

**REVIEW**

# Transitioning from university to postgraduate medical training: A narrative review of work readiness of medical graduates

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**Abstract**

**Context:** Work readiness is often described in terms of the clinical competence medical graduates bring to day 1 of internship. Despite being increasingly viewed as a key graduate outcome, work readiness has remained poorly defined.

**Objective:** This narrative review draws on the international literature to explore how different research methods provide differing insight into what constitutes work readiness of medical graduates. From this, we explored contributory factors and developed a conceptual framework to better understand work readiness.

**Methods:** Databases were searched using the terms including “ready,” “readiness,” “preparedness,” “medical graduates,” “intern,” and “junior doctor.” Information was summarized using a textual description template that included information on study setting, participants, methodologies, limitations, and key result areas (including measures/themes and study conclusions). Consensus discussions between authors led to the naming and understanding of the key themes.

**Results:** Seventy studies were included in the review. Study participants included final-year medical students (n = 20), junior doctors early in internship (n = 24), and junior doctors late in internship or postgraduate year 2 and above (n = 23). Most studies explored work readiness through the retrospective self-report of the students and/or junior doctor participants. Quantitative research methods elaborated on key skills-based competencies, whereas qualitative research methods provided insight into key contextual and individual characteristics that contributed to preparedness.

**Conclusions:** Different research methods provided insight into competencies, as well as individual and contextual aspects, associated with preparedness for practice. The transition from university to clinical practice is significant and requires personal capability and confidence, as well as a supportive training context. Enabling students to engage authentically in clinical environments enhanced preparedness by promoting understanding of role and responsibility. Individual resilience is important, but contextual factors, including provision of adequate support and feedback, can enhance or subtract from feeling prepared. We propose a novel conceptual framework for better understanding work readiness.

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## KEYWORDS

education, readiness, graduate, intern

## 1 | INTRODUCTION

Preparing medical graduates for the demands of work as a junior doctor remains a shared goal of education providers and healthcare employers.<sup>1</sup> The transition from a student to junior doctor is recognized as a stressful time where many young doctors experience “transition shock,” conceal their struggles, and cope rather than thrive.<sup>2,3</sup> While most Australian graduates reported feeling prepared for clinical practice, a significant proportion felt unprepared, and the views of training supervisors were mixed.<sup>1,4</sup> Similar findings have been echoed in medical graduate surveys internationally. Work readiness for internship was identified as a priority area in the recent Australian National Health Workforce Strategy.<sup>1</sup> A stakeholder forum in 2016 defined work readiness as the skills and competencies required to contribute to “safe and effective patient care under supervision on day 1 of internship”<sup>4</sup>; however, a shared understanding of what constitutes work readiness is lacking.

Our primary aim was to explore how work readiness has been studied and conceptualized in the contemporary medical education literature. Readiness has also been termed “preparedness for practice,” and the two descriptions have been used interchangeably in the literature. To this end, we incorporated both in our search terms, and we will refer to either or both as interchangeable concepts. Our secondary aim was to define key themes and to provide a novel conceptual framework for understanding work readiness. Our findings provide insight into teaching approaches that could enhance preparedness in graduates as they transition from student to junior doctor.

## 2 | METHODS

### 2.1 | Data sources and search strategy

Database searches were performed (PubMed and Ovid Medline, December 2018) using the search terms (readiness OR ready OR preparedness) AND (“medical graduates” OR “intern” OR “junior doctor”). Articles were excluded if they were published before 1998, in languages other than English or not relevant. Any type of study was included (original studies, reviews, commentaries, or opinion pieces).

### 2.2 | Inclusion and exclusion criteria

Articles were included if participants were final-year medical students or junior doctors and/or included other relevant groups involved in junior doctor supervision (eg, clinical supervisors). Articles were excluded if participants were exclusively postgraduates enrolled in specialty training programs, international medical graduates joining the workforce, or if the content was irrelevant or too specific (eg, only examined skills in lumbar

puncture or laparoscopy). Further exclusions were made for studies with very small sample sizes, not meeting inclusion criteria (*post-hoc*) or poor methodological descriptions. Reviews, commentaries, and opinion pieces were included if they related directly to the general work readiness of interns.

### 2.3 | Data management

Our initial search found 132 papers. Eight additional articles were identified from manual searching of reference lists of articles included after full text review. An updated search was performed in December 2019 that identified a further four articles. In all, 70 articles were identified for inclusion in this review. Articles were summarized using a textual description template that included information on study setting, participants, methodologies, limitations, and key result areas (including measures/themes and study conclusions).

### 2.4 | Data synthesis

Descriptive data from the included articles were summarized in tables by two team members (JP and SB). All authors identified key words and recurring themes, which were compiled into a single list. This list was revised using mind-mapping and consensus discussions to consolidate key themes. Themes were derived from shared and important findings that emerged from across numerous studies involving different methodologies. Themes incorporated competencies and skills-based outcomes as well as qualitative views of preparedness factors, including clinical placements, supervision, confidence, and responsibility, among others. We aimed to identify shared themes while acknowledging that they reflect both an analytical interpretation of the data and a narrative view of the general discourse of the literature. Consensus discussions were undertaken by all authors and further refined in subsequent team meetings. All authors are involved in medical education and postgraduate training, and three authors are involved in rural education and training, and hence this can lead to subconscious bias in thematic analysis and interpretation of data.

## 3 | RESULTS

### 3.1 | Descriptive summary

Of the 70 included studies, 33 used a qualitative methodology, 10 used qualitative methods, and 17 were mixed methods. There were a further 10 studies including literature reviews, commentaries, and editorials (Table 1). Study participants included final-year medical

**TABLE 1** Study design and participants in papers included in the review of literature 1998 – 2019

	Quantitative Methods	Qualitative Methods	Mixed Methods
<b>Original research - Snapshot</b>			
<b>Medical student</b>	Bojanic <sup>6</sup> Burns <sup>7</sup> Coombes <sup>8</sup> Costello <sup>10</sup> Dare <sup>9,11</sup> Dyar <sup>12</sup> McKenzie 2017 <sup>15</sup> Minha <sup>16</sup> Morrow <sup>17</sup> Rothwell <sup>18</sup> Scicluna <sup>19</sup> Stroben <sup>21</sup> Wijnen-Meijer 2015 <sup>23</sup>	Daly <sup>25</sup> Iling 2013 <sup>14</sup>	Iling 2008 <sup>13</sup> Lightmann <sup>20</sup> Tran <sup>24</sup> Watmough <sup>22</sup>
<b>Early internship</b>	Abuhusain <sup>26</sup> Bennett <sup>27</sup> Bleakley <sup>28</sup> Cave <sup>29</sup> Heidemann <sup>31</sup> Minha <sup>16</sup> Morrow <sup>17</sup> Prozesky <sup>42</sup> Scicluna <sup>19</sup> Watmough <sup>22</sup> Winn <sup>40</sup>	Eley <sup>2</sup> Iling 2013 <sup>14</sup> Lundin <sup>32</sup> Monrouxe 2018 <sup>35</sup> Muthaura <sup>36</sup> Sturman <sup>3</sup> Walker <sup>39</sup>	Gome <sup>30</sup> Iling 2008 <sup>13</sup> Kelly <sup>37</sup> Linane <sup>38</sup> McKenzie 2018 <sup>41</sup> Miles <sup>33</sup> Minter <sup>34</sup> Rothwell <sup>18</sup>
<b>Late or post internship</b>	Barr <sup>53</sup> Dean <sup>55</sup> Duns <sup>52</sup> Eley <sup>62</sup> Goldacre 2010 <sup>50</sup> Goldacre 2014 <sup>57</sup> Hill <sup>56</sup> Kassim <sup>49</sup> Lachish <sup>46</sup> Laven <sup>45</sup> Minha <sup>16</sup> Morcke <sup>48</sup> Ochsmann <sup>47</sup> Prozesky <sup>42</sup> Svirko <sup>44</sup> Watmough <sup>22</sup>	Eley <sup>2</sup> Marker <sup>54</sup> Iling 2013 <sup>14</sup> Monrouxe <sup>35</sup>	Linane <sup>38</sup> Morris <sup>51</sup> Tallentire 2011 <sup>43</sup> Tran <sup>24</sup>
<b>Third party participants</b>	Burns <sup>7</sup> Heidemann <sup>31</sup> Laven <sup>45</sup> Morrow <sup>17</sup> Prozesky <sup>42</sup> Scicluna <sup>19</sup> Tallentire <sup>43</sup> Watmough <sup>22</sup> Wijnen-Meijer <sup>60</sup>	Daly <sup>25</sup> Dean <sup>55</sup> De Villiers <sup>61</sup> Iling 2013 <sup>14</sup> Monrouxe <sup>35</sup> Muthaura <sup>36</sup> Walker <sup>39</sup>	Iling 2008 <sup>13</sup> Rothwell <sup>18</sup> Stewart <sup>59</sup> Woolley <sup>5</sup>
<b>Original research - Longitudinal follow-up</b>			
<b>Medical students</b>	Scicluna <sup>19</sup>	Iling 2013 <sup>14</sup>	Iling 2008 <sup>13</sup> Kelly <sup>37</sup> Rothwell <sup>18</sup> Watmough <sup>22</sup>
<b>Junior doctors</b>	Goldacre 2010 <sup>50</sup> Gome <sup>30</sup>		
<b>Other</b>			
<b>Literature review</b>	Alexander, <sup>63</sup> Brinkman, <sup>64</sup> Monrouxe 2017, <sup>65</sup> Tallentire 2012 <sup>66</sup>		
<b>Commentary/Editorial</b>	Cleland, <sup>67</sup> Dewan, <sup>68</sup> Murray, <sup>75</sup> Tweed, <sup>71</sup> Sen Gupta, <sup>58</sup> Wackett <sup>79</sup>		

students,<sup>6-25</sup> junior doctors early in their first postgraduate year,<sup>3,13,14,16-19,26-42</sup> junior doctors late in internship (>6 months) or in postgraduate year 2 or above<sup>2,14,16,22,24,35,38,42-57</sup> (Table 1). Twenty-one studies incorporated feedback or reports from clinical supervisors or training managers<sup>5,7,13,14,17-19,22,25,31,35,36,39,43,45,55,58-61</sup> (Table 1). Six studies followed up students longitudinally when they were part way into, or at the end of, their intern year<sup>13,14,18,19,22,37</sup> (Table 1). Two studies followed up doctors longitudinally; interns surveyed at week 1 and week 10 of a general medicine rotation<sup>30</sup> and house officers in the UK surveyed in PGY 1 and again in PGY 3<sup>50</sup> (Table 1).

Most studies explored work readiness through retrospective self-report from students and/or junior doctor participants. In around one-third of studies, other stakeholders' views were incorporated through interviews with clinical supervisors,<sup>13,14,18,25,35,36,61</sup> training managers<sup>18,35,39,55</sup> or other staff (eg, nurses, pharmacists),<sup>13,18,35</sup> or from supervisor surveys or reports.<sup>17,31,42,43,45,58-60</sup> One study examined a stand-alone assessment of work readiness (a multifaceted simulation scenario),<sup>23</sup> and another study analyzed results of a safe prescribing assessment.<sup>18</sup> Only two studies explored patient or carer perspectives of junior doctors.<sup>35,69</sup>

### 3.2 | Theme 1: Confidence

Studies which sought feedback from students and interns very early in their training described self-reported, anticipated preparedness for internship, which we will refer to as *confidence*. Interviews<sup>2</sup> and survey studies<sup>15,37</sup> linked graduate confidence with frequency of undergraduate exposure to intern tasks and practical experience. Most surveys sought responses to a generic question regarding overall preparedness for internship or confidence for specific intern tasks (eg, intravenous cannulation, electrocardiogram interpretation), generic clinical skills (eg, prescribing<sup>8</sup> or dealing with emergencies<sup>52</sup>), or non-technical skills (eg, communication with patients, team work).<sup>28,53</sup> In the UK and Europe, the proportion of participants who reported feeling adequately prepared for internship ranged between 30% and 80%.<sup>12,46,50</sup> Australian studies and intern surveys reported a majority of participants (70%-80%) felt at least adequately prepared,<sup>37,53,70</sup> but this varied depending on the task; for example, only 30% to 40% of participants felt prepared for dealing with emergencies.<sup>15,52</sup>

Several studies from Australia and NZ demonstrated benefits of integrated workplace attachments during medical school on development of confidence and self-efficacy; these included the NZ Trainee Intern year,<sup>11,71</sup> rural extended placements,<sup>25</sup> rural preinternships,<sup>58</sup> and rural clinical school experience.<sup>2,62</sup> An in-depth mixed methods study in the UK<sup>13,14</sup> indicated that authentic on-the-job learning for final-stage medical students was a key factor in developing work readiness. Some but not all studies reported an association between preparedness and younger age,<sup>47</sup> male gender<sup>50,53</sup> or Caucasian ethnicity.<sup>46</sup>

Around one-third of studies deliberately examined effects of interventions during the transition from student to junior doctor on self-reported preparedness. Transitional interventions associated with improved preparedness included clinical simulation of intern tasks (eg,

emergency ward calls),<sup>21,22,54,67</sup> small group workshops during clinical clerkships,<sup>10</sup> preinternship terms or education packages,<sup>15,19,20,41</sup> boot-camp style courses,<sup>7,16,34,59</sup> an integrated clinical orientation/team handover,<sup>40</sup> or a student mentor scheme.<sup>24</sup>

### 3.3 | Theme 2: Reflexivity

This theme describes the retrospective insights of interns regarding their preparedness following completion of the majority of internship. We argue that reflexivity represents the overlap between initial confidence and actual capability. Interns in Queensland reported a decline in self-confidence in part related to shift in role and doubt in own proficiency and described the transition from being "at the top of their game" [as students] to the "very, very bottom of the food chain" [as interns].<sup>3</sup> In survey data, a significant proportion of students and graduates reported feeling under-prepared to deal with errors or uncertainty.<sup>53</sup> While junior doctors might perceive themselves as being prepared, this was often for straightforward tasks and cases, but they were less well prepared for complex cases or communication.<sup>35</sup> The importance of being cautious was recognized by some graduates who reported that overconfidence might compromise patient safety.<sup>25,39</sup> Supervisor ratings for a sample on-call case found around 25% of interns in the study did not recognize the need to call for senior help.<sup>31</sup>

### 3.4 | Theme 3: Capability

Confidence is a self-perception of work readiness, whereas capability can be a measure of ability to perform. The view that graduates should enter the workplace only after they have acquired all the necessary skills was exemplified in interviews with organizational representatives from a regional hospital in Victoria.<sup>39</sup> In contrast, clinical supervisors placed emphasis on internship as a closely supervised teaching year where immediate competence was not expected and lack of feeling prepared was "much more an educational than a patient safety issue".<sup>57</sup> "Conscientiousness" and coping with workload were reported by supervisors to be important factors distinguishing capable interns in South African hospitals.<sup>61</sup>

Clinical supervisors in the UK reported that junior doctors did not have sufficient ward experience, but despite anxiety felt by graduates, they were generally well prepared for intern tasks, or if they were lacking, they "got up to speed" quickly.<sup>13</sup> An audit of workplace-based assessments in South Australia demonstrated that supervisors rated interns at or above "competent/well prepared," whereas graduates rated themselves more harshly.<sup>45</sup> In contrast, supervisor ratings of intern preparedness were lower compared to interns' self-ratings in Scotland<sup>43</sup> and Botswana.<sup>42</sup> Several sources reported a lack of graduate preparedness for prescribing<sup>8,15,18</sup>; however, only one study objectively measured prescribing competencies using a "safe prescribing" assessment.<sup>18</sup> Clinicians and patients perceived that junior doctors generally did not manage more complex communication tasks

well, such as considering psychosocial aspects of patient care or involving patients in decision-making.<sup>32,35</sup>

Significant differences in capability from different UK medical schools suggested potential curriculum effects on preparedness; however, results were inconsistent.<sup>46,50</sup> Graduates' self-report data were compared after classifying curricula as traditional vs nontraditional: no differences in overall self-rated preparedness were found between graduates of traditional vs nontraditional medical schools in the UK<sup>13</sup> or other parts of Europe.<sup>23</sup> Positive associations between curriculum factors and preparedness for nontechnical skills such as patient communication were reported; these included PBL<sup>29,33,45,55,56</sup> and patient-centered learning curricula<sup>13,14,28</sup> as well as shadowing and assistantship terms.<sup>20,29</sup> The benefits of short-term assistantships were noted to depend on structured educational frameworks and could be negatively impacted by low-quality informal learning.<sup>65,71</sup> Graduate vs undergraduate entry was not associated with preparedness outcomes.<sup>29,50,62</sup>

### 3.5 | Theme 4: Responsibility

Internship signifies a legal and practical transition in the level of individual responsibility. Responsibility for patient safety requires the deliberate or unconscious negotiation between an individual and the workplace context.<sup>2</sup> Training managers and supervisors recognized responsibility as a “massive shift” for junior doctors<sup>39,61</sup> and acknowledged benefits of integrated clinical experience prior to graduation.<sup>39,60,61</sup> In Australia, increased preparedness was reported by junior doctors who had undertaken a period of undergraduate training in rural clinical schools.<sup>2,62</sup> The authors suggest that this may reflect more authentic hands-on experience and greater opportunity for supervised clinical autonomy, with benefits derived in part from participation in clinical care and decision-making.<sup>2,25</sup> Other rural immersion learning models, including a rural student preinternship, were reported to have similar benefits.<sup>58</sup> In NZ, final-year students undertake paid trainee internships where they are part of healthcare teams and have limited clinical responsibilities; 92% of NZ trainee interns reported feeling well prepared for internship compared to 53% of penultimate-year students.<sup>9,11</sup> Similarly, in the UK benefits for preparedness were reported following introduction of shadowing and assistantships for final-year students.<sup>13,25,65,72</sup>

### 3.6 | Theme 5: Context

Whereas confidence and capability are linked with individual readiness (the nature), context refers to the clinical workplace (the nurture). Several factors were important for the transition to intern roles; these included consultant-level feedback,<sup>47,52</sup> small group teaching,<sup>30,52</sup> and feeling supported and enabled to call for help.<sup>3,29</sup> In contrast, hidden curriculum factors (eg, navigating roles and team hierarchy) posed significant challenges for junior doctors.<sup>3,35,39</sup> Free text responses in Australian internship surveys revealed concerns about being

unsupported, responding to bullying, dealing with errors, and managing work-life balance.<sup>37,70</sup>

### 3.7 | Theme 6: Resilience

The overlap between the workplace and confidence influences intern resilience to manage the emotional, physical, and social challenges of internship. When junior doctors faced crises or uncomfortable situations, negative emotional responses were commonly reported in audio diaries,<sup>35</sup> and others reported feeling unprepared and identified limited opportunities for debriefing.<sup>32</sup> UK multicenter studies including surveys and narrative interviews identified personal characteristics of graduates as important contributors to resilience in the workplace<sup>39,61</sup> and that maturity and personality styles influenced receptiveness to learning.<sup>13,14,25</sup> Graduates in an Australian study commented that “resilience *per se* cannot be taught” but developed through “real-life experiences”.<sup>39</sup>

## 4 | DISCUSSION

Work readiness has become a desirable graduate outcome although a clear definition has remained elusive. Our review examined the literature from the past two decades with the aim of answering two questions: (1) how has work readiness been studied? and (2) what is work readiness? Our findings indicate that work readiness has predominantly been viewed as an individual, self-reported attribute. Few studies examined ways to measure or assess work readiness as a discrete outcome prior to graduation, although general competencies, simulation performance, and entrustability were viewed as related concepts. Differing views of preparedness related to lived experience vs anticipation of internship, encapsulated by junior doctors' views of resilience as requiring “real-life experiences,”<sup>39</sup> and early internship as a time when their confidence declined.<sup>3</sup> Supervisor views were mixed but indicated that junior doctors were prepared to handle simple rather than complex clinical situations. In contrast, patient or consumer feedback on work readiness was rarely explored in the literature.

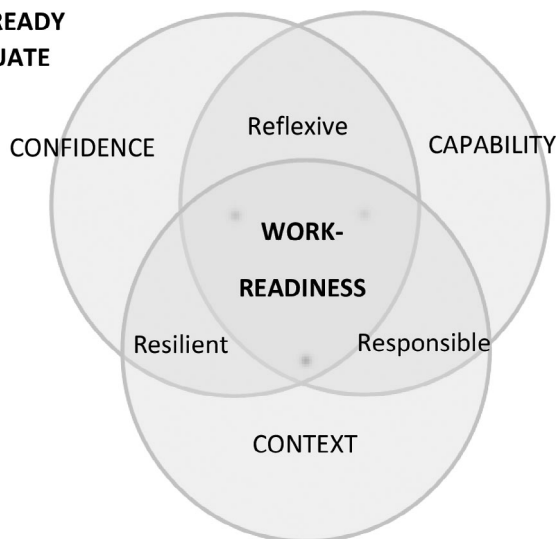
Our findings indicate that work readiness has several operating definitions that overlap. Work readiness can be a state of mind, that is, of being prepared to deal with the role/responsibilities, the actual lived experience of working in the role, and an empirical reality of graduate behavior (eg, calling for help, patient-centered care). To better appreciate the interplay of factors that contribute to work readiness, we explored important themes and teaching approaches. Three major themes were confidence, capability, and context, and three other themes were resilience, reflexivity, and responsibility. In essence, these key interacting factors describe how students adapt to the transition of work as a junior doctor and relate to how well both individual and training factors have prepared them—the nature and nurture. Our findings indicate that a holistic approach to student learning and a greater understanding of the pedagogy of transition will

help to improve graduate readiness for the complexities of work as a junior doctor.

Confidence and capability were two major themes. Preparedness can be viewed from the individual's perspective (ie, feeling ready, confidence) but also as a measure of competence (eg, supervisor ratings of preparedness). A third major theme was context, which encapsulates the potential impact that training environments (both clinical placements and the workplace) can have on individual preparedness. Positive and negative experiences involving supervision and feedback, or exposure (or lack of) to authentic clinical responsibility, or the hidden curriculum, can in turn enhance or subtract from preparedness. Three other themes were identified that we propose from a dynamic interplay within the individual; these were reflexivity (eg, clinical insight, calling for help), resilience (eg, adapting to the role, facing challenges), and responsibility (eg, capability to safely manage patient care). These factors may positively or negatively impact on graduate behavior and readiness in the clinical workplace, and hence explain why some might thrive whereas others may not. A conceptual model of how these factors may interact is illustrated in Figure 1.

Teaching and learning approaches may positively influence work readiness. The benefits of short-term shadowing or assistantship placements for work readiness were highlighted in a review of UK literature from 2009 to 2014.<sup>65,72</sup> Improved preparedness was associated with opportunities for informal learning and reflexivity.<sup>65,72</sup> Undergraduate clinical experience varies internationally, and this needs to be considered when generalizing findings. Our review of

## WORK READY GRADUATE



**FIGURE 1** Conceptual model of work readiness of medical graduates, represented as the overlap between three major contributors; individual confidence, capability, and contextual factors (e.g. education and training environment). Additional contributors include resilience, sense of responsibility and reflexivity (or adaptability) of medical graduates. Depending on the individual these factors can both enhance or subtract from preparedness for work as a doctor. Likewise the education and training environment can have a strong influence on development of individual traits or characteristics considered to be key outcomes for work readiness

Australian and international literature indicates that graduate preparedness was also enhanced through longer term integrated placements, such as the NZ Trainee intern year,<sup>11,71</sup> rural preinternship,<sup>58</sup> and rural extended placement program.<sup>25</sup> Integrated clinical placements are likely to favor experiential learning and authentic understanding of and practice in the role of a junior doctor. In addition, they are likely to provide realistic exposure to working in a clinical team and build confidence for multiprofessional teamwork.

Personal capabilities were an important theme in the studies and reflected both resilience and reflexivity, as well as support available. Interns reported an initial decline in self-confidence, difficulties dealing with higher stakes decision-making, and challenges navigating the hospital system and team hierarchy.<sup>2,3,39</sup> In addition, developing safe work practice was linked with being aware of limitations and was aided by accessible support structures.<sup>3,35,39</sup> Interns' ability to "safety net" their everyday work (through awareness of limitations, coping strategies, and adequate supervision) is likely to be important for readiness for the clinical workplace. Individual personality and learning style can influence clinical confidence. Ability to manage interpersonal conflict,<sup>39</sup> maturity and past life experiences,<sup>39</sup> and a proactive learning approach<sup>25</sup> is also likely to contribute to resilience in the workplace. Developing self-regulated learning strategies as an undergraduate may assist graduates to problem solve and adapt in the clinical environment.<sup>17</sup>

Multiple stakeholders were included in only a proportion of studies. Patients or carers were consulted in two studies. There was some disparity in expectations of employers and policy makers, who expected graduates to be work-ready on day 1 (eg, <sup>39</sup>), compared to views of supervisors and interns themselves where the focus was on education and support.<sup>3,50</sup> It was acknowledged that students and interns anticipate relatively straightforward situations and lacked some insight in complex clinical scenarios. Patients interviewed reported that junior doctors did not involve them in decision-making and lacked attention to psychosocial aspects of care.

The importance of clinical supervision to preparedness was highlighted in many studies. Interns and students valued feedback on performance, particularly from consultants.<sup>3,10,25,30,37,58</sup> Supervision and feedback are important particularly when faced with difficult circumstances, dying or distraught patients, areas highlighted by both interns and clinicians as challenging. Many of these situations are typical of after-hours work when interns are relatively isolated and supervision less readily available. A study of Australian medical students undertaking rural placements (not reviewed here) showed that self-rated competence was positively correlated with ratings of clinical supervision.<sup>73</sup> While continuity of supervision is important, so is quality. For example, interruptions to workforce and variable quality of supervision were reported to detract from potential success of rural placement programs.<sup>25</sup>

Graduates internationally reported being under-prepared to provide nutritional care and cultural competency,<sup>28,53</sup> which may reflect elements lacking in some traditional curricula. Our review included studies of newer curricula including rural clinical schools in Australia and socially accountable medical schools. Graduates of these schools<sup>25,74</sup> and their supervisors<sup>5</sup> reported improved work readiness for competencies related to addressing health inequities and



community needs. A recent editorial emphasized that, in Australia, work readiness should encompass providing culturally safe care for Aboriginal and Torres Strait Islanders.<sup>75</sup>

#### 4.1 | Limitations

It is acknowledged that most studies relied on students' and doctors' self-reported preparedness. Self-report is an important measure of graduate confidence but presents challenges for interpretation. The tools used to evaluate self-reported preparedness varied considerably, ranging from validated comprehensive surveys to unvalidated simple questionnaires. Nonresponder bias was a key consideration in most of the retrospective survey studies whose response rates varied. Self-report is also limited by definitions and understanding of preparedness among study participants. Being "prepared" has different meanings and may be closely linked to other aspects of professional identity. Many graduate outcome studies had the limitation of reporting the evaluation from a single educational institution making generalizability difficult to assess and introducing potential for publication bias.

#### 4.2 | Work readiness and transition to practice: need for a paradigm shift in teaching approaches?

Models of medical education have focused primarily on "assimilative learning," that is, accumulation of skills and knowledge. An alternative approach is to recognize that internship is a period of critically intensive learning where challenges provoke transformational experiences,<sup>76-78</sup> which in turn contribute to motivation and greater understanding of role. As described by O'Brien in a recent commentary on transition to residency, awareness of the pedagogy of transition should lead to constructive teaching approaches that encourage critical reflection and conversations about clinical judgments and alternatives.<sup>77</sup> Challenges, with the right support, can be viewed as necessary and positive elements of early internship, rather than focusing on a seamless transition on day 1. A novel, collaborative approach is also required to assist new interns to be prepared for other challenges, including dealing with bullying or clinical errors. Encouraging open dialogue and reflective practice could enhance social and development skills relevant to preparedness, as proposed for other key transition periods during undergraduate training.<sup>78</sup>

Our review of the literature provides support for reframing work readiness with a focus on the transition to clinical practice, recognizing the challenges for the individual, and providing the right supports. We suggest three fundamental pedagogical principles:

- Inculcate students as self-regulated and proactive learners who will readily adapt to new environments.
- Provide opportunities for graded responsibility as an undergraduate and promote self-reflection.
- Prepare students for challenges of internship through integrated (ideally longitudinal) clinical attachments that provide exposure to the "hidden curriculum."

## 5 | CONCLUSIONS

Our review provides a comprehensive analysis of the work readiness literature. Key themes were related to the individual as well as the education and training workplace. Work readiness can be viewed both as a state of mind and an empirical reality in graduate behavior that reflects individual skills, knowledge, and resilience (confidence and capability), which can in turn be fostered through mentorship, feedback, and support. Work readiness maximizes individuals' reflexivity and capacity to adapt to the clinical environment and to the roles and responsibilities of work as a junior doctor. Supervisors and stakeholders have a role to play through greater understanding of the pedagogy of transition. Workplaces and institutions should aim to create authentic learning opportunities for students to take on graded clinical responsibilities and for appropriate support structures to be in place for junior doctors struggling with the transition.

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No conflicts of interest exist for any authors.

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#### REFERENCES

1. Scoping Framework for the National Medical Workforce Strategy. Australian government, Department of Health; 2019 July 2019.
2. Eley DS. Postgraduates' perceptions of preparedness for work as a doctor and making future career decisions: support for rural, non-traditional medical schools. *Educ Health (Abingdon)*. 2010;23(2):374.

3. Sturman N, Tan Z, Turner J. "A steep learning curve": junior doctor perspectives on the transition from medical student to the health-care workplace. *BMC Med Educ.* 2017;17(1):92.
4. Health Workforce Principal Committee MDANZ. National Intern Work Readiness Forum - Summary of Proceedings. 2016.
5. Woolley T, Clithero-Eridon A, Elsanousi S, Othman AB. Does a socially-accountable curriculum transform health professional students into competent, work-ready graduates? A cross-sectional study of three medical schools across three countries. *Med Teach.* 2019;41(12):1427-1433.
6. Bojanic K, Schears GJ, Schroeder DR, Jenkins SM, Warner DO, Sprung J. Survey of self-assessed preparedness for clinical practice in one Croatian medical school. *BMC Res Notes.* 2009;2:152.
7. Burns R, Adler M, Mangold K, Trainor JA. Brief boot camp for 4th-year medical students entering into pediatric and family medicine residencies. *Cureus.* 2016;8(2):e488.
8. Coombes ID, Mitchell CA, Stowasser DA. Safe medication practice: attitudes of medical students about to begin their intern year. *Med Educ.* 2008;42(4):427-431.
9. Dare AJ, Petrie KJ, Bagg W. Prepared for practice? Medical students' perceptions of a shortened final year medical programme. *N Z Med J.* 2009;122(1292):32-43.
10. Costello J, Livett M, Stride PJ, West M, Premaratne M, Thacker D. The seamless transition from student to intern: from theory to practice. *Intern Med J.* 2010;40(10):728-731.
11. Dare A, Fancourt N, Robinson E, Wilkinson T, Bagg W. Training the intern: the value of a pre-intern year in preparing students for practice. *Med Teach.* 2009;31(8):e345-50.
12. Dyar OJ, Nathwani D, Monnet DL, Gyssens IC, Stalsby Lundborg C, Pulcini C. Do medical students feel prepared to prescribe antibiotics responsibly? Results from a cross-sectional survey in 29 European countries. *J Antimicrob Chemother.* 2018;73(8):2236-2242.
13. Illing JMG, Kergon C, Burford B, et al. How prepared are medical graduates to being practice? A comparison of three diverse UK medical schools. Final Report for the GMC Education Committee. 2008.
14. Illing JC, Morrow GM, Rothwell nee Kergon CR, et al. Perceptions of UK medical graduates' preparedness for practice: a multi-Centre qualitative study reflecting the importance of learning on the job. *BMC Med Educ.* 2013;13:34.
15. McKenzie S, Mellis C. Practically prepared? Pre-intern student views following an education package. *Adv Med Educ Pract.* 2017;8:111-120.
16. Minha S, Shefet D, Sagi D, Berkenstadt H, Ziv A. "See one, Sim one, do one"- a National pre-Internship Boot-Camp to ensure a safer "student to doctor" transition. *PLoS One.* 2016;11(3):e0150122.
17. Morrow G, Johnson N, Burford B, et al. Preparedness for practice: the perceptions of medical graduates and clinical teams. *Med Teach.* 2012;34(2):123-135.
18. Rothwell C, Burford B, Morrison J, et al. Junior doctors prescribing: enhancing their learning in practice. *Br J Clin Pharmacol.* 2012;73(2):194-202.
19. Scicluna HA, Grimm MC, Jones PD, Pilotto LS, McNeil HP. Improving the transition from medical school to internship - evaluation of a preparation for internship course. *BMC Med Educ.* 2014;14:23.
20. Lightman E, Kingdon S, Nelson M. A prolonged assistantship for final-year students. *Clin Teach.* 2015;12(2):115-120.
21. Stroben F, Schroder T, Dannenberg KA, Thomas A, Exadaktylos A, Hautz WE. A simulated night shift in the emergency room increases students' self-efficacy independent of role taking over during simulation. *BMC Med Educ.* 2016;16:177.
22. Watmough S, Box H, Bennett N, Stewart A, Farrell M. Unexpected medical undergraduate simulation training (UMUST): can unexpected medical simulation scenarios help prepare medical students for the transition to foundation year doctor? *BMC Med Educ.* 2016;16:110.
23. Wijnen-Meijer M, Ten Cate O, van der Schaaf M, Burgers C, Borleffs J, Harendza S. Vertically integrated medical education and the readiness for practice of graduates. *BMC Med Educ.* 2015;15:229.
24. Tran K, Tran GT, Fuller R. West Yorkshire Mentor scheme: teaching and development. *Clin Teach.* 2014;11(1):48-52.
25. Daly M, Perkins D, Kumar K, Roberts C, Moore M. What factors in rural and remote extended clinical placements may contribute to preparedness for practice from the perspective of students and clinicians? *Med Teach.* 2013;35(11):900-907.
26. Abuhusain H, Chotirmall SH, Hamid N, O'Neill SJ. Prepared for internship? *Ir Med J.* 2009;102(3):82-84.
27. Bennett CR, Mawhood N, Platt MJ. The impact of medical school assessment on preparedness for practice. *Med Teach.* 2018;41:1-3.
28. Bleakley A, Brennan N. Does undergraduate curriculum design make a difference to readiness to practice as a junior doctor? *Med Teach.* 2011;33(6):459-467.
29. Cave J, Woolf K, Jones A, Dacre J. Easing the transition from student to doctor: how can medical schools help prepare their graduates for starting work? *Med Teach.* 2009;31(5):403-408.
30. Gome JJ, Paltridge D, Inder WJ. Review of intern preparedness and education experiences in general medicine. *Intern Med J.* 2008;38(4):249-253.
31. Heidemann LA, Fitzgerald JT, Hartley S. Are medical students trained in cross-cover? *Clin Teach.* 2018;15:1-6.
32. Lundin RM, Bashir K, Bullock A, et al. "I'd been like freaking out the whole night": exploring emotion regulation based on junior doctors' narratives. *Adv Health Sci Educ: Theory Practice.* 2018;23(1):7-28.
33. Miles S, Kellett J, Leinster SJ. Medical graduates' preparedness to practice: a comparison of undergraduate medical school training. *BMC Med Educ.* 2017;17(1):33.
34. Minter RM, Amos KD, Bentz ML, et al. Transition to surgical residency: a multi-institutional study of perceived intern preparedness and the effect of a formal residency preparatory course in the fourth year of medical school. *Acad Med.* 2015;90(8):1116-1124.
35. Monrouxe LV, Bullock A, Gormley G, et al. New graduate doctors' preparedness for practice: a multistakeholder, multicentre narrative study. *BMJ Open.* 2018;8(8):e023146.
36. Muthaura PN, Khamis T, Ahmed M, Hussain SR. Perceptions of the preparedness of medical graduates for internship responsibilities in district hospitals in Kenya: a qualitative study. *BMC Med Educ.* 2015;15:178.
37. Kelly C, Noonan CL, Monagle JP. Preparedness for internship: a survey of new interns in a large Victorian health service. *Aust Health Rev.* 2011;35(2):146-151.
38. Linane H, Connolly F, McVicker L, et al. Disturbing and distressing: a mixed methods study on the psychological impact of end of life care on junior doctors. *Ir J Med Sci.* 2018;118:633-639.
39. Walker A, Yong M, Pang L, Fullarton C, Costa B, Dunning AM. Work readiness of graduate health professionals. *Nurse Educ Today.* 2013;33(2):116-122.
40. Winn AS, Marcus CH, Williams K, et al. Development, implementation, and assessment of the intensive clinical orientation for residents (ICOR) curriculum: a pilot intervention to improve intern clinical preparedness. *Acad Pediatr.* 2018;18(2):140-144.
41. McKenzie S, Mellis C. The impact on internship of a tailored intern preparation package. *Adv Med Educ Pract.* 2018;9:639-648.
42. Prozesky DR, Molwantwa MC, Nkomazana O, Kebaetse MB. Intern preparedness for the CanMEDS roles and the Dunning-Kruger effect: a survey. *BMC Med Educ.* 2019;19(1):422.
43. Tallentire VR, Smith SE, Wylde K, Cameron HS. Are medical graduates ready to face the challenges of foundation training? *Postgrad Med J.* 2011;87(1031):590-595.
44. Svirko E, Lambert T, Goldacre MJ. Gender, ethnicity and graduate status, and junior doctors' self-reported preparedness for clinical practice: national questionnaire surveys. *J R Soc Med.* 2014;107(2):66-74.
45. Laven G, Keeffe D, Duggan P, Tonkin A. How was the intern year?: self and clinical assessment of four cohorts, from two medical curricula. *BMC Med Educ.* 2014;14:123.



46. Lachish S, Goldacre MJ, Lambert T. Self-reported preparedness for clinical work has increased among recent cohorts of UK-trained first-year doctors. *Postgrad Med J*. 2016;92(1090):460-465.
47. Ochsmann EB, Zier U, Drexler H, Schmid K. Well prepared for work? Junior doctors' self-assessment after medical education. *BMC Med Educ*. 2011;11:99.
48. Morcke AM, Nielsen DG, Kjeldsen IT, Eika B. Medical graduates feel well-prepared for clinical work. *Dan Med Bull*. 2011;58(11):A4330.
49. Kassim SS, McGowan Y, McGee H, Whitford DL. Prepared to practice? Perception of career preparation and guidance of recent medical graduates at two campuses of a transnational medical school: a cross-sectional study. *BMC Med Educ*. 2016;16:56.
50. Goldacre MJ, Taylor K, Lambert TW. Views of junior doctors about whether their medical school prepared them well for work: questionnaire surveys. *BMC Med Educ*. 2010;10:78.
51. Morris M, O'Neill A, Gillis A, et al. Prepared for practice? Interns' experiences of undergraduate clinical skills training in Ireland. *J Med Educ Curr Dev*. 2016;3:85-90.
52. Duns G, Weiland T, Crotty B, Jolly B, Cuddihy H, Dent A. Self-rated preparedness of Australian prevocational hospital doctors for emergencies. *Emerg Med Australas*. 2008;20(2):144-148.
53. Barr J, Ogden KJ, Rooney K, Robertson I. Preparedness for practice: the perceptions of graduates of a regional clinical school. *Med J Aust*. 2017;206(10):447-452.
54. Marker S, Mohr M, Ostergaard D. Simulation-based training of junior doctors in handling critically ill patients facilitates the transition to clinical practice: an interview study. *BMC Med Educ*. 2019;19(1):11.
55. Dean SJ, Barratt AL, Hendry GD, Lyon PM. Preparedness for hospital practice among graduates of a problem-based, graduate-entry medical program. *Med J Aust*. 2003;178(4):163-166.
56. Hill J, Rolfe IE, Pearson SA, Heathcote A. Do junior doctors feel they are prepared for hospital practice? A study of graduates from traditional and non-traditional medical schools. *Med Educ*. 1998;32(1):19-24.
57. Goldacre MJ, Lambert TW, Svirko E. Foundation doctors' views on whether their medical school prepared them well for work: UKgraduates of 2008 and 2009. *Postgrad Med J*. 2014;90(1060):63-68.
58. Sen Gupta TK, Muray RB, McDonell A, Murphy B, Underhill AD. Rural internships for final year students: clinical experience, education and workforce. *Rural Remote Health*. 2008;8(1):827.
59. Stewart MK, Henry RC, Ehrenfeld JM, Terhune KP. Utility of a standardized fourth-year medical student surgical preparatory curriculum: program director perceptions. *J Surg Educ*. 2018;75(3):639-643.
60. Wijnen-Meijer M, ten Cate O, van der Schaaf M, Harendza S. Graduates from vertically integrated curricula. *Clin Teach*. 2013;10(3):155-159.
61. De Villiers M, Van Heerden B, Van Schalkwyk S. 'Going the extra mile': supervisors' perspectives on what makes a 'good' intern. *South African Med J = Suid-Afrikaanse Tydskrif Vir Geneeskunde*. 2018;108(10):852-857.
62. Eley DS. Junior doctors' perceptions of their preparedness for hospital work: support for the rural clinical school model as a key to better preparation. *Med J Aust*. 2010;192(2):109-110.
63. Alexander C, Millar J, Szmids N, Hanlon K, Cleland J. Can new doctors be prepared for practice? A review. *Clin Teach*. 2014;11(3):188-192.
64. Brinkman DJ, Tichelaar J, Graaf S, Otten RHJ, Richir MC, van Agtmael MA. Do final-year medical students have sufficient prescribing competencies? A systematic literature review. *Br J Clin Pharmacol*. 2018;84(4):615-635.
65. Monrouxe LV, Grundy L, Mann M, et al. How prepared are UK medical graduates for practice? A rapid review of the literature 2009-2014. *BMJ Open*. 2017;7(1):e013656.
66. Tallentire VR, Smith SE, Skinner J, Cameron HS. The preparedness of UK graduates in acute care: a systematic literature review. *Postgrad Med J*. 2012;88(1041):365-371.
67. Cleland J, Patey R, Thomas I, Walker K, O'Connor P, Russ S. Supporting transitions in medical career pathways: the role of simulation-based education. *Adv Simul*. 2016;1:14.
68. Dewan M, Norcini J. A purpose-driven fourth year of medical school. *Acad Med*. 2017;3:3.
69. Kostov CE, Rees CE, Gormley GJ, Monrouxe LV. 'I did try and point out about his dignity': a qualitative narrative study of patients and carers' experiences and expectations of junior doctors. *BMJ Open*. 2018;8(1):e017738.
70. Council AM. Joint AMC - MBA Preparedness for Internship Survey: Australian Medical Council; 2019 [Available from: <https://www.amc.org.au/accreditation-and-recognition/assessment-accreditation-primary-medical-programs/joint-amc-mba-preparedness-for-internship-survey/>].
71. Tweed MJ, Bagg W, Child S, Wilkinson T, Weller JM. How the trainee intern year can ease the transition from undergraduate education to postgraduate practice. *N Z Med J*. 2010;123(1318):81-91.
72. Jones A, Willis SC, McArdle PJ, O'Neill PA. Learning the house officer role: reflections on the value of shadowing a PRHO. *Med Teach*. 2006;28(3):291-293.
73. Witney M, Isaac V, Playford D, Walker L, Garne D, Walters L. Block versus longitudinal integrated clerkships: students' views of rural clinical supervision. *Med Educ*. 2018;52(7):716-724.
74. Greenhill J, Poncelet AN. Transformative learning through longitudinal integrated clerkships. *Med Educ*. 2013;47(4):336-339.
75. Murray RB, Wilson A. Work-readiness and workforce numbers: the challenges. *Med J Aust*. 2017;206(10):433-434.
76. Kilminster S, Zukas M, Quinton N, Roberts T. Preparedness is not enough: understanding transitions as critically intensive learning periods. *Med Educ*. 2011;45(10):1006-1015.
77. O'Brien BC. What to do about the transition to residency? Exploring problems and solutions from three perspectives. *Acad Med*. 2018;93(5):681-684.
78. Atherley A, Dolmans D, Hu W, Hegazi I, Alexander S, Teunissen PW. Beyond the struggles: a scoping review on the transition to undergraduate clinical training. *Med Educ*. 2019;53(6):559-570.
79. Wackett A, Daroowalla F, Lu WH, Chandran L. Reforming the 4th-year curriculum as a springboard to graduate medical training: one school's experiences and lessons learned. *Teach Learn Med*. 2016;28(2):192-201.

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