)
10  exp Professional Competence/ (67836)
11  exp Clinical Competence/ (52286)
12  exp Self Efficacy/ (206)
13  (Confidence adj3 practice).tw. (107159)
14  exp Professional Practice/ (1384)
15  exp Resilience, Psychological/ (64664)
16  exp coping behavior/ (2309)
17  exp Competency-Based Education/ (8759)
18  *"Education, Medical, Graduate"/ (13520)
19  *"Education, Medical"/ (12122)
20  "Education, Medical, Continuing"/ (1758)
21  (prepar* adj3 practi*).tw. (214)
22  ((readiness or ready) adj3 practi*).tw. (447)
23  (transition* adj3 pract*).tw. (291)
24  (((Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*).tw. (15)
25  (resilien* adj3 medical).tw. (3)
26  (effective* adj3 medical curriculum).tw. (46)
27  foundation train*.tw. (14611)
28  medical education.tw. (3303)
29  professionalism.tw. (48)
30  prescribing skill*1.tw. (2387)
31  scientific knowledge.tw. (82)
32  (fitness adj3 practise).tw. (147)
33  (fitness adj3 purpose).tw. (1898)
34  (defin* adj3 practi*).tw. (1381)
35  (asses* adj3 prepar*).tw. (133)
36  (toler* adj3 uncert*).tw. (14346)
37  Leadership.tw. (45)
38  Ethical manner.tw. (2888)
39  Clinical analysis.tw. (7088)
40  Clinical* effective*.tw. (313)
41  Communicate effectively.tw. (16021)
42  *"Communication"/ (3)
43  Communicate appropriately.tw. (162)
44  Clinical responsibil*.tw. (1462)
45  (Adapt adj3 chang*).tw. (11742)
46  Patient safety.tw. (2401)
47  *Patient Safety/ (845)
48  Clinical judgement.tw. (25210)
Database: PsycINFO 1806 to April Week 5 2014

Search Strategy:

1. Junior doctor*1.mp. (311)
2. pre-registration house officer.tw. (15)
3. (foundation doctor* or F1 or FY1 or F2 or FY2 or foundation year 1 or foundation year one or foundation year 2 or foundation year two).tw. (2313)
4. (PRHO* or houseman* or house man* or house officer* or intern).tw. (1151)
5. new* qualif* doctor*.tw. (25)
6. (SHO or senior house officer*).tw. (159)
7. (medic* adj3 graduat*).tw. (1692)
8. "Internship and Residency"/ (0)
9. or/1-8 (5442)
10. exp Professional Competence/ (4655)
11. exp Clinical Competence/ (0)
12. exp Self Efficacy/ (14655)
13. (Confidence adj3 practice).tw. (165)
14. exp Professional Practice/ (0)
15. exp Resilience, Psychological/ (6649)
16. exp coping behavior/ (37294)
17. exp Competence based learning/ (0)
18. "Education, Medical, Graduate"/ (0)
19. "Education, Medical"/ (0)
20. "Education, Medical, Continuing"/ (0)
21. (prepar* adj3 practi*).tw. (1380)
22. ((readiness or ready) adj3 practi*).tw. (203)
23 (transition* adj3 pract*).tw. (555)
24 (Competence or prepare* or confiden* or ready) adj3 (practise or purpose or employab*).tw. (194)
25 (resilien* adj3 medical).tw. (16)
26 (effective* adj3 medical curriculum).tw. (3)
27 foundation train*.tw. (23)
28 medical education.tw. (6965)
29 professionalism.tw. (3093)
30 prescribing skill*.tw. (7)
31 scientific knowledge.tw. (2791)
32 (fitness adj3 practise).tw. (23)
33 (fitness adj3 purpose).tw. (54)
34 (defin* adj3 practi*).tw. (1631)
35 (asses* adj3 prepar*).tw. (568)
36 (toler* adj3 uncert*).tw. (223)
37 Leadership.tw. (40701)
38 Ethical manner.tw. (79)
39 Clinical analysis.tw. (465)
40 Clinical* effective*.tw. (1517)
41 Communicate effectively.tw. (410)
42 "Communication"/ (12660)
43 Communicate appropriately.tw. (10)
44 Clinical responsibil*.tw. (129)
45 (Adapt adj3 chang*).tw. (851)
46 Patient safety.tw. (1613)
47 exp Patient Safety/ (0)
48 Clinical judgement.tw. (251)
49 Patient care.tw. (6574)
50 exp Quality assurance in health services/ (0)
51 Quality assurance.tw. (1830)
52 (CPD or Continuing professional development).tw. (982)
53 (Inadequate adj3 (supervision or train* or support or preparedness)).tw. (907)
54 (Inadequate or clinical) adj3 (supervision or train* or support or preparedness)).tw. (10407)
55 clinical performance.tw. (472)
56 (Situation adj3 uncertainty).tw. (80)
57 (Emergency adj3 judgement).tw. (0)
58 Safe prescribing.tw. (21)
59 Reflection.tw. (21411)
60 "Feedback"/ (12544)
61 (Work adj3 autonomously).tw. (14)
62 (Assistantship or Mentoring).tw. (6048)
63 psychology knowledge.mp. (84)
64 Psychology/ (26959)
65 or/10-64 (213638)
66 exp Great Britain/ (0)
67 exp Scotland/ (0)
68 exp Northern Ireland/ (0)
69 exp Wales/ (0)
70 (Great Britain or Britain or England or Scotland or Wales or UK or United Kingdom or welsh or english or scottish or irish).tw. (176578)
71 or/66-70 (176578)
72 9 and 65 and 71 (115)
73 limit 72 to yr="2013 -Current" (15)
SCOPUS SEARCH

203 RESULTS

1. “Junior doctor*” [ALL] 9390
2. “pre-registration house officer” [ABS, TITLE, KEYWORD] 177
3. “foundation doctor*” or “F1 W/3 doctor” or “FY1 W/3 doctor” or “FY2 W/3 doctor” or “foundation year 1” or “foundation year one” or “foundation year 2” or “foundation year two” [ABS, TITLE, KEYWORD] 134
4. (“PRHO*” or “houseman*” or “house man*” or “house officer*” or “intern”) [ABS, TITLE, KEYWORD] 2498
5. new* qualif* doctor* [ABS, TITLE, KEYWORD] 725
6. (“SHO” or “senior house officer*”) [ABS, TITLE, KEYWORD] 747
7. (medic* W/3 graduat*) [ABS, TITLE, KEYWORD] 31943
8. “Internship and Residency” [ALL] 33997
9. #1 OR #2 etc (can only search a certain amount of characters, need to add in fields) 68726
10. “Professional Competence” [ALL] 102101
11. “Clinical Competence” [ALL] 194097
12. “Self Efficacy” [ALL] 290294
13. (Confidence W/3 practice) [ABS, TITLE, KEYWORD] 1,577
15. “Resilience, Psychological” [ALL] 33991
16. “coping behaviour” [ALL] 183890
17. “Competency-Based Education” [ALL] 9369
18. *”Education, Medical, Graduate” [ALL] 21129
19. *”Education, Medical” [ALL] 161417
20. ”Education, Medical, Continuing” [ALL] 20434
21. (prepar* W/3 practi*) [ABS, TITLE, KEYWORD] 26739
22. (readiness or ready) W/3 practi*) [ABS, TITLE, KEYWORD] 3245
23. (transition* W/3 practi*) [ABS, TITLE, KEYWORD] 9748
24. ((Competence or prepare* or confident* or ready) W/3 (practise or purpose or employab*)) [ABS, TITLE, KEYWORD] 2947
25. (resilien* W/3 medical) [ABS, TITLE, KEYWORD] 369
26. (effective* W/3 medical curriculum) [ABS, TITLE, KEYWORD] 2241
27. “foundation train*” [ABS, TITLE, KEYWORD] 131572
29. professionalism [ABS, TITLE, KEYWORD] 12520
30. “prescribing skill*” [ABS, TITLE, KEYWORD] 796
31. “scientific knowledge” [ABS, TITLE, KEYWORD] 48823
32. (fitness W/3 practise) [ABS, TITLE, KEYWORD] 143
33. (fitness W/3 purpose) [ABS, TITLE, KEYWORD] 1,165
34. (defin* W/3 practi*) [ABS, TITLE, KEYWORD] 9281
35. (assess* W/3 prepar*) [ABS, TITLE, KEYWORD] 26414
36. (toler* W/3 uncert*) [ABS, TITLE, KEYWORD] 1460
37. Leadership [ABS, TITLE, KEYWORD] 97738
38. “Ethical manner” [ABS, TITLE, KEYWORD] 1715
40. “Clinical* effective*” [ABS, TITLE, KEYWORD] 668111
41. “Communicate effectively” [ABS, TITLE, KEYWORD] 3949
42. “Communication” [ALL] 1,229,380
43. “Communicate appropriately” [ABS, TITLE, KEYWORD] 323
44. “Clinical responsibil*” [ABS, TITLE, KEYWORD] 21895
45. (Adapt W/3 chang*) [ABS, TITLE, KEYWORD] 11189
46. “Patient safety” [ABS, TITLE, KEYWORD] 316241
47. “Patient Safety” [ALL] 890613
“Clinical judgement” [ABS, TITLE, KEYWORD] 92868
“Patient care” [ABS, TITLE, KEYWORD] 121629
“Quality assurance in health services” [ABS, TITLE, KEYWORD] 19320
“Quality assurance” [ABS, TITLE, KEYWORD] 130270
(CPD or “Continuing professional development”) [ABS, TITLE, KEYWORD] 8572
(Inadequate W/3 (supervision or train* or support or preparedness)) [ABS, TITLE, KEYWORD] 3495
((Inadequate or clinical) W/3 (supervision or train* or support or preparedness)) [ABS, TITLE, KEYWORD] 47728
“clinical performance” [ABS, TITLE, KEYWORD] 276579
(Situation W/3 uncertainty) [ABS, TITLE, KEYWORD] 116
“Safe prescribing” [ABS, TITLE, KEYWORD] 1596
Reflection [ABS, TITLE, KEYWORD] 360327
"Feedback" [ALL] 798956
(Work W/3 autonomously) [ABS, TITLE, KEYWORD] 245
(Assistantship or Mentoring) [ABS, TITLE, KEYWORD] 9604
“psychology knowledge” [ABS, TITLE, KEYWORD] 25111
Psychology [ALL] 1,781,286
#10-64 (Manually combine all) 8323125
“Great Britain” [ALL] 353864
Scotland [ALL] 198,883
“Northern Ireland” [ALL] 87318
“Wales” 440569
(“Great Britain “or Britain or England or Scotland or “Wales” or Ireland or UK or “United Kingdom” or welsh or english or scottish or irish) 122436
#66-70 (Manually combine all) 100070
9 and 65 and 71 306978
limit search result 72, to years 2013-2014, manually input all limitations/exclusions as per the protocol into the relevant boxes 188

Database: Web of Science

Search Strategy:

1. TS=(Junior doctor*) [762]
2. TS=(“pre-registration house officer”) [3]
3. TS=(“foundation doctor” OR (F1 NEAR/3 doctor) OR (FY1 NEAR/3 doctor) OR (F2 N/3 doctor) OR (FY2 N/3 doctor) OR “foundation year 1” OR “foundation year one” OR “foundation year 2” OR “foundation year two”) [91]
4. TS=((PRHO* OR “houseman*” OR “house man*” OR “ house officer*” OR intern)) [2022]
5. TS=(new* qualif* doctor*) [148]
6. TS=(SHO OR “senior house officer*”) [302]
7. TS=(medic* NEAR/3 graduat*) [2435]
8. TS=(“Internship and Residency”) [218]
9. #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1 [5506]
10. TS="Professional Competence" [3952]
11. TS="Clinical Competence" [3686]
12. TS="Self Efficacy" [20815]
13. TS= (Confidence NEAR/3 practice) [250]
14. TS="Professional Practice" [23504]
15. TS=(Resilience AND Psychological) [1082]
16. TS=(coping behavio$r) [5582]
17. TS="Competency-Based Education" [201]
18. TS="Education, Medical, Graduate" [27]
19. TS="Education, Medical" [241]
20. TS="Education, Medical, Continuing" [19]
21. TS=((prepar* NEAR/3 practi*) [1651]
22. TS=((readiness OR ready) NEAR/3 practi*) [252]
23. TS=(transition* NEAR/3 pract*) [675]
24. TS=((Competence OR prepare* OR confiden* OR ready) NEAR/3 (practise OR purpose OR employab*)) [1755]
25. TS=(resilien* NEAR/3 medical) [24]
26. TS= effective* N/3 "medical curriculum" [3]
27. TS="foundation train*" [51]
28. TS= "medical education" [22767]
29. TS= professionalism [3001]
30. TS= "prescribing skill*" [34]
31. TS= "scientific knowledge" [2910]
32. TS= (fitness NEAR/3 practice) [134]
33. TS= (fitness NEAR/3 purpose) [240]
34. TS= (defin* NEAR/3 practi*) [2020]
35. TS= (asses* NEAR/3 prepar*) [1234]
36. TS= (toler* NEAR/3 uncert*) [343]
37. TS= "Leadership" [19282]
38. TS= "Ethical manner" [37]
39. TS= "Clinical analysis" [1117]
40. TS= "Clinical* effective*" [3166]
41. TS= "Communicate effectively" [229]
42. TS= "Communication" [164602]
43. TS= (Communicate AND appropriately) [166]
44. TS= "Clinical responsibil*" [86]
45. TS= (Adapt NEAR/3 chang*) [4731]
46. TS= "Patient safety" [8225]
47. TS= "Patient Safety" [8236]
48. TS= "Clinical judgement" [253]
49. TS= "Patient care" [10395]
50. TS= "Quality Assurance" AND "Health Care") [511]
51. TS= "Quality assurance" [8436]
52. TS= (CPD OR "Continuing professional development") [1951]
53. TS= [(Inadequate NEAR/3 (supervision OR train* OR support OR preparedness)]) [820]
54. TS= ((Inadequate OR clinical) NEAR/3 (supervision OR train* OR support OR preparedness)) [11630]
55. TS= "clinical performance" [1969]
56. TS= (Situation NEAR/3 uncertainty) [347]
57. TS= (Emergency NEAR/3 judgement) [20]
58. TS= "Safe prescribing" [53]
59. TS= "Reflection" [52410]
60. TS="Feedback" [92069]
61. TS= (Work NEAR/3 autonomously) [98]
62. TS=(Assistantship OR Mentoring) [4934]
63. TS= "psychology knowledge" [12]
64. TS= Psychology [27007]
65. #64 OR #63 OR #62 OR #61 OR #60 OR #59 OR #58 OR #57 OR #56 OR #55 OR #54 OR #53 OR #52 OR #51 OR #50 OR #49 OR #48 OR #47 OR #46 OR #45 OR #44 OR #43 OR #42 OR #41 OR #40 OR #39 OR #38 OR #37 OR #36 OR #35 OR #34 OR #33 OR #32 OR #31 OR #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 [458528]
66. TS= “Great Britain” [3843]
67. TS = Scotland [7635]
68. TS=“Northern Ireland” [2307]
69. TS=Wales [10767]
70. TS= ("Great Britain" OR Britain OR England OR Scotland OR Wales OR Ireland OR
    UK OR "United Kingdom" OR welsh OR english OR scottish OR irish) [217928]
71. #70 OR #69 OR #68 OR #67 OR #66 [127342]
72. 9 and 65 and 71 [25]

List of all Search Results including Additional Web Sites and Journals Searched
2009-2013

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**TOTAL 1797**

**GRAND TOTAL 3762**
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Online Supplement B: Quality assessment criteria

### Quality Indicator for QUANTITATIVE studies

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<td>Research question</td>
<td>Is the research question(s) or hypothesis clearly stated?</td>
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<tr>
<td>Study Participants</td>
<td>Is the participant group appropriate for the study being carried out (number, characteristics, selection, and homogeneity)? Were the participants from more than one location?</td>
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<tr>
<td>‘Data’ collection method</td>
<td>Are the methods used reliable and valid for the research question and context?</td>
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<tr>
<td>‘Data’ completeness of ‘data’</td>
<td>Have participants dropped out? Is this attrition rate less than 50%? For questionnaire based studies, is the response rate acceptable (60% or above) or has the response rate issue been addressed appropriately?</td>
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<tr>
<td>Control for confounding</td>
<td>Have multiple factors/variables been removed or accounted for where possible?</td>
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<tr>
<td>Analysis of results</td>
<td>Are the statistical methods appropriately used? If not, why not?</td>
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<tr>
<td>Conclusions</td>
<td>Is it clear that the data justify the conclusions drawn as reported in the abstract?</td>
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<td>Reproducibility</td>
<td>Could the study be repeated by other researchers?</td>
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<tr>
<td>Theoretical Perspective</td>
<td>What is the theory? Is it explicit?</td>
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<td>Study design</td>
<td>What is the design of the study? Is it explicit?</td>
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<td>Ethical issues</td>
<td>Were all relevant ethical issues addressed? If not, what wasn’t addressed?</td>
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### Quality Indicator for QUALITATIVE studies

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<td>Study design</td>
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<tr>
<td>Clear explanation of methods of data collection and analysis</td>
<td>Is there a clear account of the process of data collection and analysis? Is there sufficient data (quotations) to judge whether the authors’ interpretation is adequately supported? Alternatively, do the researchers rely too heavily on verbatim quotes with little of their own description of themes?</td>
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Fair dealing
Does the research design explicitly incorporate a range of different perspectives so one group is not presented as if it represents the whole truth about a situation.

Ethical issues
Were all relevant ethical issues addressed? If not, what wasn’t addressed?

Attention to negative cases
As well exploring alternative explanations for the data, have the authors discussed elements in the data that (apparently) contradict the ‘main trend’ of the phenomena under study.

Reflexivity
Have the authors reflected on their role(s) in the study? What is the relationship between the researcher and the participants?

Quality Indicator for MIXED METHODS studies
Use both sets of indices depending on the part of the study you are assessing – and also consider the issue of ‘Triangulation’ - are the results from either two or more different methods of data collection (for example, interviews and questionnaires) comparable? Did the researchers look for patterns of convergence to develop or corroborate their interpretation?
Online Supplement C: Full list of codes developed for data extraction

01. Conceptualising and measuring preparedness

01.01. Defining preparedness
01.01.01. Synonyms for preparedness
01.01.01.01. Transition to practice
01.01.01.02. Readiness to practice
01.01.01.03. Fitness of purpose
01.01.01.04. Fitness to practice
01.01.02. As an immediate skills-based competency concept
01.01.02.01. Practical skills
01.01.02.02. Diagnostic skills
01.01.02.03. Prescribing skills
01.01.02.04. Knowledge
01.01.03. As a personal development concept
01.01.03.01. Resilience
01.01.03.02. Uncertainty/Ambiguity
01.01.03.03. Interpersonal skills

01.02. Assessing preparedness
01.02.01. Self-reported measures of confidence via likert scales (survey/questionnaire)
01.02.02. Medical Graduates qualitative interviews
01.02.03. Supervisor-reported measures of confidence via likert scales (survey/questionnaire)
01.02.04. Supervisor qualitative interviews
01.02.06. Patient qualitative interviews
01.02.11. Observation
01.02.15. Assessment
01.02.19. Repertory grid technique
01.02.20. Policy Makers Qualitative Interviews
01.02.21. Health Service Staff Qualitative Interviews
01.02.22. Desk-Based Research

02. What is the effectiveness of formal Y5 to F1 transition interventions?
02.01. Induction
02.02. Shadowing
02.03. Assistantship
02.04. Mentoring
02.04.03. Data is unclear regarding mentoring
02.05. Simulation
02.06. GMC registration
02.07. Training

03. To what extent individual graduates prepared for specific task/skill or knowledge based capabilities?

03.01. Practical Skills
03.01.01. Perform a full physical examination
03.01.02. Perform a mental-state examination
03.01.03. Carry out practical procedures safely and effectively
03.01.04. Take and record a patient’s medical history, including family and social history
03.01.05. Elicit patients’ questions, their understanding of their condition and treatment options, and their views, concerns, values and preferences
03.01.06. Assess a patient’s capacity to make a particular decision in accordance with legal requirements and the GMC’s guidance
03.01.07. Provide explanation, advice, reassurance and support to patient
03.01.08. Contribute to the care of patients and their families at the end of life
03.01.09. Diagnose and manage clinical presentations
03.01.10. Interpret findings from the history, physical examination and mental-state examination
03.01.11. Clinical judgements and decisions
03.01.12. Able to write appropriate certificates
03.01.13. Perform general activities
03.01.14. Perform clinical activities

03.02. Prescribing Skills
03.02.01. Understand prescribing procedures
03.02.02. Prescribe drugs safely, effectively and economically
03.02.03. Establish an accurate drug history, covering both prescribed and other medication
03.02.04. Provide a safe and legal prescription
03.02.05. Calculate appropriate drug doses and record the outcome accurately
03.02.06. Provide patients with appropriate information about their medicines
03.02.07. Access reliable information about medicines
03.02.08. Detect and report adverse drug reactions
03.02.09. Demonstrate awareness of complementary and alternative therapies
03.02.10. Demonstrate knowledge of drug actions
03.02.11. Plan appropriate drug therapy for common indications
03.02.12. Plan appropriate drug therapy for common indications

03.03. Knowledge

03.03.01. Psychology
03.03.01.01. Understand psychological concepts of health, illness and disease
03.03.01.02. Understand patients with dependence issues and other demonstrations of self-harm
03.03.01.03. Understand adaptation to major life changes
03.03.01.04. Understand psychological aspects of behavioural change and treatment compliance
03.03.01.05. Understand psychological factors that contribute to illness, the course of the disease and the success of treatment
03.03.01.06. Apply psychological theoretical frameworks to individuals, groups and societies to disease

03.03.02. Sociology
03.03.02.01. Understand normal human behaviour at a societal level
03.03.02.02. Apply social science principles, method and knowledge to medical practice
03.03.02.03. Understand sociological concepts of health, illness and disease
03.03.02.04. Apply sociological theoretical frameworks to individuals, groups and societies to disease
03.03.02.05. Understand sociological factors that contribute to illness
03.03.02.06. Understand sociological aspects of behavioural change and treatment compliance

03.03.03. Scientific Knowledge
03.03.03.01. Understand the adequacy of scientific knowledge
03.03.03.02. Understand normal human structure and functions
03.03.03.03. Understand the scientific bases for common disease presentations
03.03.03.04. Justify the selection of appropriate investigations for common clinical cases
03.03.03.05. Understand the fundamental principles underlying such investigative techniques
03.03.03.06. Select appropriate forms of management for common diseases
03.03.03.07. Make accurate observations of clinical phenomena and appropriate critical analysis of clinical data
03.03.03.08. Understand normal human behaviour at an individual level
03.03.03.09. Understand the role of nutrition in health
03.03.03.10. Have adequate knowledge of statistics
03.03.03.11. Apply scientific method and approaches to medical research
03.03.03.12. Critically appraise the results of relevant research
03.03.03.13. Formulate simple relevant research questions and study design
03.03.03.14. Apply findings from the literature to answer questions raised by specific clinical problems
03.03.03.15. Understand ethical/governance issues involved in medical research
03.03.04. Epidemiology and health provision knowledge
03.03.04.01. Apply to medical practice the principles, method and knowledge of population health and the improvement of health and healthcare.
03.03.04.02. Understand basic principles of health improvement
03.03.04.03. Understand how health behaviours and outcomes are affected by the diversity of patient populations
03.03.04.04. Understand measurement methods relevant to the improvement of clinical effectiveness and care
03.03.04.05. Understand the principles underlying the development of health and health service policy
03.03.04.06. Apply basic principles of communicable disease control in hospital and community settings
03.03.04.07. Apply epidemiological data in managing healthcare for the individual and the community
03.03.04.08. Recognise the role of environmental and occupational hazards in ill-health and discuss ways to mitigate their effects
03.03.04.09. Understand principles and application of primary, secondary and tertiary prevention of disease
03.03.04.10. Understand a global perspective of health determinants
03.03.05. Knowledge of Acute/Emergency care
03.03.05.01. Provide immediate care in medical emergencies.
03.03.05.02. Assess and recognise the severity of a clinical presentation and a need for immediate emergency care.
03.03.05.03. Diagnose and manage acute medical emergencies.
03.03.05.04. Provide basic first aid.
03.03.05.05. Provide immediate life support.
03.03.05.06. Provide cardio-pulmonary resuscitation or direct other team members to carry out resuscitation.
03.03.05.07. Emergency judgement
03.03.06. Governance Knowledge
03.03.06.01. Use information effectively in a medical context.
03.03.06.02. Keep accurate, legible and complete clinical records.
03.03.06.03. Make effective use of computers
03.03.06.04. Maintain confidentiality
03.03.06.05. Access information sources
03.03.06.06. Apply the principles, method and knowledge of health informatics to medical practice.
03.03.07. Safeguarding skills
03.03.07.01. Identify the signs of abuse
03.03.08. Knowledge of ethics
03.03.08.01. Act according to ethical and legal principles
03.03.08.02. Understand and adhere to the GMC's ethical guidance and standards
03.03.08.03. Demonstrate clinical responsibility
03.03.08.04. Act in accordance to the ethical duties of a doctor
03.03.09. Medico-Legal knowledge
03.03.09.01. Understand and accept the legal, moral and ethical responsibilities
03.03.09.02. Demonstrate knowledge of laws, and systems of professional regulation
03.03.09.03. Understand the framework, in which medicine is practiced in the UK
03.03.10. Prepared to provide palliative/end of life care
03.03.11. Knowledge and experience of the ward
03.03.11.01. Understands ward logistics such as where special equipment (catheters etc) or forms are
03.03.11.02. Understands how the clinical environment works
03.03.11.03. Trainees are prepared to work on call and during Hospital at night

04. To what extent individual graduates prepared for interactional/interpersonal capabilities?

04.01. Communication and team work
04.01.01. Communication with clinicians
04.01.02. Communication interprofessional
04.01.03. Handover
04.01.04. Discharge
04.01.05. Learn and work effectively within a multi-professional team
04.01.06. Understand and respect the roles and expertise of health and social care professionals
04.01.07. Understand the beneficial effect of working in interdisciplin ary team working
04.01.08. Work with colleagues to put patients first
04.01.09. Build positive working relationships
04.01.10. Understand the role of doctors as managers
04.01.11. Involve patients in their care
04.01.12. Involve patient's carers/families with care
04.01.13. Attitude, Respect, Equality
04.01.13.01. Preserve patient dignity and act with integrity
04.01.13.02. Act with respect
04.01.13.03. Acknowledge equality and diversity

04.02. Communication with patients/relatives
04.02.01. Effective communication across patient diversity
04.02.02. Effective communication across language barriers
04.02.03. Effective communication across a range of media
04.02.04. Effective communication about topics
04.02.05. Effective communication in difficult circumstances
04.02.06. Effective communication in various roles
04.02.07. Effective communication around patient-involvement in decision-making
04.02.08. Formulate a plan of investigation, treatment, management in partnership
04.02.09. Obtain informed consent

04.03. Continuing Professional Development
04.03.01. Acquire new knowledge
04.03.02. Lifelong learning
04.03.03. Reflect
04.03.04. Appraisal
04.03.05. Teaching and Leadership
04.03.05.01. Reflect, learn and teach others
04.03.05.02. Function effectively as a mentor and teacher
04.03.06. Limitations
04.03.06.01. Recognise own personal and professional limits
04.03.06.02. Recognise own personal health needs
04.03.07. Time Management
04.03.07.01. Prioritise
04.03.07.02. Work-Life Balance
04.03.07.03. European Working Time Directive Knowledge
04.03.07.04. Manage time and prioritise tasks
04.03.07.05. Recognise the duty to take action if a colleague’s health, performance or conduct is putting patients at risk.

04.04. Clinical Supervision

05. To what extent individual graduates prepared for cultural, systemic and technological based capabilities?

05.01. Protect patients and improve care.

05.02. Place patients’ needs and safety at the centre of the care process.

05.03. Health and Safety
- 05.03.01. Promote, monitor and maintain health and safety in the clinical setting
- 05.03.02. Understanding how errors can happen in practice
- 05.03.03. Understand risk management and prevention
- 05.03.04. Understanding responsibilities within the current systems for raising concerns about safety and quality.
- 05.03.05. Understand and have experience of the principles and methods of improvement
- 05.03.06. Understand infection control

06. To what extent are individual graduates prepared for practice on a personal level?

06.01. Resilience

06.02. Uncertainty/Ambiguity
- 06.02.01. Deal effectively with uncertainty and change
- 06.02.02. Tolerance of uncertainty
- 06.02.03. Adaptation to change
- 06.02.04. Situation uncertainty

06.03. Coping behaviour

06.04. Responsibility

06.05. Support seeking behaviour
07. Do demographic factors contribute to variations in preparedness?

07.01. Age

07.02. Ethnicity

07.03. Gender

07.04. English second language

07.05. Undergraduate training location

07.06. Disability

07.07. Personality

07.08. Degree status

07.09. PBL course

07.10. Traditional course
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<tbody>
<tr>
<td>TITLE</td>
<td></td>
<td>CLAIRON THE REPORT AS A SYSTEMATIC REVIEW, META-ANALYSIS, OR BOTH.</td>
<td>7</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td></td>
<td>PROVIDE A STRUCTURED SUMMARY INCLUDING, AS APPLICABLE: BACKGROUND, OBJECTIVES, DATA SOURCES, STUDY ELIGIBILITY CRITERIA, PARTICIPANTS, AND INTERVENTIONS; STUDY APPRAISAL AND SYNTHESIS METHODS; RESULTS; LIMITATIONS; CONCLUSIONS AND IMPLICATIONS OF KEY FINDINGS; SYSTEMATIC REVIEW REGISTRATION NUMBER.</td>
<td>3</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td></td>
<td>DESCRIBE THE RATIONALE FOR THE REVIEW IN THE CONTEXT OF WHAT IS ALREADY KNOWN.</td>
<td>5-6</td>
</tr>
<tr>
<td>METHODS</td>
<td></td>
<td>PROVIDE AN EXPLICIT STATEMENT OF QUESTIONS BEING ADDRESSED WITH REFERENCE TO PARTICIPANTS, INTERVENTIONS, COMPARISONS, OUTCOMES, AND STUDY DESIGN (PICOS).</td>
<td>8</td>
</tr>
<tr>
<td>Protocol and registration</td>
<td></td>
<td>INDICATE IF A REVIEW PROTOCOL EXISTS, IF AND WHERE IT CAN BE ACCESSED (E.G., WEB ADDRESS), AND, IF AVAILABLE, PROVIDE REGISTRATION INFORMATION INCLUDING REGISTRATION NUMBER.</td>
<td>3, 7</td>
</tr>
<tr>
<td>Eligibility criteria</td>
<td></td>
<td>SPECIFY STUDY CHARACTERISTICS (E.G., PICOS, LENGTH OF FOLLOW-UP) AND REPORT CHARACTERISTICS (E.G., YEARS CONSIDERED, LANGUAGE, PUBLICATION STATUS) USED AS CRITERIA FOR ELIGIBILITY, GIVING RATIONALE.</td>
<td>7</td>
</tr>
<tr>
<td>Information sources</td>
<td></td>
<td>DESCRIBE ALL INFORMATION SOURCES (E.G., DATABASES WITH DATES OF COVERAGE, CONTACT WITH STUDY AUTHORS TO IDENTIFY ADDITIONAL STUDIES) IN THE SEARCH AND DATE LAST SEARCHED.</td>
<td>7-8</td>
</tr>
<tr>
<td>Search</td>
<td></td>
<td>PRESENT FULL ELECTRONIC SEARCH STRATEGY FOR AT LEAST ONE DATABASE, INCLUDING ANY LIMITS USED, SUCH THAT IT COULD BE REPEATED.</td>
<td>Supplement A</td>
</tr>
<tr>
<td>Study selection</td>
<td></td>
<td>STATE THE PROCESS FOR SELECTING STUDIES (I.E., SCREENING, ELIGIBILITY, INCLUDED IN SYSTEMATIC REVIEW, AND, IF APPLICABLE, INCLUDED IN THE META-ANALYSIS).</td>
<td>8, Supplement B</td>
</tr>
<tr>
<td>Data collection process</td>
<td></td>
<td>DESCRIBE METHOD OF DATA EXTRACTION FROM REPORTS (E.G., PILOTED FORMS, INDEPENDENTLY, IN DUPLICATE) AND ANY PROCESSES FOR OBTAINING AND CONFIRMING DATA FROM INVESTIGATORS.</td>
<td>8-10</td>
</tr>
<tr>
<td>Data items</td>
<td></td>
<td>LIST AND DEFINE ALL VARIABLES FOR WHICH DATA WERE SOUGHT (E.G., PICOS, FUNDING SOURCES) AND ANY ASSUMPTIONS AND SIMPLIFICATIONS MADE.</td>
<td>8</td>
</tr>
<tr>
<td>Risk of bias in individual studies</td>
<td></td>
<td>DESCRIBE METHODS USED FOR ASSESSING RISK OF BIAS OF INDIVIDUAL STUDIES (INCLUDING SPECIFICATION OF WHETHER THIS WAS DONE AT THE STUDY OR OUTCOME LEVEL), AND HOW THIS INFORMATION IS TO BE USED IN ANY DATA SYNTHESIS.</td>
<td>9-10; Supplement B-C</td>
</tr>
<tr>
<td>Summary measures</td>
<td></td>
<td>STATE THE PRINCIPAL SUMMARY MEASURES (E.G., RISK RATIO, DIFFERENCE IN MEANS).</td>
<td>N/A</td>
</tr>
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**PRISMA 2009 Checklist**

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<tr>
<td>Synthesis of results</td>
<td>14</td>
<td>Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I²) for each meta-analysis.</td>
<td>9</td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>15</td>
<td>Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).</td>
<td>9-11</td>
</tr>
<tr>
<td>Additional analyses</td>
<td>16</td>
<td>Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.</td>
<td>N/A</td>
</tr>
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</table>

**RESULTS**

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<tr>
<td>Study selection</td>
<td>17</td>
<td>Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.</td>
<td>Tables 1-2</td>
</tr>
<tr>
<td>Study characteristics</td>
<td>18</td>
<td>For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.</td>
<td>11-17; Tables 1-2</td>
</tr>
<tr>
<td>Risk of bias within studies</td>
<td>19</td>
<td>Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).</td>
<td>11-17</td>
</tr>
<tr>
<td>Results of individual studies</td>
<td>20</td>
<td>For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.</td>
<td>N/A</td>
</tr>
<tr>
<td>Synthesis of results</td>
<td>21</td>
<td>Present results of each meta-analysis done, including confidence intervals and measures of consistency.</td>
<td>11-17</td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>22</td>
<td>Present results of any assessment of risk of bias across studies (see Item 15).</td>
<td>N/A</td>
</tr>
<tr>
<td>Additional analysis</td>
<td>23</td>
<td>Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**DISCUSSION**

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<tr>
<td>Summary of evidence</td>
<td>24</td>
<td>Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).</td>
<td>17</td>
</tr>
<tr>
<td>Limitations</td>
<td>25</td>
<td>Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).</td>
<td>20-21</td>
</tr>
<tr>
<td>Conclusions</td>
<td>26</td>
<td>Provide a general interpretation of the results in the context of other evidence, and implications for future research.</td>
<td>21-22</td>
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**FUNDING**

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<tr>
<td>Funding</td>
<td>27</td>
<td>Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.</td>
<td>22</td>
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PRISMA 2009 Checklist


For more information, visit: www.prisma-statement.org.

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How prepared are UK medical graduates for practice? A rapid review of the literature 2009–2014

Lynn V Monrouxe, Lisa Grundy, Mala Mann, Zoe John, Eleni Panagoulas, Alison Bullock and Karen Mattick

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