Preparedness for Practice:
A Rapid Evidence Assessment

Commissioned by the General Dental Council (GDC)

August 2020

**Association for
Dental Education
in Europe (ADEE)**

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GLOSSARY

We present in this glossary definitions of core terms, mainly based on references used in this review. By providing a glossary, our intention is to enhance the understanding of this report rather than to establish one final 'definition' for each concept.

Adverse events (AE)	Unintended injuries or complications that are caused by the management of a patient's healthcare, rather than by the patient's underlying disease. In dentistry, an adverse event is defined as "unnecessary harm due to dental treatment".
Association for Dental Education in Europe (ADEE)	A European non-profit educational organisation, which brings together a broad-based membership across Europe comprised of dental schools, specialist societies and national associations concerned with dental education.
Burnout (occupational)	According to the World Health Organisation (WHO), occupational burnout is a syndrome resulting from chronic work-related stress, with symptoms characterised by "feelings of energy depletion or exhaustion; increased mental distance from one's job or feelings of negativism or cynicism related to one's job; and reduced professional efficacy." One instrument for assessing burnout is the Maslach Burnout Inventory (MBI), which assesses three dimensions of the burnout, namely emotional exhaustion, depersonalisation, and reduced personal accomplishment.
Coach/coaching/ peer coaching	A person with domain expertise, who supports the 'coachee'-learner in achieving specific professional goals by facilitating self-directed learning and providing training and guidance. Coaching is a one-to-one relationship, focused on the enhancement of learning and development, through increasing self-awareness and personal responsibility in a supportive and encouraging climate. Peer coaching is an interactive type of coaching, in which peers at a similar level of knowledge, engage in an equal relationship that typically involves observation of the task, feedback to improve performance and support in the implementation of changes.
Similar: Mentor/mentoring	Traditionally, a person who teaches or gives help and advice to a less experienced person, the 'mentee'. Traditional mentoring is a hierarchical relationship in which the more experienced person provides guidance over a sustained period of time to a less experienced 'mentee', tailored to the expertise of the mentor and the needs of the 'mentee'. Modern mentoring is a cooperative, mutually beneficial process, whereby the mentor participates in the mentee's professional development, by providing learning, advice, guidance and encouragement.
Competence / Competent	Professional behaviours and skills required by a graduating dentist in order to respond to the full range of circumstances encountered in general professional practice. Professional competence has also been defined as 'the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served.'
	'Competent' is defined in the GDC documents as 'having a sound theoretical knowledge and understanding of the subject together with an adequate clinical experience to be able to resolve clinical problems encountered, independently, or without assistance'.

Relevant: Capability	The ability of an individual to respond to required change, namely the extent to which an individual can adapt to change, generate new knowledge, and continue to improve their performance.
Competency-based assessment	Assessment in which the assessor makes a judgement of skills and competencies against clear benchmarks or criteria. Competency-based assessment may be contrasted with assessment in which candidates are compared to others or graded.
Deliberate practice	This refers to a special type of practice that is purposeful and systematic. While regular practice might include mindless repetitions, deliberate practice requires focused attention and is conducted with the specific goal of improving performance.
Delphi process/ method/technique	The *Delphi technique* is named after the Ancient Greek oracle of Delphi, who could predict the future. It is a systematic interactive way of congregating expert opinion through a series of iterative questionnaires, with a goal of coming to a group consensus. Several rounds of questionnaires are sent out to the group of experts (who may be experts from experience of services), and the anonymous responses are aggregated and shared with the group after each round. Thus, experts are encouraged to revise their earlier answers considering the replies of other members of their panel. It is believed that during this process the group will converge towards an answer. The process is stopped after a predefined stop criterion (e.g., number of rounds, achievement of consensus, stability of results). The characteristic features of the Delphi are anonymity, iteration with controlled feedback, statistical group response, and expert input.
Dental foundation training	In UK, newly qualified dental graduates spend a mentored year in general dental practice settings under a scheme known as dental foundation training. Known as Vocational Training (VT) in Scotland, foundation training was initially started as a voluntary scheme for new dental graduates in UK as early as 1977. However, in 1993 a one-year period of training subsequently became a mandatory requirement for all newly qualified dental graduates in the UK who intended to practice within the National Health Service. This arrangement 'allows a gradual and controlled transition from the shelter of undergraduate education to unsupervised practice'.
Disease prevalence	It is a statistical concept: a measure of the burden of a *disease* in a population in a given location and at a particular time, as represented in a count of the number of people affected by the disease.
EndNote	A reference management software package, used to manage bibliographies, citations and references. References retrieved from all databases (Medline, CINAHL, Ovid, Web of Science etc) were imported into Endnote, which enabled the researchers to efficiently manage the screening process.
Evidence-based practice (EBP)	The conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It integrates three principles: (1) the best available research evidence on the specific clinical problem, (2) clinical expertise of the health professional, and (3) patients' values, preferences and expectations. It started in 1992 in the field of medicine (evidence-based medicine).

Feedback	In clinical settings, feedback refers to the specific information about the comparison between a professional's observed performance and a standard, given with the intent to improve the professional's performance.
Fitness to practise (FtP)	Fitness to practise implies that health professionals continue to practice in accordance with regulators' standards, including requirements relating to the maintenance of professional skills and knowledge. It encompasses an assessment of both conduct and competence.
Focus Group	A form of qualitative research, where the researcher poses questions (related to the issue being studied) which are discussed with a group of people, providing the researcher with in-depth knowledge concerning attitudes, perceptions, beliefs and opinions of individuals regarding the topic. During this process, the researcher either takes notes or records the discussion.
General Dental Council (GDC)	The UK-wide statutory regulator of just over 100,000 members of the dental team, including approximately 40,000 dentists and 60,000 dental care professionals. Its primary purpose is to protect patient safety and maintain public confidence in dental services. To achieve this, it registers qualified dental professionals, sets standards for the dental team, investigates complaints about dental professionals' fitness to practise, and works to ensure the quality of dental education.
Grades of quality (grades of evidence)	A system for grading the quality of evidence for outcomes reported in research studies. Systematic reviews and randomised controlled trials are rated high in the quality scale, whereas case reports and opinion papers are usually rated as low-quality evidence. Limitations in the design and implementation of the study, inconsistency or imprecision of results, high probability of bias are among the factors lowering the quality of the study.
Grey literature	This refers to materials and research produced by organisations outside of the traditional academic publishing and distribution channels. Common grey literature publication types include reports (annual, research, technical, project, etc.), working papers, government documents and white papers.
Independent practice	'Independent practice' is a controversial term; a common definition is for a professional to be capable of unsupervised practice, acting with an appropriate measure of independence, while not yet reaching a point of individual autonomy. The GDC defines independent practice as "working with autonomy within the GDC Scope of Practice, and own competence, once registered. Independent practice does not mean working alone and in isolation, but within the context of the wider dental and healthcare team and may be under supervision if newly qualified."
Interprofessional education (interdisciplinary education)	Refers to an educational situation, where members of two or more professions are engaged in learning with, from and about each other. It aims to improve relationships, increase trust and deepen understanding of other professionals' roles and responsibilities and assist in the development of communication and interpersonal skills.

Lifelong learning	All general education, vocational education and training, non-formal education and informal learning undertaken throughout life, resulting in an improvement in knowledge, skills and competences. Such learning might occur within a personal, civic, social and/or employment-related perspective.
Literature review	A comprehensive summary of previous research on a topic. A literature review comprises a survey of scholarly articles, books, and other sources relevant to a particular area of research. The review should enumerate, describe, summarise and critically evaluate the previous research on a topic, with the aim to identify strengths, gaps, controversies or areas for further research and not merely provide summaries or descriptive lists.
Mixed methods research	A method that uses multiple sources of data collection with the aim to provide a better understanding of research problems than an individual data source alone, and to subsequently increase the pragmatic validity through triangulation. It focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single study or series of studies.
Never-events	The 'never-event' approach is a clinical risk management strategy used within the NHS to focus attention on serious harm incidents. A never-event is a serious, largely preventable patient safety incident that should not occur if the available preventable measures were implemented by healthcare workers. Example: 'wrong tooth extraction' has been defined as a dental 'never-event' by NHS England.
Outcomes-based curriculum	Outcomes-based curriculum is a learner-centred approach to education that focuses on what a student should know, understand and be able to do upon completion of the programme. The curriculum is constructed by first determining the *learning outcomes* (statements of the skills, knowledge and attitudes the learner will "own" at the end of the course). The process ensures that the learners can demonstrate achievement of outcomes, and that learning outcomes, learning activities/methods and assessment are aligned.
Outreach training/ education	Structured training / education which takes place outside the premises of the academic institution, e.g. in community settings, healthcare facilities, hospitals, rural practices, etc. and offers the opportunity for learners to practise in the 'real world', outside the protective environment of the University.
Patient safety	The prevention of errors and adverse effects to patients associated with healthcare (World Health Organisation, 2016).
Related: Patient safety incidents	Any unintended events or hazardous conditions resulting from the process of care, rather than due to the patient's underlying disease, that led or could have led to unintended health consequences for the patient or health care processes associated with safety outcomes.
Preceptor / preceptorship	A person who shares a high level of educational and clinical knowledge and who serves as a clinical evaluator of the novice in the professional environment. In this role, preceptors are committed to demonstrating and assuring competent healthcare (medical, dental, nursing) practices.

Peer review	A critical examination and evaluation of the performance of individual health professionals by members of the same profession or a team. It may be formal or informal.
Similar: Peer audit	A process of review of the clinical performance/clinical records of healthcare providers against best-practice standards, over a specified time period, performed by peers.
Personal development plan (PDP)	A structured process of creating an action plan based on an individual's learning, performance and achievements, to set out the goals, strategies and outcomes of learning and training. The plan should clearly define time frames, activities and outcomes to meet the defined goals.
Portfolio	A professional collection of evidence of both the processes and product of learning. Practitioners compiling a portfolio are encouraged to engage in critical reflection on their accomplishments and current practices, gain insight into their strengths, weaknesses and learning needs, and perform prospective analysis to guide their future development.
E-portfolio	A purposeful collection of digital items (ideas, evidence, reflections, feedback, etc) which presents a selected audience with evidence of a person's learning and ability.
Preparedness for practice	Being capable of carrying out patient assessment and treatment planning, perform routine, straightforward dental procedures safely, provide holistic care, communicate effectively, demonstrate professionalism and teamwork skills, recognise own limits and knowing when to seek help. The concept of 'preparedness' can be problematic, with the term being related to clinical or technical performance, competence and/or confidence, depending on the understanding and opinions of the stakeholder being asked. Chapters 3.1 and 4.3.1 discuss this concept.
Similar: Work readiness	Work readiness is a concept that comprises more than a mere focus on competence, skills, and ability. It also assumes that the new graduate possesses generic soft skills including teamwork, time management, communication skills, social skills and emotional intelligence.
PRISMA guidelines	The PRISMA (Preferred Reporting Items for Systematic Review and Meta-analysis) guidelines set out the preferred methodology for conducting and reporting a systematic review. Full compliance with the guidelines will clearly and justifiably indicate inclusion and exclusion criteria, facilitate clarity and transparency in reporting, enable a structured report and synthesise the findings of the eligible studies.
Problem-based learning (PBL)	An educational method (derived from andragogy – adult learning theory) in which students are presented with real-life problems that stimulate them to discuss, reflect, negotiate and evaluate. Student responsibility and self-directed learning are emphasised, and teamwork skills are also nurtured. Teaching strategies include critical thinking questions, scenarios, case studies and small group work.

Purposive sample	A purposive sample, also known as judgmental, selective, or subjective sample, is a non-probability sample that is selected based on characteristics of a population that are of interest and the objective of the study. Purposive sampling relies on the judgement of the researcher while selecting the members of population to participate in the study. The sample being studied is not representative of the population, thus generalisations cannot be made, but for researchers pursuing qualitative or mixed methods research designs, this is not considered a weakness.
Rapid Evidence Assessment (REA)	This is an approach to evidence review which uses the same methods and principles as a systematic review but makes concessions to the breadth or depth of the process, in order to synthesise evidence and produce results within a shorter timeframe than that required for a full systematic review. It may use a combination of key informant interviews and targeted literature searches to provide a balanced assessment of what is already known about a specific problem or issue. It is particularly helpful in informing policy and decision makers, programme managers and researchers.
Rapid review	A form of evidence synthesis that may provide more timely information for decision making compared with systematic reviews. A rapid review speeds up the systematic review process by simplifying or omitting stages of the systematic review to produce information in a short period of time.
Rasch analysis	Rasch Analysis is a psychometric technique used to measure latent traits like attitude or ability. In the Rasch model, the probability of a specified response (e.g. right/wrong answer) is modelled as a logistic function of the difference between the person (respondent's abilities, attitudes or personality traits) and item parameters (e.g. question's difficulty). Rasch analysis also helps researchers think in more sophisticated ways about the constructs (variables) they wish to measure.
Reflection	A metacognitive process that creates understanding of specific issues in practice through critically contextualising, observing and analysing, to generate new knowledge and insights which can enhance practice.
Related: Reflective practice	An active and deliberate process of critically examining one's practice in which the individual is challenged to engage in self-assessment, leading to new understanding and development of new knowledge.
Role modelling	A person whose behaviour, example, or success is or can be emulated by others. Role modelling in education refers to a process where faculty members demonstrate clinical skills, model and articulate expert thought processes, and manifest positive professional characteristics.
Safe beginner	The newly graduated dentist, who has the ability to provide effective patient-centred care autonomously, in relation to the level of clinical skill expected and, on occasion, with continued guidance. Following graduation, further preparation is undertaken through mandatory dental foundation training, which enables an individual to progress into being able to work as an independent clinician. The 2015 GDC document "Preparing for Practice" uses the term 'safe beginner' for the new graduate.

The GDC defines 'safe beginner' as 'a rounded professional who, in addition to being a competent clinician and/ or technician, will have the |

	range of professional skills required to begin working as part of a dental team and be well prepared for independent practice. They will be able to assess their own capabilities and limitations, act within these boundaries and will know when to request support and advice.'
Scoping review	This is a type of knowledge synthesis, which follows a systematic approach to map evidence on a topic and identify main concepts, theories, sources, and knowledge gaps. In contrast to systematic reviews which answer clearly defined questions, scoping reviews are useful for outlining broader questions.
Self-assessment	This refers to involvement of learners in making conclusions about their own learning, particularly about their achievements and the outcomes of their learning, in relation to identified standards/ learning outcomes.
Self-directed learning	This describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.
Semi-structured interviews	These are in-depth interviews, commonly used in qualitative research, where the respondents answer open-ended questions. It is the most frequent qualitative data source in health services research. The method consists of a dialogue between researcher and participant, guided by a flexible interview protocol and supplemented by follow-up questions, probes and comments.
Systematic review	An approach to literature review designed to provide an objective, complete and exhaustive summary of current evidence relevant to a research question. It involves a detailed and comprehensive plan and search strategy derived *a priori*, with the goal of reducing bias by identifying, critically appraising, and synthesising findings qualitatively or quantitatively.
Transition	The process of changing from one state or condition to another (Oxford English Dictionary Online, 2012).
Transition to practice	Transition to practice is defined as the period from which novice practitioners first experience autonomous decision-making and acquire professional accountability for patient care. Transition is a complex and dynamic process triggering a period of intense learning and increase in proficiency for novice practitioners as they are 'socialised' into their new workplace environment.
Workplace-based assessment (WBA)	The assessment of the trainee's professional skills and attitudes, which provides evidence of appropriate clinical competences. Direct Observation of Procedural Skills (DOPS), Mini-Clinical Evaluation Exercise (mini-CEX), Objective Structured Clinical Examinations (OSCEs) and Case-based discussion (CbD) are commonly used methods of workplace-based assessment.
Work shadowing	Work shadowing refers to a learning process whereby a person 'shadows'/ follows or observes a professional in their work role for a period, for the purpose of enhancing their knowledge, skills and understanding.

Other Abbreviations   11

ADEE	Association for Dental Education in Europe
COPDEND (UK)	Committee of Postgraduate Deans and Dental Directors (UK)
FGDP (UK)	Faculty of General Dental Practitioners (UK)
GDC	General Dental Council
GMC	General Medical Council
NHS	National Health Service
NMC	Nursing and Midwifery Council

EXECUTIVE SUMMARY

The General Dental Council (GDC) seeks to ensure that its work and policies are informed by current evidence. In 2018 the GDC commenced their risk and thematic quality assurance activities and it was agreed that preparedness for practice of UK dental graduates should be the first area for thematic review. To support the delivery of the commitments made in their corporate strategy (2019), the GDC commissioned this review by a project team under the auspices of the Association for Dental Education in Europe (ADEE).

Aims
The primary aims of this review were twofold: to explore *how well-prepared* new dental graduates, trained in the UK, are for practice at the point of graduation, in terms of their clinical experience and competence as well as their broader skills; and to identify *what works* well in preparing students to be ready for practice as registered dental professionals. More specifically, the review aimed to address the following questions:

1. to what extent are new dental graduates meeting required learning outcomes and is this an effective starting point from which to practise safely?
2. what factors contribute to variance in preparedness for practice, are there specific skills, tasks or knowledge that graduates are achieving or lacking and what evidence demonstrates this?
3. what is the potential impact, on both patients and the profession, of graduates being inadequately prepared for practice?
4. what is the evidence (from dentistry or other healthcare professions) of ways that preparedness for practice has been defined, addressed and evaluated?

Preparedness for practice may focus on more than one transition phase. In UK dentistry, this can be the transition from student to 'safe beginner', or from 'safe beginner' to independent practitioner as defined by the GDC. The focus of this review is preparedness for practice at the level expected of a new graduate/new registrant.

Methods
A mixed-methods approach was followed comprising scoping interviews with 13 topic experts and a rapid evidence assessment (REA) of preparedness for practice literature (89 publications). In addition, evidence was collated from a GDC conference 'Preparedness for practice of UK graduates' (November 2019) and from our parallel report on the review of professionalism. Research ethics approval was obtained from Cardiff university (SREC#3389).

Key findings
We cross-reference the main findings of this review to the four research questions (RQs). Where a key finding is relevant to more than one question, the question number is recorded in brackets after the statement.

> *Research Question 1:* to what extent are new dental graduates meeting required learning outcomes and is this is an effective starting point from which to practise safely?

- Safety and the concept of the 'safe beginner' (one who is independent but knows their own limits) were recognised as important.

- Evidence suggests that dental foundation trainers tend to hold higher expectations of the new graduate than the standards required to meet the expected outcomes at graduation and believe that standards are declining. It is important that all stakeholders understand what can and will be achieved at the end of undergraduate training and have confidence in this (RQ4).
- There was a difference of opinion about the purpose of foundation training; some trainers expect more of an independent practitioner at graduation, others expect a safe beginner ready to further develop skills.
- Members of the UK Faculty of General Dental Practice (FGDP(UK)) desired more teaching in a range of skills at undergraduate level, including aspects of endodontics and orthodontics as well as practice management.
- It was suggested that students need to be prepared to work with different patient groups in different contexts and be aware that there may be inter-generational differences in expectations (RQ2). The literature suggests that the new dentist needs an awareness of patient expectations and how expectations can be managed; patients also need to recognise that dentists may not be able to meet all expectations (RQ3).
- A key message from the studies of preparedness for specific clinical skills is that confidence and competence increase with experience, particularly with practical experience. Clinical exposure and practise enhance preparedness and confidence (RQ4).
- Some authors suggest that limitations should be rectified through additions to undergraduate curricula (RQ4). However, other authors highlight the challenges to universities to deliver this because of an already crowded curricula and difficulties in finding sufficient and suitable patients with which the students can gain experience.
- New graduates' perceptions of preparedness for practice are linked to feelings of confidence and there is evidence to suggest that men self-rate their confidence more highly than women (RQ2).
- Evidence also suggests that older students may feel more prepared for practice (RQ2).

Research Question 2: what factors contribute to variance in preparedness for practice, are there specific skills, tasks or knowledge that graduates are achieving or lacking and what evidence demonstrates this?

Specific skills, tasks or knowledge that graduates are achieving or lacking
- Lack of preparedness in the dental field relates more to complex skills (treatment planning, crown/bridge, root canal treatment (especially molar), surgical extractions and diagnosis in orthodontics) where experience is limited by number of cases seen at the undergraduate level RQ3).
- Some UK dental students lacked confidence in root canal treatment although this was found to vary by dental school.
- New graduates, both dental and medical, felt unprepared for aspects of prescribing and drugs management. Authors suggest the need for a review of undergraduate curricula to address this.
- Studies across Europe show that students and/or new dental graduates could be better prepared for managing special needs patients, aspects of patient safety and the critical appraisal of literature.

- Areas that healthcare/medical undergraduates would benefit from better preparation include referrals, medicines management and prescribing, diagnosis and treatment planning, wound care, delivering emergency care, hand-over, working within a multi-disciplinary team, legal and ethical issues, and managing clinical incidents/errors.
- Other relevant research from the wider health care literature indicated that medical students/new graduates felt ill-prepared for clinical leadership and this may be the case for dental professionals. Further, it should not be assumed that all students can manage the simple tasks; if on entering the workplace the new graduate struggles with simple tasks, this can create further difficulties (RQ4).

Factors contributing to variance in preparedness for practice
- As a result of changing demographics and dental disease, students were found to have little experience of some complex tasks such as, complete dentures, molar endodontics and surgical exodontia, compounded by increased student numbers over the last 10 years.
- Findings from the UK on factors contributing to variance in preparedness are similar to those reported from New Zealand, Pakistan and Malaysia (RQ3).
- In Europe, student preparedness for exodontia varied by dental school (RQ1).
- Compared to a discipline-based organisation of teaching, evidence from dental education research suggests that integrated, patient-centred teaching is more effective (RQ4).
- Research with students from other health-related professions found that graduates from problem-based learning programmes were prepared better in communication, team working and dealing with paperwork (RQ4).
- The literature recommends the need for close co-operation across the different teaching environments – undergraduate and postgraduate - to ensure a consistent approach to supervision and assessment, through appropriate quality management processes (RQ4).

Research Question 3: what is the potential impact, on both patients and the profession, of graduates being inadequately prepared for practice?

- There was comparatively little evidence found about the impact of being inadequately prepared on patients or on the professionals. However, potential impacts can be expected to arise from areas of lack of preparedness identified under the other research questions.
- In addition to demographic changes, societal changes are reported to include a more litigious environment for which students and new graduates need to be prepared to navigate (RQ2). It was identified in the GDC conference that fear of the GDC needs to be alleviated and an appropriate message about regulation conveyed to new dentists, aligning with the GDC Corporate Strategy 2020-2022 'Right time. Right place. Right Touch' (2019) (RQ4).
- Interviewees gave attention to attitudes and behaviours that were indicators of preparedness for practice, and that can impact on patients and the profession. Two of these related to interactions with others, specifically with patients and in teamwork: being able to communicate well and managing complexity and uncertainty (RQ4).

Definitions
- Preparedness for practice encompasses not only clinical skills but also behavioural, emotional and attitudinal aspects. Clinical competence was seen as a fundamental aspect of preparedness for practice although interviewees recognised that it is constituted by multiple elements, including health, mental health and pastoral aspects.
- A recommendation at the GDC conference was that in refining the prescribed learning outcomes (2020/21), the GDC should first strengthen and clarify the definition of a 'safe beginner' especially in a changing environment (RQ1).
- Likewise, at the same event, analysis shows that it was recommended that support is needed for the transition from undergraduate to postgraduate training. An aspect of this is to identify the way the GDC might engage with Dental Foundation Training, and the latter's link to undergraduate training. This could be facilitated by closer communication across the three stakeholder organisations: undergraduate and postgraduate training organisations and the regulatory body.

How preparedness for practice has been addressed
- There is much evidence of the value of 'real-world', outreach placements in improving preparedness for practice. Findings from the UK are replicated elsewhere (Sweden, India). Variation in how outreach facilities operate was noted, which could have an impact on preparedness for practice (RQ2). One of the main reasons why 'real practice' experience is important is that it helps students/trainees to learn to deal with complexity and pressure (RQ2).
- Studies of different approaches to curricula design have demonstrated beneficial effects of patient-centred, outcomes-based, integrated, problem-based and interprofessional programmes.
- There may be difficulties in addressing preparedness through increased clinical exposure, not least because curricula are already full and suitable patients may not be available.
- The challenges of universities should not be underestimated. All dental schools have had increased student numbers (now reducing) along with difficulties in the recruitment of new staff.
- In addition, it was reported in the interviews that some schools experience challenges when faced with a student who is not progressing sufficiently and university reluctance to accept termination of studies and that GDC Fitness to Practise guidance for students, while useful, is effective at the end of the undergraduate programme and not at the time of any incident.
- Researchers should be mindful of ascribing benefit to the outreach experience solely to increased clinical exposure (which may or may not occur); account needs also to be taken of the effect of a different approach to teaching in outreach centres (RQ2). An example is the need to appropriately and progressively remove support to the student (scaffolding) to encourage them to gain independence and in so doing increase confidence. Participants in the scoping interviews suggested that the GDC could recognise the need for this progressive approach.

- Evidence-based guidance on supporting medical student transition to new doctor has been compiled (RQ3). To support new foundation dentists, further development of GDC toolkits (or toolkits from other organisations) was suggested at the GDC conference.
- Student/trainee self-reflection, supported by constructive feedback, can assist the development of preparedness for practice. Regular reflection on practice aids development.
- Workplace-based experiences include clinical placements, shadowing, assistantships and have been defined and recommended by the GMC. The NMC advocate preceptorships for new registrants. Together with induction processes, these have been shown to support transition from student to new graduate in their first post.
- Evidence from dentistry and nursing supports the ongoing value of mentoring for the new graduate.
- At the GDC conference it was recommended that a clear distinction between peer review, mentoring and coaching is needed and a description of what the roles entail.
- Preparedness may be enhanced if there is better communication and engagement between stakeholders, including universities and postgraduate training organisations. Better connections between stakeholders are recommended in the dental and medical education literature (RQ1). A recommendation from the GDC conference was that the GDC might engage more in promoting good practice.
- There are examples of efforts to enhance dialogue between dental schools, postgraduate trainers and managers. Through discussion, a shared understanding and clarification of the expectations of the new graduate may be developed, so assisting the transition period. (RQ1, 4).

How preparedness for practice has been evaluated
- Preparedness for practice needs repeated measures over multiple domains, including workplace-based measures. There needs to be multiple points of assessment, over time using multiple assessors with a consistency of approach to assessment, to check on developing preparedness. Distinction and balance are needed between competence vs. capability (RQ1,2,3).
- Tools to measure preparedness for practice have been developed including DU-PAS (Dental Undergraduates Preparedness Assessment Scale) and GAPP (graduate preparedness for practice) (RQ1).
- Other means of evaluating preparedness include competency-based assessment and self-reflection (RQ1). Self-assessment can be taught and is a skill for life-long learning.

Conclusions and Implications
This synthesis of the relevant literature and analysis of the scoping interview data provides the GDC with evidence which can support the development of their policies relating to preparedness for practice. The review aims to ensure that the GDC's work in relation to UK dental graduates' preparedness for practice at the point of graduation is informed by a credible and current evidence base. Preparedness for practice does not just concern clinical experience, competence and confidence, but also broader skills. In the review, effort has been made to identify what works well in preparing new graduates to be ready for practice as registered dental professionals.

Following analysis of the key findings, a series of implications are listed for consideration by the GDC:

1. *Define, in more detail, what is meant by the 'safe beginner'.* It is important that all relevant personnel/stakeholders understand the meaning, including educators, the new graduate, foundation trainers and members of the public. This descriptor should be applicable to all the dental professionals.

2. *Identify in learning outcomes what range of skills are required and ensure context is taken into consideration.*

    a. This may relate to changes in experience of disease processes as they continue to evolve. Importantly, new graduates should understand their level of expertise, their strengths and their continuing educational, technical and professional needs. They should feel comfortable to share their achievements at graduation and their needs for on-going training and education with their educational/clinical supervisors (and employers) as they enter foundation training or first employment. They should know when to ask for help and when to refer patients on. It will be valuable to take into consideration the changes in disease/ demographics in any new outcomes and to ensure that these outcomes are a clear guide to Universities as to what is expected of a 'safe beginner'.
    b. Given changing patient demographics, it may be timely for curricula review, including consideration of the changes in disease processes. Staff training is needed to support curricula change. Other areas of faculty development include giving effective and timely feedback and managing student failure. Availability of appropriate staff may be an issue. There is an increasing use of part-time general dental practitioners as undergraduate teachers who have professional development needs related to the challenges of clinical teaching.

3. *Support new graduates entering the 'transition phase' from graduation into workforce employment, through foundation training where applicable, and beyond.* This could be enhanced through greater interaction and engagement between dental schools, postgraduate training organisations and the regulatory body. Consideration might be given, in particular to:
    a. Greater ongoing support and mentoring by all stakeholders during undergraduate training and during the early transition phase of foundation training.
    b. Enhanced communication between students within their dental schools and between dental schools.
    c. Use of mentorships and role models, evidence of which is already present in medicine.
    d. Provision of 'shadowing' opportunities and apprenticeships, evidence of which is already present in medicine and nursing.
    e. Greater support for learning to work in a team.
    f. Avoiding the 'fear factor' exacerbated by the pressures of entering the workforce.
    g. Strengthening confidence and insight - knowing when to refer and when ask for help.

4. *Provide opportunities for all dental professionals, in training, to experience 'real world' clinical practice situations, for example to:*
    a. experience new working environments - through outreach and community placements.
    b. facilitate an increase in clinical exposure and to try to address the variation in opportunities between dental schools, taking into account the realistic expectations of what can be achieved.
    c. ensure that common/simple clinical and professional activities are not overlooked but continuously monitored and strengthened.

5. *Review assessments and 'toolkits' for measuring and quality assuring preparedness for practice.*
    a. Assessment should be a shared experience for both educator and student/trainee – there is a need to instil a willingness in the latter to have pride in what they have done and share their achievements. In addition, they should be encouraged to reflect on their practice and identify their learning and development needs.
    b. There is a need to promote self-reflection/self-assessment and recognise that sharing feedback is a two-way process between trainee and educator. This process should be recognised as a learning opportunity.
    c. Appreciate that individuals will learn at different rates and put in reasonable support for this. However, where students are not achieving the required standards, there need to be viable options to allow a student to leave training.
    d. Closer engagement between dental schools, their host universities and the GDC could facilitate a better understanding of universities in relation to patient safety, the best interest of students and the need for termination of studies.

6. *Support further research to address gaps in the literature and wider evidence on preparedness for practice. Examples include*:
    a. Reviewing curriculum frameworks and how they address preparedness for practice.
    b. The mentoring role– training, identifying roles and responsibilities, linked to support mechanisms across the 'transition phase'.
    c. Investigate staff recruitment, training and retention and the effect on preparedness for practice.
    d. The role of visiting general dental practitioner supervisors – they need a greater sense of their contribution to education and training.
    e. How to strengthen consistency of approach to learning and teaching without stifling innovation and flexibility.
    f. Investigating the transition from graduation into foundation training (and further transition stages – e.g. foundation to core, foundation to independent general practice, core to specialty training and returning to general practice at any stage).
    g. Identifying ways to strengthen undergraduate experience in specialties but not at the expense of learning and retaining expertise in basic clinical procedures and processes.

On reflection from our analysis of the evidence, we have identified a number of implications, but to address these, some consideration needs to be given to the issue of 'context', in particular, issues around student progression, support and termination of studies.

Universities hosting dental schools, their infrastructure and the staff who provide dental undergraduate training, face challenges. Changes, increases and decreases, in allocated student numbers over the last 15 years or more have accentuated these challenges which include: appropriate staff recruitment and retention; clinical space for treating patients; exposure to wide ranges of procedures to satisfy the required learning outcomes of a new graduate; budget constraints (over which dental schools and their universities have varying degrees of control), limited central funding for education (university funding) and health services (NHS funding) to support primary care patient management by students; the impact on restricted numbers of clinical opportunities influenced by increased pressure, from universities and the NHS, to train UK and overseas postgraduate trainees.

A further significant challenge faced by dental schools/universities are students who have a fitness to practise issue during their undergraduate course. Dental Schools are guided by the GDC's requirements and whilst in the students' best interests and/or for patient safety reasons, staff agree that training should be extended or terminated, the university's appeals process, administered centrally, may be at odds with the local decision. The university's appeals systems may not fully appreciate the nature of dentistry as a profession nor the GDC's guidance on student fitness to practise and so allow the student to return to the course. GDC input and advice at this point would be helpful.

PART 1 – INTRODUCTION

1.1 Background

The GDC seeks to ensure that its work and policies are informed by current evidence. To achieve this objective, it commissions evidence-reviews and research. It uses the findings to produce recommendations, including for education and training in dentistry. This report concerns the work undertaken for one of two linked projects: here we report our rapid evidence assessment of preparedness for practise. The companion report presents our mixed-method review of professionalism. The purpose of these reviews was to help the GDC to ensure that its work is informed by the credible and current evidence base and to address concerns voiced from a range of sources that new dental graduates are not adequately prepared for practice.

The GDC has a statutory responsibility to quality assure primary dental education and training in the UK as well as being responsible for setting the learning outcomes for all UK programmes that provide eligibility to apply for registration (GDC 2012). If they wish to work in the NHS, all new UK graduates are required to complete foundation training (known as vocational training in Scotland), typically for one year. In 'Patients, Professionals, Partners, Performance', the GDC's road map for 2016 – 2019 (GDC 2016), it states its concern to ensure that dental professionals are properly trained in the skills necessary to practice dentistry safely from the outset. To do this, the GDC gathers data and undertakes research to inform their approach to quality assuring the education and training of the dental profession. It is the intention of the GDC to review the learning outcomes in 2020 and 'Standards for Education' (GDC, 2015) in 2021.

The study reported here builds on early work undertaken by the GDC. Based on data collected in 2013 (including a survey of 3500 dental professionals, a literature search, interviews with stakeholders in dental and wider healthcare sectors, and complaints and insurance claims data), the GDC reported on 'risks in dentistry' (Europe Economics 2014). The risks identified related to competency (lack of skills or knowledge), poor communication and where this related to inadequate record keeping, poor treatment. However, new graduates seemed to have fewer fitness to practise (FtP) issues. Reporting on the 'Transition to Independent Practice' (Boak et al 2013), the GDC found that there was no evidence of increased risk of a FtP referral or a greater risk to patients from new registrants. They committed to monitor this.

In 2018, the GDC introduced thematic and risk-based quality assurance activities and it was agreed that the preparedness for practice of UK graduates should be the first area for thematic review. This report contributes to that review, which is reported on separately by the GDC. In addition to this REA, evidence informing the thematic review includes two surveys with Foundation Dentists (2018 and 2019); survey with Educational Supervisors/Trainers (2018); workshop and follow up survey with deans, associate deans, training programme directors and educational supervisors/trainers (2019); three tripartite education and training workshops (2019); GDC Preparedness for Practice of UK graduates Conference (2019); inspections of all dental schools (2018-2019); Fitness to Practise Newly Qualified Dentist case analysis (2015-2019).

When considering the issue of preparedness for practice, it is essential for patient safety that new dental graduates are prepared for practice as "safe beginners" as described in the GDC's 'Standards for Education' and 'Preparing for Practice' (GDC 2012, 2015). Yet

it is not uncommon to hear concerns about the adequacy of new registrants' preparedness for practice (Cabot & Barton 1999; Oxley et al 2017). What is often unclear is whether these concerns are based on hearsay and anecdotal evidence or substantiated by robust evidence and shared understandings of expected outcomes. It is thus important to synthesise the evidence on preparedness for practice of all dental professionals, trained in the UK, at the point of graduation, identify concerns and evidence gaps before discussing implications for the future with key stakeholders.

1.2 Aim of the Review of Preparedness for Practice

The primary aims for this review of preparedness for practice were twofold:
- to explore *how well-prepared* new dental graduates, trained in the UK, are for practice at the point of graduation, in terms of their clinical experience and competence as well as their broader skills; and
- to identify *what works* well in preparing students to be ready for practice as registered dental professionals including the appropriate evidence to demonstrate preparedness.

More specifically, the review aimed to address the following research questions:
1. to what extent are new dental graduates meeting required learning outcomes and is this an effective starting point from which to practise safely?
2. what factors contribute to variance in preparedness for practice, are there specific skills, tasks or knowledge that graduates are achieving or lacking and the evidence to demonstrate this?
3. what is the potential impact, on both patients and the profession, of graduates being inadequately prepared for practice?
4. What is the evidence (from dentistry or other healthcare professions) of ways that preparedness for practice has been defined, addressed and evaluated?

1.3 The Project Team

Members of the project team working under the auspices of Association for Dental Education in Europe (ADEE) included:

Professor Jonathan Cowpe	Project Manager and Expert Advisor
Professor Alan Gilmour	Expert Advisor, Lead for preparedness for practice
Professor Alison Bullock	Academic Project Lead, Lead for Delphi and Focus Groups
Dr Ilona Johnson	Expert Advisor, Lead for Professionalism
Dr Argyro Kavadella	Researcher
Ms Rhiannon Jones	Researcher
Dr Sophie Bartlett	Researcher
Dr Dorottya Cserzo	Researcher
Ms Emma Barnes	Researcher
Mrs Elaine Russ	Research Centre Manager
Denis Murphy	ADEE, Project Administration

ADEE was responsible for the organisation and management related to the execution of the project. Although project team members had specific responsibilities, the ethos was one of collaboration, and co-production with the GDC. The project plan included regular meetings with the GDC and agreed update progress reports (August, October and December 2019). The team also worked with the GDC on three learning events (GDC, Policy and Research Board workshop, September 2019, GDC conference, November

2019, GDC 'moving upstream' event February 2020). Communication with the GDC and project monitoring was facilitated by an Expert Reference Group (ERG) with whom the team consulted during the project. The ERG membership is listed in *Appendix 1.*

PART 2 – METHODOLOGY

2.1 Introduction

We adopted a mixed methods approach to this study of preparedness for practice. The core part was a rapid evidence assessment. Rapid evidence assessments (REAs) are well-suited to the GDC's need to gain an overview of the amount and quality of evidence and identify evidence gaps and so inform future developments. Their rapid nature indicates that they provide a more stream-lined approach to the review and tend not to be as in-depth as a systematic review (Gannan et al 2010). They are, nonetheless, systematic in their approach to searching and assessing the evidence.

The REA was complemented by the analysis of qualitative data from scoping interviews with topic experts. Working to co-produce conclusions and implications with the GDC and other stakeholders, we also ran workshops and contributed to GDC learning events to offer further opportunities for feedback and discussion. A mixed methods approach enhanced the robustness of the findings by offering opportunities for triangulation and so limiting bias. Furthermore, we consulted with an Expert Reference Group (ERG) at intervals throughout this preparedness for practice and the professionalism projects.

We received ethics approval to carry out this research from the School of Social Sciences Ethics Committee (SREC/3390)

2.2 Stage 1: Issue Scoping

Our intention was to build on work that had already been undertaken by the GDC. This included: Transition to Independent Practice Report (Boak et al 2013); Trainee Survey 2018 (GDC 2019); Educational Supervisors Survey 2018 (GDC 2019); available evidence, at the time of this review, from the outcome of BDS Inspections by the GDC 2019 (GDC 2019); and summarised findings from previous GDC Inspections of all dental professional programmes.

We consulted, through scoping interviews, with thirteen topic experts. These conversations were conducted face-to-face or via telephone; one individual provided an email response. These individuals were identified through discussion with the GDC project team and our knowledge of the field. They were provided with an information sheet and consented to taking part in the interviews (see *Appendix 2*). Alongside developing our scope of the issue, these discussions (with experts and the GDC) signposted us to additional key evidence.

2.3 Stage 2: Rapid Evidence Assessment (REA)

For this REA, we built on the 'Transition to Independent Practice' report (Boak et al 2013), using at least those databases and search terms employed in that publication, and utilising similar inclusion and exclusion criteria. We added a citation search for the report to identify additional relevant publications.

2.3.1 Sources
A search strategy to address preparedness for practice was designed to be comprehensive and support the efficient retrieval of the most relevant literature. We followed the PRISMA guidelines (2019). Electronic databases for papers from peer

reviewed journals were searched using a predefined range of keywords and combinations of these keywords (see search terms below in Table 2). In 'Transition to Independent Practice' Boak et al (2013) searched seven online databases (Medline, CINAHL, AMED, PsycINFO, EMBASE, BNI and the Cochrane Database of Systematic Reviews). We also utilised an academic literature search engine (Google Scholar). Following Boak et al (2013), we included a web-search for grey literature. We received some suggestions for additional data from the feedback during the scoping interviews.

2.3.2 Inclusion and Exclusion Criteria

We enhanced the manageability of the REA by building on Boak et al (2013). Our intended inclusion and exclusion criteria are set out, below, in Table 1. We also sought to develop country criteria to focus our data extraction on healthcare systems more likely to be comparable with the UK (for example, New Zealand, Australia, parts of Europe).

A REA of the preparedness for practice literature search primarily focused on 'preparedness' in relation to the UK new dental graduate. Included in the evidence are relevant dental studies focusing on preparedness for practice from outside of the UK, and other healthcare professions, although for this aspect of the review the list of studies is not exhaustive. Searches were undertaken using key words derived from Boak et al (2013). Publications identified in Boak et al (2013) were not included in this REA.

Table 1: Inclusion and Exclusion Criteria

Inclusion criteria
- Research based publications investigating the general preparedness of undergraduates (at latter stage of UG training or new graduate).
- Research based publications investigating the preparedness of undergraduates in relation to single skills (at latter stage of UG training or new graduate).
- Opinion papers discussing preparedness, curriculum development and data requirements for assessment of preparedness
- Research based studies into the effectiveness of changes to curriculum design, content and delivery in better preparing undergraduates
- Research publications which identify the effects of other factors on preparedness such as age, gender, stakeholder interaction, society changes and methods to improve the transition into the workplace.

Exclusion criteria
- Publications reporting teaching techniques in one or more schools with no assessment of effectiveness
- Pre-clinical skills teaching even if includes student feedback

2.3.2.1 Search Terms

A series of searches using multiple combinations of key search terms were executed which resulted in thousands of potentially relevant publications. The search used an iterative process and secondary reference searching was undertaken of key publications included in this review to cross check and to identify further evidence.

The search terms in Table 2 were based on the one used in Boak et al (2013) and modified slightly.

Examples of dental search terms used for Preparedness for practice REA			
Dental professions	*Newly qualified synonyms*	*Preparedness synonyms*	*Support synonyms*
dentist dental practitioner dental hygienist dental therapist dental nurse orthodontic therapist orthodontist dental technician clinical dental technician dental care professional dental assistant dental auxiliary oral health technician denturist dental staff dental surgeon complementary to dentistry dental team	new registrant newly qualified newly registered new practitioner new graduate graduate undergraduate graduating student vocational trainee vocational dentist foundation trainee foundation dentist overseas registrant overseas graduate European graduate European registrant educational supervisor	preparedness for practice readiness for practice transition role transition student to practitioner competence confidence	support supervision vocational training foundation training graduate training safe beginner

The search strategy was developed and refined iteratively as initial results were generated. Subject heading searches proved to be of limited value. Keyword searches were based on five main concepts derived from the project's research areas and initial test searching: dental professions, newly qualified, preparedness, support and patient safety. Each was elaborated by synonyms and closely related terms used in full or attenuated forms. Keyword searches were undertaken singly and in various combinations to progressively focus and circumscribe search results.

2.3.3 Selection Process and Data Extraction
The process for selecting (and eliminating) the publications collected via the search methodology is summarised below and in Figure 1.

2.3.3.1 Screening
From our initial explorations, we were aware that more publications would be sourced than could be handled in a REA. We limited screening to near to 1000 references (primarily determined by using the 'most relevant' facility within search engines to order all returned results). This figure had been informed by our experience of what was manageable from our work on the GDC-funded CPD literature review, and Boak et al (2013)

The search of databases for preparedness for practice literature identified 1559 publications. Following elimination of the duplicates, 1317 publications were left for screening (titles and abstracts). We scanned all these titles and abstracts and excluded items based on our predefined criteria. After undertaking a concordance check (to ensure criteria were understood and applied consistently), two members of the team worked independently and in parallel. Any uncertainty was brought to the wider team and consensus sought. We strived to ensure robust screening to avoid time spent in retrieving full texts which turned out not to be relevant.

However, we also noted that in order to select the maximum number of high-quality papers, the researchers occasionally selected papers outside these criteria. These exceptions were selected on the basis of quality (as concluded from the abstract) and the high relevance to the project research questions.

Non-relevant papers (1184) were removed. The full texts of the remaining 133 publications were sought. On an initial review of full texts, further publications were removed as not relevant. This resulted in 108 publications which were considered for data extraction. During this process, the project team members performed an additional elimination and selection process when they identified that on close reading a paper did not fulfil the selection criteria or was judged not relevant. The final number of publications contributing to the data recorded in this literature review was 89.

EndNote was used to manage the screening process; database search results were imported into EndNote and title/abstract screening carried out within the programme. This ensured an accurate record of titles excluded and assisted with full paper retrieval. Following PRISMA guidelines, a flowchart displayed the number of items identified, screened, assessed for eligibility and included (See Figure 1).

2.3.3.2 Data Extraction

The full text of included publications was read, and the relevant data extracted and recorded on a data extraction template (DET). This template reflected that used in Boak et al (2013), with modifications. To quality assure the process, the DET was piloted on 10 articles, reviewed by the team members and modified.

For each of these 89 papers we extracted and recorded: reviewer and date, citation, year study began, country, participants (size and type), research methods, assessment of methodological quality, findings relevant to the questions, recommendations, and overall rating of relevance.

The strength of the study design was assessed using a simplified levels of evidence model widely adopted (Essential Evidence Plus 2020), slightly modified to accord with Boak et al (2013). (See Table 3). In Table 4, we report the quality levels of the papers referenced in each section of the report. Total numbers in the table exceed 89 as publications are cited in more than one section.

Table 3: Study design quality levels

Grade Ia	Systematic reviews of RCTs
Grade Ib	Randomised controlled trials
Grade IIa	Systematic reviews of studies without randomization
Grade IIb	Studies without randomisation: single group pre and post intervention, cohort, time series, matched, case-control studies
Grade III	Other non-experimental studies
Grade IV	Opinions and case reports

Figure 1: PRISMA flow diagram detailing the search process

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Identification
    ┌─────────────────────────────┐
    │ Citations identified through│
    │     database searching      │──────────┐
    │         (n=1559)            │          │
    └─────────────┬───────────────┘          ▼
                  │              ┌─────────────────────────┐
                  │              │   Duplicates excluded   │
                  │              │        (n=242)          │
                  ▼              └─────────────────────────┘
    ┌─────────────────────────────┐
    │    Citations after          │
    │    duplicates excluded       │
    │        (n=1317)             │
    └─────────────┬───────────────┘

Screening
                  ▼
    ┌─────────────────────────────┐      ┌─────────────────────────────┐
    │   Citations screened by     │      │  Citations excluded based    │
    │    title and abstract       │─────▶│  on title/ abstract as they  │
    │        (n=1317)             │      │  did not address the         │
    └─────────────┬───────────────┘      │  research questions          │
                  │                      │        (n=1184)              │
                  │                      └─────────────────────────────┘

Eligibility
                  ▼
    ┌─────────────────────────────┐      ┌─────────────────────────────┐
    │  Full text articles assessed│      │   Additional articles        │
    │      for eligibility        │◀─────│   identified through         │
    │        (n=133)              │      │   reference screening        │
    └─────────────┬───────────────┘      │        (n=4)                 │
                  │                      └─────────────────────────────┘
                  │                      ┌─────────────────────────────┐
                  │─────────────────────▶│   Excluded (n=29)            │
                  │                      └─────────────────────────────┘

Included
                  ▼
    ┌─────────────────────────────┐      ┌─────────────────────────────┐
    │  Articles included in data  │      │  Full text articles excluded │
    │        extraction           │─────▶│        (n= 19)               │
    │        (n= 108)             │      └─────────────────────────────┘
    └─────────────┬───────────────┘
                  ▼
    ┌─────────────────────────────┐
    │ Articles included in the REA│
    │        (n= 89)              │
    └─────────────────────────────┘
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Table 4: Study design evidence quality levels

Section	Quality Level					
	Grade Ia	**Grade Ib**	**Grade IIa**	**Grade IIb**	**Grade III**	**Grade IV**
	Systematic reviews of RCTs	Randomised controlled trials	Systematic reviews of studies without randomisation	Studies without randomisation: single group pre and post intervention, cohort, time series, matched, case-control studies	Other non-experimental studies	Opinions and case reports
4.1 What is preparedness for practice?	0	0	1	0	2	2
4.2 Measuring and Evaluating preparedness for practice	0	0	0	2	3	1
4.3 Perceptions of preparedness for practice	0	0	3	2	27	3
4.4 Factors influencing preparedness for practice	0	0	12	9	29	11
4.5 Effect of Societal Change	0	0	0	0	0	1
Totals	*0*	*0*	*16*	*13*	*61*	*18*

A final record of the evidence collated, the references and their quality levels were scrutinized by two team members independently and then collectively to construct Table 4.

2.4 Stage 3: Co-production Activities with the GDC and Consultation with the Expert Reference Group (ERG)

Throughout the study, we worked closely with a project team based at the GDC. Members of the project team were invited to and networked with a range of stakeholders who attended the GDC's conference 'Preparedness for Practice of UK graduates' (November 2019). Stakeholders with interests in the education and training of all dental professionals were invited to attend. This learning event provided an opportunity to share findings from the on-going investigations and to develop conclusions and implications.

One single ERG was established and consulted in relation to both the preparedness for practice and professionalism studies. The group was consulted at three points during the project. Initially, they were provided with information about the study, including the project plan and milestones. They were consulted on the questions to be addressed in the scoping interviews. A discussion took place via video-link between ERG members and ADEE team members in November 2019. Discussions centred primarily on the draft report on the analysis of the evidence from the scoping interviews with topic experts. A further video discussion took place in January 2020. Discussions then centred on findings related to the professionalism study. Between these meetings, email exchange was had with some members of the ERG. The views of the ERG members were taken into consideration when refining evidence from both aspects of the project to compile the final report.

PART 3: KEY FINDINGS FROM THE SCOPING INTERVIEWS

To complement the rapid evidence assessment and to inform our understanding of the issues related to preparedness for practice, we undertook a number of scoping interviews.

3.1 The Data and Analysis

We conducted 13 scoping interviews with a purposively selected sample of preparedness for practice experts. These individuals were knowledgeable about both professionalism and preparedness for practice (the findings on the former we detail in our companion report), and we thank them for their contribution. The experts were professionals in dentistry (seven respondents, including two GDC representatives), healthcare (two respondents), medical education (three respondents) and aviation (one respondent). All were senior in terms of their career stage. Four were male and nine were female. Eleven of the interviews were via telephone, one was conducted via Skype and one of the responses came in the form of an email. The average length of the telephone and Skype interviews was 49 minutes [1]. In reporting the data, we use pseudonyms to protect the anonymity of the interviewees.

Themes were identified through a process of inductive coding. In this report we provide a short description of each code and give extracts to illuminate the code. A short depiction of the codes, organised into thematic categories, is set out in Table 5. It includes the number of times each of the codes was used across the interviews. Each stretch of talk could be coded for multiple themes, and there was considerable overlap between certain codes. In the text we indicate in how many interviews each code was used. For example, there were 13 extracts of talk that was coded as relating to 'definition' (Table 5) and the code was used in ten interviews (see description under the heading 'definitions'). We only report codes that were discussed at least five times.

3.2 Overview of Findings

As will be observed in the companion report on professionalism, the number of references tend to be higher for *professionalism* than for *preparedness for practice* because more questions were asked about this topic and more time spent in the interviews discussing this topic.

We organised the data related to preparedness for practice into four overarching themes, concerned with principles, attitudes and behaviours, contexts, and learning and development. (See Table 5).

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[1] One interview was with two individuals.

Table 5: An overview of themes and codes for preparedness for practice

THEMES\CODES	Number of times
principles\definition	13
principles\health	9
principles\health\mental health	15
principles\regulations	6
principles\ethics and values	5
principles\motivation	3
principles\motivation\altruism	3
principles\motivation\financial	3
attitudes and behaviours\interacting with patients	18
attitudes and behaviours\working in a team	17
attitudes and behaviours\confidence	12
attitudes and behaviours\dealing with complexity	16
attitudes and behaviours\dealing with uncertainty	7
attitudes and behaviours\adapting	2
contexts\culture	10
contexts\healthcare	8
contexts\generations	5
learning and development\clinical competence	28
learning and development\learning by observing	13
learning and development\learning by doing	30
learning and development\'real' practice	11
learning and development\safety	27
learning and development\autonomy	13
learning and development\support	24
learning and development\insight	19
learning and development\insight\limits	12
learning and development\assessment	25
learning and development\assessment\practical	10
learning and development\challenges	12
learning and development\lifelong learning	8

3.3 Theme 1 – Principles

This thematic category refers to principles that underpin preparedness for practice, but which cannot be directly observed.

3.3.1 Definitions

In most cases these definitions were given in response to a direct question about defining preparedness for practice. Definitions were elicited in ten of the interviews. Two participants reformulated their definitions at the end of the interview. All definitions mentioned multiple elements that constitute preparedness for practice, but the specific elements highlighted differed among participants.

> *Gemma: I think it's a multifaceted concept. I think you can look at it in terms of a graduate's knowledge; a graduate's skills; a graduate's approach to their clinical practice; approach to their patients; approach to their own self and their learning*

Almost all definitions mentioned 'clinical competence' as a fundamental aspect of preparedness for practice. Codes linked to how participants defined preparedness for practice included: *clinical competence, professionalism, regulations, health, ethics and values, insight, lifelong learning, safety, autonomy, limits, dealing with uncertainty,*

interacting with patients, dealing with complexity, adapting, mental health, clinical confidence and learning by doing.

3.3.2 Health

Three interviewees made a link between health and preparedness for practice and accounted for the nine times we used this code. The sub-code of 'mental health', refers to discussions related to mental health issues, including resilience, depression, isolation, burn-out, stress, anxiety, and perfectionism. It was used in seven interviews.

> *Zoe: I see a lot of young foundation dentists who ... they're suddenly placed in an area where they have no friends, no family. So from... a pastoral point of view I wonder if enough has been done to prepare them for the wider practice that dentistry can be quite isolating.*

3.3.3 Regulations

There were references to requirements, regulations, and standards in three interviews. Emily described preparedness for practice as "mak[ing] sure that an individual has the right knowledge, skills, behaviours for the profession that is set by a regulatory body."

3.3.4 Ethics and values

This code was mentioned multiple times in a single interview, in the context of the importance of being 'of good character' when training to be a nurse.

3.4 Theme 2 – Attitudes and Behaviours

This thematic category relates to attitudes and behaviours that are seen as indicators of preparedness for practice.

3.4.1 Interacting with patients

Six interviewees highlighted the ability to communicate well with a range of patients as an aspect of preparedness for practice.

> *Maria: Having conversations with patients and so on and perhaps not just in one particular setting but having that crossover to see different levels, different ranges of situations.*

> *Zoe: We've passed the exam but is our interaction with patients, our communication skills, our confidence, our levels of interaction with patients [good] enough?*

3.4.2 Working in a team

This code refers to discussions of team working skills. Like *interacting with patients*, this is also closely related to general communication skills. However, the two were clearly separated in most of the interviews, which is why we assigned separate codes. It was used in seven interviews, with eight instances coming from the same interview, where the interviewee was discussing the role of the team in supporting trainees on placements.

> *Claire: You have to learn that you work as a team and you are only as good as your team.*

3.4.3 Confidence

Eight interviews mentioned the role of confidence in practice.

> *David: Now you might be capable but if you're not confident, there's still a risk there.*

> *Sophie: Preparedness for practice is ensuring there is a clear link between theory and practice to allow graduates to feel confident and competent in delivering care.*

3.4.4 Dealing with complexity

Participants highlighted that in order to be prepared for practice, new graduate trainees need the ability to carry out procedures under challenging circumstances (for instance time pressure, distressed patients, complications) and to prioritise well. It was used in eight interviews.

> *Phil: What you want is people to have the generic skillset to be able to go, 'okay I am going to use all my skills to manage time, prioritise, all these things, to apply those skillsets to come out with a sensible solution to whatever problem I'm confronting'.*

3.4.5 Dealing with uncertainty

Two interviewees suggested that the dentist must accept uncertainty in patient care in order to be prepared for practice.

> *Freya: Understanding that there is not always a black and white 'yes' and 'no' answer. That there are always more than fifty shades of grey. That they are able to deal with uncertainty.*

> *Kate: I think the preparedness issues that are really key is preparedness for uncertainty and preparedness for knowing what to do in the face of uncertainty.*

3.5 Theme 3 – Contexts

This thematic category refers to specific contexts which can shape expectations about preparedness for practice.

3.5.1 Culture

Participants referred to the culture of the learning and working environment, the specific school, regional differences in patients, and national cultures. The code was used in seven interviews.

> *Zoe: Have they been prepared for the population that they are going to be treating… with the levels of deprivation? So they might have trained somewhere in London and … I wonder how prepared they are for the local community.*

> *Kate: … the different organisational cultures but also the different country cultures (…) Say you come from a culture in which … you're not good with uncertainty but you're learning in a culture where uncertainty is a positive thing and it's being developed.*

3.5.2 Healthcare

Six interviewees made comparisons with other healthcare professions or discussed healthcare in general.

> *Freya: … being in a healthcare, patient-facing situation, it's a complex situation.*

3.5.3 Generations

Generational differences were also mentioned in relation to preparedness for practice. This code was used in three interviews.

> *Bryan: …different expectations of older professionals or more experienced professionals [of]… what's coming out of dental school … So they don't necessarily all need to know how to make and fit a full set of dentures because they're so rarely going to see people without any teeth.*

3.6 Theme 4 – Learning and Development

This thematic category relates to goals, ways of learning, and methods of assessment.

3.6.1 Clinical competence

This code refers to clinical knowledge, skills, and the ability to carry out appropriate treatment. We have also coded references to the specialised skills required in aviation. This code was used in eleven of the interviews. Most of the coded extracts refer to knowledge and skills in general, with a few specific examples (for instance: the ability to carry out a root canal treatment, or fitting full dentures)

> *Freya: We have to support them in honing and developing the skills they're going to need.*

3.6.2 Learning by observing

Six interviewees gave examples of students learning through observing professionals in 'real' practice.

> *Kate: I think that on placements we can have ad hoc opportunities for seeing this in action and for clinicians to positively role model.*

3.6.3 Learning by doing

Eleven interviews included examples of trainees learning something by practising. This code was used in the context of 'real' practise, university-based practise, and simulation. Three participants mentioned the difficulties of setting the minimum number of procedures required to learn specific skills.

> *Gemma: There is a logical argument that in order to be able to do something well and safely you have to have done it a few times, but the educational evidence would not support that there is a magic number of times that one has to do it.*

> *Emily: But also included in this will be the opportunity to make mistakes in a safe environment such as simulation.*

This raises the issue of whether an undergraduate course should be the same length for each student as some may take longer to reach the required competence in all areas.

3.6.4 'Real' practise

Participants referred to general practices, private practices, and outreach centres. These were framed as 'real' practices in contrast to university-based practices, where patients have different attitudes and expectations. The code was used in six interviews.

> *Bryan: ...ones that use a lot of outreach networks where they're actually going out into real clinics in the local area, or some which actually see patients, ... they jump into foundation training much more easily, I think.*

3.6.5 Safety

Ten interviewees discussed safety concerns. Most of these references focused on patient safety, with two mentions of potential dangers of harming reputations.

> *Phil: Is this person going to be safe and competent to operate on their own?*

> *Gemma: A degree of competence that enables somebody to safely work independently, but that level of competence probably implies that within doing that procedure there will be certain situations, certain patients, certain configurations of treatment that the graduate will say, 'no, hang on a minute. I need some help with this'.*

3.6.6 Autonomy

This code refers to the ability to work independently or with minimal supervision. It was used in six interviews. Often it was mentioned together with safety, as in the illustrative quote.

> *Kate: What it means for me is ... that you can, skills and knowledge wise, that you are at the level that it is safe for you to practice without close supervision.*

3.6.7 Support

Ten interviews highlighted the role of mentoring and support in developing preparedness for practice.

> *Emily: I think the areas that could be developed more are around the support and the practice learning environment.*
>
> *Bryan: I think some dental schools ... it's still a very cosy protective environment where they are reasonably cosseted.*
>
> *Gemma: If you maintain the same level of scaffolded support as they had, you know, first year on clinics, then they're never going to be able to walk independently really.*
>
> *Maria: I know mentoring means different things to different people, but often having a mentor for different areas that the individual needs to develop is very useful.*

Support was also discussed at length in one interview, where it was argued that as a result of short-term placements in medical training, teams do not invest in trainees, leaving them with little support during placements.

The conflicting demands of ensuring patient safety (a GDC requirement), whilst allowing the dismantling of the students' supportive scaffolding to allow the development of independence, is a challenge for universities and is clearly shown in the statements here and in 3.6.4 and 3.6.5.

3.6.8 Insight

Six interviewees spoke about the importance of insight and reflection in developing preparedness for practice, especially in the context of learning from mistakes.

> *Freya: I really do think, for workplace learning, role modelling opportunities for reflective practice of real-life cases, discussion and with experts who are happy with uncertainty, who deal with it on a daily basis. So not an expert standing and saying, 'this is how to do it', but you know 'these were challenges I faced while I was doing it, and this is my thought process'.*

The sub-code *limits* refer to discussions about knowing your limits and being able to step back when necessary. It was used in four interviews.

> *Kate: It means that you know the limits of your knowledge as well. So you know when you need to get help.*

3.6.9 Assessment and monitoring progress

There were also discussions about assessment of preparedness for practice. This code was used in eleven interviews. The consensus was that ideally there should be multiple points of assessment, with feedback from multiple people who have observed the trainee in practice.

> *Freya: Individually assessed separate competencies, if they're never integrated in assessment, then maybe that's going to be a real challenge to preparedness, because when is a student going to have opportunity to be assessed on putting all those together?*
>
> *Sophie: Student nurses and midwives have to achieve clinical competencies which are laid down in the nursing and midwifery council standards and form 50% of the preparation programme. These are assessed in practice by the mentor/sign off mentor and by simulation within HEIs.*

The sub-code of *practical assessment* refers to the assessment of practical skills in contrast to theoretical knowledge. It was used in six interviews.

> *Emily: How somebody is prepared for practice will be assessed both academically, and in practice. It might be in some role play within classrooms or it may well be ...with supervisors and assessors in clinical practice.*

The need for a robust assessment system is a clear requirement to ensure that on graduation students are "safe-beginners". The use of competency-based assessment systems, backed up by academic achievement, has been the mainframe of undergraduate education. The idea of multiple point assessments from different supervisors is pertinent here and suggests a work-based assessment system, where work is assessed in real life situations and not just at individual points, as is the case in competency assessment systems (Dawson et al 2017).

Monitoring progress of students/trainees particularly across the transition through graduation into the workplace was raised. One interviewee described how the medical schools based in Cardiff and Swansea engage with the Postgraduate, Professional Support Unit (PSU) of Health Education and Innovation Wales (HEIW). Representatives from each organisation meet on a regular basis to share and monitor student and foundation doctor progression through the transition of undergraduate and postgraduate training. This was said to facilitate support for student/graduate doctors who are recognised as struggling and promote engagement between educational supervisors across the continuum of training. A summary of this process is included in Appendix 3

3.6.10 Challenges

Six interviewees gave examples of challenging situations in which preparedness for practice is tested, or challenges in the development and assessment of preparedness for practice.

> *Phil: When something goes wrong, they drill through the wrong bit of somebody's tooth and it all starts going a bit wrong, how do they then cope? Do they panic, do they start flapping or can they maintain a rational thought process?*

3.6.11 Lifelong learning

Five interviewees noted that learning must continue after the point of registration.

> *David: Being prepared to recognise that you still have things to learn. ... there's no point in your life where you actually are totally prepared for everything. It's a continual growth.*

3.7 Summary

The scoping interviews complement the report of the REA and should not be read in isolation. That said, it is helpful to summarise the main findings from just the scoping interviews and map the findings to the four research areas of interest.

1. to what extent are new dental graduates meeting required learning outcomes and is this an effective starting point from which to practise safely?
2. what factors contribute to variance in preparedness for practice, are there specific skills, tasks or knowledge that graduates are achieving or lacking and what evidence demonstrates this?
3. what is the potential impact, on both patients and the profession, of graduates being inadequately prepared for practice?

4. what is the evidence (from dentistry or other healthcare professions) of ways that preparedness for practice has been defined, addressed and evaluated?

We provide a summary of the main points arising from the interviews and indicate which of the four research questions, in brackets (RQ 1,2,3,4) after each point, they address:

1. Clinical competence was seen as a fundamental aspect of preparedness for practice although interviewees recognised that multiple elements constitute preparedness for practice, including health, mental health and pastoral aspects. (RQ4) However, variation is demonstrable across different graduate cohorts. (RQ1)
2. Interviewees gave attention to attitudes and behaviours that were indicators of preparedness for practice. Two of these related to interactions with others, specifically with patients and in teamwork. Being able to communicate well is an important aspect of preparedness. (RQ4) These issues can impact on patients and the profession. (RQ3)
3. Managing complexity and dealing with uncertainty were also identified as important aspects of preparedness for practice, which can impact on the profession and patient care. (RQ3,4)
4. Experience in a 'real' practice, contributing to the provision of care (as well as observing) is central to development. (RQ2,4)
5. It was suggested that students need to be prepared to work with different patient groups in different contexts and be aware that there may be inter-generational differences in expectations. (RQ1,2)
6. One of the main reasons why 'real practice' experience is important is that it helps students/trainees to learn to deal with complexity and pressure. (RQ2) These can help to address the issues raised in points 3,4,5 above. (RQ4)
7. Safety and the concept of the 'safe beginner' (one who is independent but knows their own limits) were also recognised as important. (RQ1)
8. To be prepared for practice, students/trainees need appropriate support (including constructive feedback and gradual withdrawal of support through the course of their training). (RQ4)
9. There needs to be multiple points of assessment over time to check on developing preparedness. (RQ4)
10. Regular reflection on practice aids development. (RQ4)
11. Closer communication between undergraduate and postgraduate training organisations to support and facilitate the transition of graduates into the workplace could be of value. (RQ1,2,3,4)

PART 4 – RAPID EVIDENCE ASSESSMENT

In this section of the report we record the evidence collated through the rapid review of the relevant literature. Throughout this account a series of summary points are recorded. Each point is mapped to the research questions this review on preparedness for practice addresses, as listed below. The specific research questions (RQ 1-4) are recorded in brackets after each summary point

The four specific research questions that this review aimed to address

1. to what extent are new dental graduates meeting required learning outcomes and is this an effective starting point from which to practise safely?
2. what factors contribute to variance in preparedness for practice, are there specific skills, tasks or knowledge that graduates are achieving or lacking and what evidence demonstrates this?
3. what is the potential impact, on both patients and the profession, of graduates being inadequately prepared for practice?
4. what is the evidence (from dentistry or other healthcare professions) of ways that preparedness for practice has been defined, addressed and evaluated?

4.1 What is Preparedness for Practice?

The concept of preparedness for practice is not new. In UK dentistry it relates to the idea of the readiness of a new graduate to enter the workplace, specifically foundation training. However, at this stage they are described as 'safe beginners' and not independent practitioners (GDC 2012). The GDC defines independent practice as 'working with autonomy within the GDC Scope of Practice, and own competence, once registered'. In a commentary about leadership in undergraduate education, Lynch et al (2019) highlighted that the new graduate was incomplete and stressed the importance of the education continuum through foundation training and self-directed learning. A similar point was made by Ali et al (2014) whose study participants recognised that there were limitations on what could be achieved in undergraduate education and that this was just the starting point for lifelong learning. Thus, the concept of preparedness seems to have two stages: preparedness for working as a 'safe beginner' on graduation and preparedness for independent practice after further supervised training. The focus of this review is on the transition from dental student to newly qualified dentist and so our attention is on the preparedness of a new graduate.

Murdoch-Kinch (2018) in an opinion article, highlighted that the definition of preparedness varies across the globe but that commonly the concept is often defined in terms of a number of competencies grouped into domains. For example, on the basis of an analysis of interviews with a range of stakeholders on what is meant by preparedness, Ali et al (2014) identified a set of competencies or expected skills and capabilities. On the basis of these data the authors report that the new graduate should be a safe practitioner about to utilise a broad range of basic clinical skills, have the insight to understand their limitations, be willing to seek assistance when required and reflect on and plan their lifelong learning. They should treat patients regardless of their background, demonstrate good communication skills and be aware of their and their patients' expectations before starting clinical interventions. There was an understanding that working as part of a team was important.

In discussing the conceptualisation of preparedness for medical practice, Monrouxe et al (2018) highlight that previous studies tended to focus on clinical skills and procedures. On the basis of their extensive study which included interviews with foundation doctors, educators, postgraduate leads, other healthcare professionals, employers and governmental organisations on a UK wide basis, they also identify the importance of behavioural and emotional aspects of being prepared for practice. In a systematic review of UK and international literature, Mohan and Ravindran (2018) describe a preparedness for practice conceptual framework for dental graduates. It comprises six domains: academic and technical competence, communication and interpersonal skills, protective mechanisms and adaptive skills, professional attitude and ethical judgement, clinical entrepreneurship and financial solvency skills, and social and community orientation. They also highlighted the need for reflection by the student within the workplace. However, they did feel that further research was required to fully understand this construct.

> **Summary points**
> - Preparedness for practice may focus on more than one transition phase. In UK dentistry this can be the transition from student to safe beginner, or from safe beginner to independent practitioner. **The focus of this review is preparedness for practice as a new dental graduate (RQ1)**.
> - Preparedness for practice encompasses **not only clinical skills** but also behavioural, emotional and attitudinal aspects **(RQ4)**.

4.2 Measuring and Evaluating Preparedness for Practice

A number of studies have looked at how preparedness could be measured so that stakeholders could be satisfied that a new graduate was ready to make the transition to the workplace. Dawson et al (2017) in an opinion piece, provide commentary on how education providers assess preparedness. They suggest that the traditional single competency-based assessments, numbers of procedures completed and time-served are inadequate. Their argument is that measurement of 'deliberate practice', in other words performance on a task using work-based continuous assessment with a scoring system related to the individual student's ability to work independently on each skill, is paramount. They argue that multi-skills need to be assessed on a daily basis allowing for a multi-faceted, multi-layered system and a substantial amount of data. This would allow progression towards independent practice to be regularly monitored and feedback given at an individual level. In their view, the key to preparedness was the demonstration of consistent performance over many skill domains, in a variety of patient related circumstances. An underlying theme in this article was an understanding that students do not progress at the same rate, nor have the same clinical, professional or communication difficulties.

Using foundation trainers and foundation dentists, Ray et al (2016) developed and piloted an assessment questionnaire that they termed GAPP (graduate preparedness for practice). This assessment was based on the four GDC domains and they felt that it provided a useful analytical tool for assessing the preparedness of new graduate dentists.

A tool for the measuring preparedness of dental graduates was developed by Ali et al (2017b). Data were collected from a UK national survey of students and foundation dentists and a Rasch analysis conducted and externally validated by stakeholders. The

authors conclude that the tool is a valid and reliable student assessment for use at intervals, including prior to graduation. They suggest that it provides data for educators, those in foundation training and also students, to facilitate reflection. In a related paper, Ali et al (2017a) applied the measure, now termed DU-PAS (Dental Undergraduates Preparedness Assessment Scale) to evaluate self-perceived preparedness of final year students in the UK. The authors concluded that the results were valid, reliable and unidimensional.

Other studies have used competency-based assessment as the means of assessing students' preparedness for specific skills. For example, Redford et al (2018) investigated the use of a competency assessment in a UK dental school to evaluate students' preparedness for extractions. The students thought this assessment was appropriate.

Student self-reflection is also used as a means of evaluating preparedness. For example, Ihm and Seo (2016) investigated reflective training as a means of enabling third- and fourth-year students to self-assess their preparedness for dental competencies. The results of this survey-based study in the Republic of Korea suggested reflective training enabled students to self-reflect on their performance and their scores generally closely matched those of their clinical supervisors.

Summary points
- Preparedness for practice needs **repeated measures over multiple domains**, including workplace-based measures **(RQ4)**.
- Tools to measure preparedness for practice have been developed including **DU-PAS** (Dental Undergraduates Preparedness Assessment Scale) and **GAPP** (graduate preparedness for practice) **(RQ1,4)**.
- Other means of evaluating preparedness include **competency-based assessment and self-reflection (RQ1,4)**.

4.3 Perceptions of Preparedness

4.3.1 Student and new graduate perceptions: what they feel confident and prepared for and where they lack confidence or feel unprepared
Using DU-PAS, Ali et al (2017a) distinguished areas where final year students, in the UK, felt more or less prepared. Students were confident of their preparedness in the basic examination and the assessment of a patient. Preparedness scores were low for diagnosis and referral for oral cancer. In operative procedures, students were sufficiently confident with simpler skills such as provision of a local anaesthetic (block), plastic restorations (including caries removal), simple periodontal care, simple extractions and construction of dentures. New graduates were less confident in treatment planning and least confident of all in orthodontic, endodontic (especially multi-rooted teeth) and crown procedures.

These findings echo research by Gilmour et al (2016) who reported on a UK study of the confidence of final year students with a range of clinical skills (n=39). They also found that students were most confident in the simpler skills of basic examination, prevention, non-surgical periodontal therapy, plastic restorations, whilst the students were less confident preforming more complex skills such as surgical skills, molar endodontics and fixed prosthodontics. The students were six months from graduation, but it was clear that a significant proportion did not feel prepared and relied significantly on their clinical supervisors.

Shah et al (2018), using a questionnaire-based study of one UK dental school, investigated the self-perceived confidence of final year students. They found that there was a variation in the number of extractions and surgical extractions undertaken but that confidence was not directly linked to this number. However, the mean number of extractions appeared higher than had been reported in other UK dental schools. The students reported moderate confidence against most of the scenarios provided and the authors suggested that further training may be required to ensure that inappropriate referrals to the secondary care sector are kept to a minimum.

In recent research, Ali et al (2018) investigated the preparedness for practice of final year dental students in three schools in Pakistan, using the DU-PAS questionnaire previously applied in UK studies. They found that overall the students in Pakistan felt less prepared than the UK cohort. Along with their UK equivalents, the students in Pakistan felt under-prepared in areas such as treatment planning, endodontics (molar) and crowns. In addition, the area of partial dentures was a concern.

Murray et al (2016) looked at the self-reported confidence levels of undergraduate students in New Zealand. Less than half of respondents felt prepared for practice, but as in most studies the students felt confident in the less complex procedures including extractions and simple root removal. In more complex procedures or those of a more specialist nature (restoring implants), the students reported lower confidence levels.

In a study from Malaysia, Mat-Yudin et al (2019) used the DU-PAS questionnaire (Ali et al 2017a) with final year students in six dental schools. The results are comparable to those undertaken in the UK (Ali et al 2017a) and Pakistan (Ali et al 2018). Students felt less confident about molar endodontics, providing partial dentures, assessing orthodontic treatment needs and prescribing drugs to patients. In addition, other areas of concern were referral of suspected oral cancer, using an evidence-based approach to treatment and the management of anxious patients.

Using their GAPP questionnaire, Ray et al (2017) investigated the views of both foundation dentists (FD) and educational supervisors (ES) about preparedness for practice at six weeks post-graduation. In this UK study, the FDs felt less prepared for orthodontic repairs and assessment, surgical extractions and indirect restorations. Comments related to the lack of clinical experience in these areas at the undergraduate level. In addition, the business side of dentistry and the NHS were highlighted as lacking in the undergraduate curriculum. FDs rated their preparedness significantly higher than their ESs.

Literature from the research on medical training provides further evidence relevant to the practice of dentistry. In a questionnaire study of foundation year 1 (F1) doctors working in the North West of England, Watmough and Kennedy (2014) found that the F1s felt less confident/competent about nutritional assessment, skin suturing stitches, wound care and basic wound treating, correct techniques for moving and handling patients, making up drugs for parenteral administration and dosage and administration of insulin and sliding scales. Another questionnaire study of F1s, this time in the East of England (Miles et al 2017) identified deficiencies in relation to dealing with referrals, knowledge of drug interactions, neurological and visual problems, pain management and dealing with uncertainty. In other studies of medical graduates, Goldacre et al (2014) stressed the need for medical schools not to overlook what they may perceive as simple

tasks which they might expect their students to just pick up. They suggest that where some of the perceived simple tasks are creating difficulties for new graduates, this could be addressed very readily.

Kellet et al (2015) used face-to-face individual and group interviews with both foundation doctors and their supervisors. Foundation doctors felt they struggled with the following issues: the challenges of new responsibilities; decision making; time management; prioritisation of tasks; and administrative commitments. They felt particularly unprepared for making a diagnosis; prescribing in practice; and in how to act in emergency situations. Supervisors highlighted the need for more clinical exposure and that new doctors should be guided about when to ask for help. Having said that, concerns were raised by foundation doctors about the lack of support from senior staff when they did call for help.

The evidence from Monrouxe et al's (2017) rapid evidence review suggests that there is a need to improve the delivery of undergraduate medical teaching for the following: working within a multi-disciplinary team; the application of clinical reasoning in relation to diagnosis and treatment planning; delivery of emergency care; dealing with the hand-over of patient care to other staff; medicines management and prescribing; legal and ethical issues; and dealing with clinical incidents/errors. This echoes Kellet et al (2015) who studied the transition to practice of the new medical graduate. Recommendations included training in prescribing, clinical reasoning and differential diagnosis. In terms of other skills, they recommended more support in communication skills, working as part of a team, and dealing with patients with particular special needs. Other recommendations related to guidance on how to prioritise activities and time management, guidance on hand-over and on tasks related to administration (documentation and record keeping). They also suggested that students and new graduates need continued guidance on life skills.

Monrouxe et al (2018) also carried out an extensive stakeholder investigation, on medical training, including F1s and F2s, educators, postgraduate leads, other healthcare professionals, employers and governmental organisations on a UK wide basis. They used narrative interviews with individuals and audio diaries compiled by foundation doctors over a 3-month period. The medical graduates in this study appeared mostly prepared for recording a history and patient examination; performing simple aspects of patient and colleague communication; diagnosis and management; and being keen to work in multi professional teams. In addition, they felt capable of carrying out basic practical and investigative procedures and obtaining valid consent. Medical graduates appeared to need help to address their deficiencies in the following: applying biomedical scientific knowledge to clinical practice, dealing with and managing a high volume of patients, dealing with complex patient conditions and the acute sick patient, dealing with challenging communication issues, prescribing, documentation and information gathering, dealing with complex ethical and legal issues, addressing the management of their time and supporting an appropriate work-life balance.

Lomis et al (2017) describe a set of guiding principles for US medical training institutions to enable them to support effective and safe management of patients during the transition from undergraduate to medical residence. This is based on a set of thirteen 'core entrustable professional activities' (EPAs) which the authors argue should be agreed for the new medical graduate as they enter postgraduate residency training in the US.

Summary points
- Lack of preparedness in the dental field relates more to **complex skills** (treatment planning, crown/bridge, endodontics especially molar, surgical extractions and diagnosis in orthodontics) where **experience is limited** by number of cases seen at the undergraduate level **(RQ2,3)**.
- Findings from the UK are similar to those reported from other countries (New Zealand, Pakistan, Malaysia) **(RQ2,3)**.
- Areas that medical undergraduates need to be **more prepared** are identified in the literature including: referrals, medicines management and prescribing, diagnosis and treatment planning, wound care, delivering emergency care, hand-over, working within a multi-disciplinary team, legal and ethical issues, and managing clinical incidents/errors **(RQ2)**.

4.3.2 Trainers' perceptions of new graduates' preparedness for practice in clinical procedures

In two related studies, Gilmour et al (2018) and Jones et al (2018) investigated foundation trainers' expectations and experience of new graduates in relation to a wide range of clinical and supporting skills. In the 'experience of trainers' article (Jones et al 2018), the authors report that many of the expectations were met by the new graduates but highlighted where there was a mismatch between the experience of trainees and their expectations. As in other studies, the more complex skills of surgical extractions, molar endodontics, indirect restorations (such as crowns and complete dentures) and orthodontic basic skills revealed a mismatch between experience and expectations. There were some interesting findings related to the simpler procedures - for example, a reported lack of skill in using amalgam. The authors also noted that there were significant variations between undergraduate schools in the perceived ability of their graduates to match the expectations of this group of trainer stakeholders. Trainers were critical of dental schools in relation to their clinical experience in a number of areas including fixed and removable prosthodontics, endodontic skills and surgical skills. The authors suggested that further and ongoing discussion should occur between undergraduate and postgraduate training organisations, especially to clarify the variation of experience currently observed.

Oxley et al (2017) circulated a questionnaire to all dental foundation trainers asking them to comment on the current standards of new graduates and changes to those standards over time. The response rate of 28% was low, although this represented 312 foundation trainers. Just over 50% of respondents reported that overall, they felt that the standards of those entering foundation training were unsatisfactory. The clinical areas of concern were again crown and bridge (85%), extraction of teeth (75%), endodontics (74%), removable prosthodontics (62%) and treatment planning (62%). The qualitative data highlighted concerns about the variation between dental schools particularly in new graduates' clinical experience and there appeared to be a general feeling that standards had declined in the last few years. In their conclusions, the authors "hoped that the research will encourage exploration of the apparent lack of congruence between output from dental schools, entry to foundation training and the position of the GDC." Cabot et al (2017) in a response letter to this paper (Oxley et al2017), suggested that foundation training was the appropriate place to 'hone' more complex skills following graduation as a safe beginner.

In the judgement of Ray et al (2017), foundation training is necessary to give new graduates the required clinical experience in the areas of surgical extractions, endodontics and indirect restorations, and felt that foundation training programmes should train new graduates in the business side of dentistry.

> **Summary point**
> - Evidence suggests that dental foundation trainers tend to hold **higher expectations** of the new graduate than expected outcomes at graduation and believe that standards are declining.
> - There is a difference of opinion about the purpose of foundation training; some trainers expect more of an independent practitioner at graduation, others a safe beginner ready to further develop skills **(RQ1)**.
> - There is a suggestion that the number of procedures undertaken by undergraduates is inadequate especially of the more complex procedures, although others suggest that foundation training should develop these skills alongside the business skills required for general dental practice **(RQ4)**.

4.3.3 Other Stakeholder perceptions of student and new graduate preparedness for practice

Oliver et al (2016) used a questionnaire circulated to the membership of the Faculty of General Dental Practice (UK) (FGDP(UK)), to ask about their undergraduate training, what they valued about their training and what they felt they needed more of. The survey received 649 responses although this was only 19.4% of the total membership of FGDP(UK). The responses came mainly from those qualified more than 10 years (61%) who felt that they had not had enough teaching in surgical endodontics, conscious sedation, non-surgical periodontal treatments (root surface debridement), fixed orthodontic appliances, porcelain veneers, implants and posterior composites. This is somewhat at odds with other studies, particularly the inclusion of surgical endodontics, fixed orthodontic appliances and implants which are commonly seen more in specialty training. In addition, respondents felt the inclusion of business and practice management teaching, communication skills and increased clinical time and experience were required, although they suggested that this should be in partnership with foundation training. The authors concluded that more teaching in extractions and endodontics was desirable whilst commenting on the universities' challenge of delivering these in crowded curricula with financial pressures that these issues entail.

> **Summary point**
> - Members of the FGDP(UK) desired more teaching in a range of skills at undergraduate level, including aspects of endodontics and orthodontics as well as practice management **(RQ1)**.
> - Undergraduate education and foundation training organisations could look to improve their joint working in a number of areas to share information and facilitate the transition into the workplace **(RQ4)**.

4.3.4 Perceptions of Preparedness with reference to single skills

Rather than focusing on general preparedness, a number of studies investigate perceptions of preparedness of specific skills. We report these in two groups: clinical skills and other skills.

4.3.4.1 Clinical skills

A number of studies have investigated the requirements for preparedness in individual clinical skills. Although more difficult to interpret in terms of the overall effect of these on general preparedness, a number of articles discuss skills which have been highlighted by students, foundation dentists and foundation trainers, as causing difficulties or a lack of confidence for new graduates. Often these are the more challenging clinical skills and ones which schools find more difficult to provide extensive experience because of falling patient numbers or a requirement for the student to gain other basic skills first

Movahedi et al (2019), in an opinion paper, looked at the requirements for prosthodontic preparedness, highlighting the need for sufficient experience in this skill but also noting that this needs to be undertaken as "deliberate practise". In other words, although repetition of the skill is necessary, reflective practise with feedback from a mentor is required. **Complete and partial dentures** were the focus of Puryer et al's (2018) questionnaire-based study of the confidence of undergraduate students in one UK dental school. They confirmed that confidence increased with experience (didactic teaching plus clinical experience). However, they noted difficulty in recruiting patients for such treatments (reduction in the number of edentulous patients) and that on average students graduated with the completion of less than two complete dentures and just under six partial dentures. In a series of two articles, Weider et al (2013a, 2013b), report their studies of complete denture teaching in the UK. In one study they circulated a questionnaire to UK dental foundation training schemes (Wieder et al 2013b) and in another to the UK dental schools (Wieder et al 2013a). They found a wide range of teaching and experience with one school having no complete denture requirement at all. The general trend was for reduced time for complete denture teaching and the authors suggested a rethink of undergraduate teaching in this area. A number of respondents questioned whether a new graduate met the requirements of competency in complete dentures as required by the General Dental Council (GDC). The second article (Wieder et al 2013b) investigated the views of foundation dentists (FDs) in London, noting a lack of experience (especially of London trained FDs) of dentures with a mean of three cases of complete dentures undertaken as an undergraduate. Confidence in this area was relatively low and again the authors questioned the competence of new graduates.

In Wales, Jones and Cope (2018) circulated a questionnaire to dental foundation trainees, dental core trainees and those on combined longitudinal programmes. They reviewed the knowledge and attitudes of new graduate dentists about antimicrobial **prescribing** and resistance. Whilst most felt their training in prescribing of antimicrobials was sufficient, they lacked the confidence in actually prescribing medications. The authors concluded that there should be defined competencies about the uses of antimicrobials and factors relating to resistance in undergraduate curricula.

Further evidence about preparedness for prescribing is found in the wider healthcare literature. Medical graduates' preparedness for prescribing has been investigated by Geoghen et al (2017). Shortly after entering an internship programme, the new Irish graduates completed a survey recording their views on the teaching about drug prescribing and their ability to prescribe appropriately on graduation. The response rate was low. The areas where the majority felt confident were writing prescriptions, recording medications within a patient history and the ability to access further medication information when working in hospitals. Only about 50% felt confident about calculating medication doses and even fewer were comfortable about drug preparation and administration. Only a quarter of respondents felt that their undergraduate course had adequately prepared them for medication prescribing in future clinical practice. In another review of medical students' preparedness for prescribing, Brinkman et al (2018) reported on a systematic review and meta-analysis of whether medical students in their last year of training possess adequate competency in prescribing. The authors recognised that prescribing errors are regularly apportioned to new doctors and are considered as breaches of patient safety. They suggested this may relate to inadequate training in clinical pharmacology and therapeutics during the undergraduate course. Taken in the context that the authors judged the relevant articles they scrutinised were of low quality in research terms, there was no consensus on the definitive competences

in prescribing required of a new medical graduate. In particular, students displayed concern around the ability to prescribe and pharmacovigilance. The authors recommended an urgent need to address the shortcomings of the undergraduate courses in pharmacology and therapeutics.

Davey et al (2015), using a questionnaire-based study in one UK dental school, investigated the self-perceived confidence and competence of students in performing root canal treatment along with their views on the quality of endodontic teaching. As before, confidence and perceived competence increased with more experience (especially practical experience, both simulated and clinical), but even in the final year 10% of respondents did not feel confident about anterior root treatments and 57% did not feel confident with molar root treatments. Puryer et al (2016) in a similar questionnaire-based study in one UK dental school, found again that as students gained more experience, they felt increasingly confident. In this study, 100% of final year students felt confident about completing anterior root canal treatments whilst 91% felt confident about posterior root canal treatments.

Exodontia is commonly highlighted as an area where new graduates struggle. Brand et al (2015) used a questionnaire-based study of 23 European dental schools, to investigate students' opinions about the didactic and clinical training in exodontia. There was wide variation in the training provided to students and wide variation in perceptions of student preparedness. There was also wide variation in whether students were trained to undertake a surgical extraction. The use of pre-clinical models seemed to be helpful in the early training of students. Redford et al (2018) undertook a survey of Cardiff School of Dentistry students in years 3,4 and 5 about the competency assessment of routine exodontia. The students reported that they felt that this assessment process enhanced their experience in tooth extraction which in turn could strengthen their preparedness for practice in this specific clinical practice.

Summary points
- As a result of changing demographics and dental disease, students were found to have little experience of **complete dentures (RQ2)**.
- New graduates, both dental and medical, felt unprepared for aspects of **prescribing** and drugs management. Authors suggest the need for review of undergraduate curricula to address this **(RQ2)**.
- Some UK students lacked confidence in **root canal treatment** although this was found to vary by dental school **(RQ2)**.
- In Europe, student preparedness for **exodontia** varied by dental school **(RQ1,2)**.
- A key message from these studies of preparedness for specific clinical skills is that **confidence and competence increase with experience**, particularly with practical experience **(RQ1)**.

4.3.4.2 Other skills

Using an on-line survey of dentistry students and new graduates in Malaysia, Fuad et al (2015) assessed the views of students about their ability to **manage patients with special needs**. They concluded that new graduates were not prepared adequately at the time of graduation to manage the oral healthcare of patients with special needs.

Palmer et al (2019) used focus groups to investigate third year dental students' attitudes to **patient safety** with in undergraduate clinical practice. The results indicated that students were well aware of the definition of patient safety, including never-events. They felt that they needed to be aware of their own competence although some felt that they

needed more practice to be competent and so improve patient safety. The importance of good communication was discussed as was the need and value of small group teaching. In the conclusions, the authors felt that early teaching of patient safety and its definition and requirements, were important.

Nieminen and Virtanen (2017) investigated the ability of students to search and analyse evidence to inform their clinical practice. This questionnaire study was based in three universities in Finland and participants were all Year 5 students. The results suggested that students rarely used scientific journals in their study but that they had some skills in retrieval. However, they were not able to adequately **critically appraise literature** and the authors felt this inadequacy should be addressed better in the undergraduate curriculum. Straub-Morarend et al (2016), also investigated students' ability to utilise evidence to inform their clinical practice. Seven schools in the US were involved in the study. The students reported that they understood the term evidence-based practice but voiced their lack of confidence in their ability to critically appraise the evidence effectively. The authors concluded that there was much to be done to better equip students with the necessary skills to allow them to become evidence-based practitioners.

Medical students and junior doctors' preparedness for **clinical leadership** was studied by Barnes et al (2019) in a systematic review. In scrutinising sixteen relevant publications, they concluded that graduate doctors felt little prepared for the leadership role although they recognised that leadership skills increased with experience and related to increased responsibilities. The authors concluded that further research is required to enable the development of learning experiences at undergraduate level and facilitate an understanding of leadership roles across the transition into more independent practice.

Summary points
- Studies show that students and/or new dental graduates might be better prepared for managing **special needs** patients, aspects of **patient safety** and the critical appraisal of literature **(RQ2)**.
- Medical students/new graduates felt ill-prepared for **clinical leadership (RQ2)**.
- Authors suggest that limitations should be rectified through **additions to undergraduate curricula (RQ1,4)**.

4.4 Factors Influencing preparedness for practice

It is clear in the literature that the transition to FT is a stressful period with challenges arising from the increased workload, time management and coping with the expectations of both patients and trainers (Ali et al 2016, Gilmour et al 2018). The stress of transition is also widely recognised in the medical education literature (Cameron et al 2014, Monrouxe et al 2017). Watmough and Kennedy (2014) recognised that attention to preparedness increased as new medical graduates enter foundation training. Their study supported previous literature showing that preparedness of new graduates continues to improve. Goldacre et al (2014), for example, in their surveys of medical graduates from all medical schools across the UK, one year after their graduation report a reduction in the lack of preparedness of graduates compared with previous years.

How well the new graduate feels prepared for these and other challenges is affected by a range of factors. We begin this section by considering how influencing factors have been grouped.

4.4.1 Factor groupings

Mohan and Ravindran (2018) distinguish three groups of influences on preparedness: student training-related, namely the opportunity and extent of the practical skills undertaken as a student (i.e. clinical experience); student-related – gender and life experience, and postgraduate training, including the opportunity for internships and postgraduate training experience.

Ray et al (2018) investigated the factors which led final year students to believe they were or were not prepared for practice. The authors used focus groups with students and semi-structured interviews with senior academic staff to collect the data. A number of themes were identified which the authors grouped into intrinsic and extrinsic factors contributing to and influencing preparedness. **Extrinsic** factors centred on three aspects: (1) 'bricks and mortar' (the knowledge and the practical elements) which are affected by altruism, knowing when to seek help, dealing with ambiguity and decision making; (2) 'fear of the unknown', affected by 'leaving the cocoon' and sense of 'have I done enough?'; and (3) the adult learner, affected by 'educate me', the fragility of new knowledge, and driven by assessment. **Intrinsic** factors were (1) course-related (transition to foundation training, heterogenous experiences, requirements, preclinical, and outreach) and (2) the educators ('helping me flourish', intervention, holding me back, changing plans, no sense of urgency, and specialist or generalist).

In their rapid review of the literature concerning UK medical graduates' preparedness for practice, Monrouxe et al (2017) detected themes that centred on: individual skills/knowledge, interactional competence; systemic/technological competence, personal preparedness, demographic factors, and transitional interventions. Surmon et al (2016), carried out a systematic review which identified eight relevant articles when investigating the evidence on perceptions of preparedness for the first medical clerkship. As well as scrutinising this evidence, they investigated ways in which preparedness could be facilitated through the transition from undergraduate to graduate doctor. The authors detected ten themes relevant to preparedness. These related to competence, disconnection, links to the future, uncertainty, being part of the team, time/workload, adjustment, curriculum, prior life experiences and learning.

Focused on nursing students, Jarvinen et al (2018) carried out a scoping review which extracted data from seventeen relevant articles. The aim was to investigate evidence on factors that influence whether a nurse student is prepared for the graduate working environment. From the review, the authors detected two themes relating firstly to the education that the nurses had received and secondly personal issues that may impact on their ability to learn and progress.

Informed by these groupings and themes, below we organise factors influencing preparedness under three headings: the effect of education on preparedness – undergraduate factors 4.4.2; mechanisms to support transition 4.4.3; and 4.4.4 student/trainee factors. These are sizable topics and within each we use a number of sub-headings.

Summary points
- Factors and themes influencing preparedness for practice have been identified in the dental, medical and nursing literature **(RQ1)**.
- Informed by these factors and themes, in this review we organise these influences into undergraduate factors, **mechanisms to support transition** and student/trainee factors **(RQ1)**.

4.4.2 Effect of Education on Preparedness: Undergraduate factors

We consider the literature on undergraduate education influences on preparedness in terms of curriculum design and assessment, curriculum content (including outreach), , feedback and reflection, and faculty related factors.

4.4.2.1 Curriculum design and assessment

Park and Howell (2015), in a retrospective cohort study over a 5-year period in one dental school in the US, investigated the effect of changing from a number and discipline-based system to a **patient-based** comprehensive care curriculum. The study used student data recorded along with students' perceptions of the changes. The outcome suggested that students following the new curriculum outperformed students who followed the previous curriculum. The authors surmised that the patient-centred model, using comprehensive care rather than discipline specific care had significant advantages. Mohan and Ravindran (2018), also found that multidisciplinary patient-centred teaching was seen as a benefit when compared to speciality-based teaching.

Field et al (2017a) presented the ADEE agreed undergraduate curriculum for the European graduating dentist, which shows a **patient-centred** approach to curriculum design. This supplement to the European Journal of Dental Education also supports students having time in a primary care environment to assist in preparedness for practice along with effective staff training. Field et al (2017b) detail the methods used to provide the best teaching, learning and assessment structures within the curriculum which should be scrutinised in parallel with the four domains of learning and teaching in dental education described in detail in Field et al (2017a) – **Professionalism; Safe and effective clinical practice; Patient-centred care;** and **Dentistry in society**.. This recent curriculum framework provides an approach for the 21st century for undergraduate dental education and training previously published as 'profiles and competencies of the graduate European dentist' (Cowpe et al 2010). In a discussion paper, Chuenjitwongsa et al (2018) highlighted the use of a **competency-based** curriculum in dental education. They observed that the development of competency is independent of time limits or the number of procedures completed, and competency development should be focused on student-centred learning and the outcomes of that learning. They also suggested that dental education was influenced by "institutional features" (such as organisation of school, recruitment, training, quality assurance, governance and leadership) and external factors (such as societal oral health needs clinical science advances, policy changes in oral health management) , but these had received little research to date.

Bissel et al (2018), investigated the effect of a major curriculum change on final year dental students' perceptions of their confidence for moving into foundation training. This major curriculum change undertaken in 2009, was assessed by comparing final year groups in the two years before and four years after the change, on their confidence related to a range of clinical procedures (n=30). The results suggested that the change from a traditional to an **outcomes-based** curriculum were positive in more than half of the procedures investigated, with 25% showing a significant improvement. The authors highlighted the benefits of moving the curriculum to one that had significant outreach teaching (see below).

Postma and White (2017) investigated the **horizontal and vertical integration** of a course in a school in South Africa. A pre-clinical, case-based learning activity, in the third year, was added to the existing curriculum and was then continued in the form of portfolios and patient contact on integrated clinics followed by didactic teaching in patient care then comprehensive patient care in discipline-based clinics. The aim was to investigate if

this form of teaching encouraged the use of previous knowledge (vertical integration) with the knowledge that they were currently learning (horizontal integration). Using a visual analogue scale, students were asked to rate both the horizontal and vertical integration on the course. One group of students, preceding some of the curriculum changes, acted as a control group. The results suggested that the pre-clinical case-based learning activities, combined with the dedicated comprehensive patient care, had a positive effect on students' perceptions of their vertical and horizontal learning.

In the Netherlands, Kersbergen et al (2019) investigated a dentist/ dental hygienist **interprofessional** undergraduate training programme and how it influenced students and new graduates. The questionnaire study found that the training improved the understanding of each other's roles and responsibilities. However, these benefits were not always developed further on graduation. Salazar et al (2017) used a modified version of the Readiness for Inter-Professional Learning Scale (RIPLS) questionnaire to investigate views about interprofessional education in a UK dental undergraduate programme. The training programme again showed itself to be beneficial in encouraging and developing teamwork but that there were some ingrained senses of professional identity which were less positive.

Using a questionnaire sent to F1s in the East of England, Miles et al (2017) compared the preparedness for practice of medical graduates from medical schools using different educational approaches. Whilst the majority of trainees felt well prepared for clinical practice, the findings suggested that those graduates **from problem-based learning** programmes were prepared better in communication, team working and dealing with paperwork.

Eva et al (2016), investigated programmes of assessment designed to facilitate the move of health professionals from training into practice. They looked at recent reports on assessments of health professionals in Canada and followed this up with discussions with key stakeholders. The authors identified three themes: 'unintended consequences of competency-based assessment'; 'implementing quality assurance efforts while promoting performance improvement'; and 'linking assessment and practice'. They concluded that evidence of best practice in relation to the assessment of health professionals centred much more on quality improvement and patient safety rather than the established process of 'knows how and shows how'. They identified a list of important goals to be addressed by those involved in ensuring high quality assessment methodologies, including: 'broadening the base of assessment beyond knowledge tests'; 'building a coherent and integrated system of assessment across the continuum of training to practice'; 'harnessing the power of feedback'; and 'shifting accountability towards a model of shared responsibility between the individual and the educational system'.

Summary points
- Studies of different approaches to curricula design have demonstrated beneficial effects of **patient-centred, outcomes-based, integrated, problem-based and interprofessional programmes (RQ4)**.
- Compared to a discipline-based organisation of teaching, evidence from dental education research suggests that **integrated, patient-centred teaching** is more effective **(RQ2,4)**.
- Research with students from other health-related professions found that graduates from **problem-based learning** programmes were prepared better in communication, team working and dealing with paperwork **(RQ2,4)**.

4.4.2.2 Curriculum content

Clinical confidence improves with practice in a supportive environment (Ali et al 2016). The lack of clinical exposure was a common reason given for feelings of unpreparedness, particularly in areas of surgical extractions, endodontics (multirooted) and indirect restorations (crowns, bridges and dentures) (Ray et al 2017). Monrouxe et al (2018), in their study of medical graduates suggested that preparedness limitations related to lack of opportunities within existing undergraduate programmes. The authors advocated the use of more informal workplace opportunities and increased opportunities to work with multi-professional teams.

Much has been written about good clinical exposure and the value of 'real-world', outreach placements. Bissel et al (2018), detected a positive correlation between a new curriculum, which incorporated significant outreach teaching, and students' confidence levels over a range of clinical procedures. Mohan and Ravindran (2018), reported that effective community-based outreach training in the 'real world' appeared to be more effective in preparing students for their future work. The amount of clinical work undertaken was important and this is where outreach placements helped. Leisnert et al (2017), evaluated the perceived effect of outreach training over five years in a centre in Sweden, using a questionnaire for both students and staff mentors. The results suggested that both staff and students felt that outreach had helped in the students' development, increasing their professional confidence and self-reliance. Ray et al (2018), found the clinical experience, especially in outreach environments, was valuable as these provided exposure to real-life settings. In a small qualitative study designed to investigate the effect of dental education centres away from the main undergraduate campus in the North West of England, Kuroski et al (2019) report that the students felt that experience in these units prepared them well for foundation training. They used the term "real-life dentistry" and felt there was a positive benefit to their patients. In preparation for Foundation training, Ali et al (2016) also commented that structured experience in general practice type environments (outreach) is of great value. Lynch et al (2019) also recommended that more teaching in real-life settings, such as outreach centres, may address areas where preparedness is lacking.

A number of UK studies of outreach teaching have been conducted by Radford and Hellyer which show the positive benefits of outreach. In one study they used a Delphi survey of students and staff mentors (dentist supervisors and dental nurses who assist them) about their perceptions of working in an outreach centre (Radford and Hellyer 2016). Students reported that the outreach centre provided them with experience of working in a primary care environment under a current NHS contract which was good preparation for foundation training. In a further study, they found that working as part of a dental team the students developed a sense of belonging (Radford and Hellyer 2016). In another study, Radford et al (2016) collected data using a questionnaire with student cohorts over a four-year period. The students reported that immersion in the 'real-life' setting allowed them to better understand the roles of a dentist in primary care. The positive effect of the outreach experience was echoed in further work by Radford and Hellyer (2017). The students reported improved self-motivation, self-awareness of their limits, and enhanced self-confidence in their ability to deliver clinical care.

A study in India, reported by Verma et al (2016), investigated the effectiveness of an outreach centre. Students were allocated into two groups, one based in an outreach centre and the other was dental school based. The questionnaire results demonstrated

that compared to the dental school-based students, the outreach-based group displayed increased confidence and communication skills.

In some contrast, Walley et al (2014) found little difference between the hospital and outreach experiences in relation to paediatric clinical experience or confidence levels. They authors collected questionnaire data and written reflections from student cohorts at three different dental schools in the UK. Although the outreach centres expanded students' experience, the authors drew attention to variations in teaching between the dental school and the outreach placements.

Awojobi et al (2018) investigated a dental nurse training programme in London which involved learning in the hospital and in primary care settings. On the basis of a longitudinal, cross-sectional survey of a cohort of dental nurse students, they identified that the opportunity to work across both workplace settings offered a broader experience and enriched the preparedness of the dental nurses on graduation. This was supported by improved results in their final examination.

Newly qualified nurse graduates were the focus of Jarvinen et al's (2018) research. They highlighted the importance of clinical exposure but indicated that future research should investigate whether increased clinical exposure does support improvements in confidence and competence amongst new nurse graduates.

Researchers finding a lack of preparedness for practice, or trainers finding that the new graduate falls short of their expectations, often suggest that the solution to this problem is the inclusion of more undergraduate experience. There are obvious issues with this including an already full curricula, the challenge dental schools face in finding suitable (and sufficient) patients for students to treat, and a university system more geared to research than teaching (Lynch et al 2019). Surmon et al (2016) suggest that preparedness issues can be addressed through enhancement of undergraduate curricula programmes. From their systematic review of on perceptions of preparedness for the first medical clerkship they found evidence to support preclinical educational strategies such as enhancing content contextualization, further opportunities for the application of knowledge and skills, and constructive alignment of assessment tasks and pedagogical aims.

Changes in disease prevalence and patient preference impacts on the kinds of procedures undergraduates can experience. For example, Jones et al (2018) proffer that the lack of experience in the use of amalgam and complete denture construction arises because of changes in disease and patient preference. Certainly, within the undergraduate curriculum, patient availability for some of the more complex skills, such as molar endodontics, has been identified as a reason for new graduates' lack of preparedness (Gilmour et al 2016, Puryer et al 2018). Unlike in the UK, the students in Pakistan felt confident in tooth extraction, interpreted by the authors (Ali et al 2018) as a consequence of being able to see an increased number of patients requiring an extraction. In contrast, their lack of confidence in taking radiographs was again attributed to the availability of that experience as an undergraduate.

Based on consideration of the current guidance of a number of national and larger organisations who have all prepared competency documents for the graduating dentist, Murdoch-Kinch (2018) concluded that in a changing environment it was time to redefine the new dental graduate and update guidance.

Summary points

- **Clinical exposure** and practice enhance preparedness and confidence **(RQ1,4)**.
- There is much evidence of the value of '**real-world', outreach placements** in improving preparedness for practice. Findings from the UK are replicated elsewhere (Sweden, India) **(RQ2,4)**. However, variation in how outreach facilities operate was noted, which could have an impact on preparedness for practice.
- Researchers should be mindful of ascribing benefit to the outreach experience solely to clinical exposure; account needs also to be taken of the effect of a different approach to teaching in **outreach centres (RQ2,4)**.
- There may be difficulties in addressing preparedness through **increased clinical exposure**, not least because of already full curricula and patient availability **(RQ4)**.
- Educators should not assume that all students manage the simple tasks. If this is not the case, then difficulties with **simple tasks** when entering the workplace may create additional difficulties for new graduates **(RQ2,4)**.
- Given **changing patient demographics**, it may be timely for curricula review **(RQ4)**.

4.4.2.3 Reflection and feedback

A number of authors drew attention to the importance of student reflection on their developing preparedness and teacher/supervisor feedback. Mohan and Ravindran (2018), stated that self-perceived preparedness was improved by teaching which encouraged reflective learning with good feedback. One recommendation from Kellet et al's (2015) study of the transition to practice of the new medical graduate included promoting reflection and ensuring that feedback to students/trainees is delivered in a constructive manner. Burrows (2018), reviewed the literature related to how student self-assessment was used in undergraduate dental teaching. The author highlights the need for self-assessment as a tool required for life-long learning and suggests that this is a skill that should be taught and used as a pedagogic tool rather than a means of assessment.

Summary points

- Student/trainee **self-reflection** supported by constructive feedback can assist preparedness for practice (RQ**4**).
- **Self-assessment** can be taught and is a skill for life-long learning (RQ**4**).

4.4.2.4 Faculty related

Faculty (staff members) need support and training to facilitate curricula change and, to ensure that new initiatives work as intended. For example, Friedlander et al (2019) described curriculum changes to a more patient-centred clinical experience and the introduction of a new assessment process. The authors discussed the need for staff training to ensure that the structure worked efficiently.

Bush et al (2013), drew attention to another area where there is a need for faculty development. They document the challenges staff face in providing feedback and discuss 'failure to fail' issues. Reasons for this included difficulty with the assessment system itself, students challenging the decision and staff protecting themselves by avoiding confrontation. Suggestions were made about in-house assessment training and detailed discussions around individual students who were performing poorly.

Other faculty-related issues concern staffing levels. Lynch et al (2019) noted challenges in recruiting suitable academic and teaching staff and providing them with a manageable

career structure. The results of the Redford et al (2018) study indicated that although students thought the competency-based assessment of their preparedness for extractions was appropriate, there were issues concerning the availability of staff with appropriate experience and that using more junior members of staff instead was not appropriate. Staffing levels were also an issue raised by Shah et al (2018). Ray et al (2018), reported variation in opinion about whether the clinical teaching at undergraduate level was best undertaken by staff who had a primary care background or those who had a specialist background. Radford et al (2015) in an opinion article, discussed the increasing use of part-time general dental practitioners as undergraduate teachers and the challenges they faced, including understanding of what clinical teaching involves, handling the three-way dynamic (patient, student and supervisor), giving feedback and managing numbers of students.

Summary points
- **Staff training** is needed to support curricula change **(RQ4)**.
- Other areas of faculty development include giving **feedback and managing student failure (RQ4)**.
- Availability of **appropriate staff** may also be an issue **(RQ4)**.
- There is an increasing use of **part-time general dental practitioners** as undergraduate teachers who have professional development needs to help them address challenges of clinical teaching **(RQ4)**.
- There is a need for close **co-operation across the different teaching environments** to ensure a consistent approach to supervision and assessment, through **appropriate quality management processes (RQ2,4)**.

4.4.3 Mechanisms to Support the Transition from Student to New Practitioner
This report focuses on the transition from graduation to foundation training. In foundation training, they will be graduated and registered by the GDC but at this stage are classified by the GDC as "safe beginners" and will be working in a general dental practice with a named educational supervisor allocated to them who will provide advice and support. However, it is worth noting that the findings are relevant to other transition stages. To begin with there is the transition into university education, then from non-clinical to clinical where they are responsible for their own patients, when they will be closely supervised when carrying out irreversible procedures on patients. On satisfactory completion of foundation training, the dentist is now classified as an "independent practitioner", with a further transition to working independently in NHS practice.

4.4.3.1 Clinical placements, assistantship, shadowing and induction
Whilst we were unable to identify direct evidence from dentistry, in the wider healthcare literature, clinical placements, preceptorships, shadowing and assistantship are all supported, workplace-based experiences, focused on preparing for practice. However, they have specific definitions in some contexts. The General Medical Council ((2009) for example defines these terms. A clinical placement is "any arrangement in which a medical student is present in an environment that provides healthcare or related services to patients or the public" (p5). This would include outreach placements as discussed above. A student assistantship is "a period during which a student acts as assistant to a junior doctor, with defined duties under appropriate supervision" (p5). The GMC made this a mandatory part of the undergraduate curriculum designed to assist transition to practice. It is typically a 6 to 8-week period undertaken shortly before graduation. The purpose of shadowing is defined as being about "familiarising the student with a specific site where they will be working in the future" (p5). Shadowing usually lasts one week and takes place as close to the point of employment as possible.

These supervised experiences are distinguished from induction which is described as "the mandatory process whereby a new employee…is introduced to the environment and employment policies of a new position… and is normally the responsibility of a Human Resources department" (p6). We note that shadowing experiences, in dentistry, should be taken in the context that clinical dental training at all levels involves significant invasive procedures on patients across the continuum of training and may be more labour intensive for clinical supervisors.

The value of increased clinical exposure for medical graduates has been endorsed by many (Burford et al 2014, Cameron et al 2014, Goldacre et al 2014, Watmough and Kennedy 2014, Kellett et al 2015, Van Hamel and Jenner 2015, Miles et al 2017, Monrouxe et al 2017). In a systematic review addressing the question 'can new doctors be prepared for practice?', Cameron et al (2014) critiqued nine publications from the previous ten years. Shadowing opportunities and early clinical exposure were cited as improving preparedness for entering clinical practice. Kellet et al (2015) also stressed the importance of more shadowing opportunities and structured induction, both of which could smooth transition into clinical practice. Blencowe et al (2015) reported a 45% reduction in mistakes reported by trainees as well as a reduction in 'serious untoward incidents' as a result of four-day induction course for F1s. This included, in particular, issues round working on night shifts and the management of patients who were in a critical state. Burford et al (2014), in a questionnaire study with F1s, found that whilst the majority felt prepared for practice, they would have welcomed more hands-on opportunities during their final year placements and that access to real-life clinical experience was the best way of supporting preparedness for practice. Van Hamel and Jenner (2015) undertook a UK-wide survey of foundation training doctors and their supervisors and found variation between medical schools and between foundation programmes in terms of preparedness for practice and levels of trainee anxiety. Levels of anxiety were lower if the trainee had had a shadowing experience. Monrouxe et al (2017) and Goldacre et al (2014) also highlight the value of shadowing opportunities and structured induction processes.

Naylor et al (2016), investigated the 'expectations and experiences' of the new graduate diagnostic radiographer. The authors utilised a small focus group of new graduates which informed semi-structured interviews. Data were collected in advance of new graduates taking up their post and then a further three times over their first 12 months in practice. As with other healthcare professions, this transition from graduation into clinical radiography practice was challenging (arising from, amongst other things, the weight of responsibility, long working hours and tiredness). The authors detected that the radiographers, in this investigation, appeared well prepared for practice and that in part related to the experience gained during their undergraduate placements. When they stayed in one area, for a year, they experienced more integration and engagement within the working community which facilitated transition.

The Nursing & Midwifery Council (2019) "strongly recommends that all new registrants have a period of preceptorship when commencing employment". The preceptorship is designed to "develop the confidence to practise competently as a nurse, midwife or specialist community health nurse". Preceptors are experienced members of staff who support new nurses to cope with the pressures and complexities of safe patient care. Systematic reviews by Edward et al (2017), Irwin et al (2018) and Ward & McComb (2017), endorse the value of preceptorships. Edward et al (2017) found 15 relevant articles. In addition to underscoring the value of preceptorships to support the early

period of newly qualified registered nurses, they noted that this relies on structured guidance and training for preceptors. Irwin et al (2018) included fourteen articles in their review. Evidence from this review demonstrated that the influence of preceptorships was positive in terms of improved nurse competence and confidence. This was more pronounced where new graduate nurses undertook preceptorship activities within the broader team than on a one-to-one basis. The authors advocated more in-depth research into the preceptor team approach to supporting new nurses. Ward & McComb (2017) included 19 publications which highlight the value of preceptorships in support of students and in the initial orientation of new graduates. The experience is appreciated by students and preceptors alike.

Summary points
- **Workplace-based experiences** include clinical placements, shadowing, assistantship and have been defined and recommended by the GMC. The NMC advocate preceptorships for new registrants. In pharmacy, where new graduates may enter the workplace as stand-alone, single-handed practitioners these opportunities could be very beneficial **(RQ4)**.
- Together with **induction processes**, these have been shown to support transition from student to new graduate in their first post **(RQ4)**.
- **(RQ4)**.

4.4.3.2 Mentoring and guidance

Ali et al (2016), in a study of multiple stakeholders, found that good teamwork helped the new dental graduate to transition into foundation training and reinforced the view that mentoring in foundation training was invaluable in the transition from being an undergraduate to graduate capable of independent practice. Mohan and Ravindran (2018) report that a mentored year of effective foundation training and sufficient work experience was seen by graduates and students as a major factor in the developing preparedness.

Zhang et al (2016) undertook a systematic review focused on how mentoring programmes for nurses are implemented. Nine studies (from US and Asia) were included. They highlighted the value of mentoring of new graduates by an experienced role model. Yardley et al (2018) conducted a scoping literature review and compiled guidance from 60 publications on supporting the transition of medical clinicians to independent practice. These guidelines are based on "do, don't and don't know" and structured around four key themes: workplace learning, independence and responsibility, mentoring and coaching, and patient perspectives. Based on evidence, *dos* describe what should be enacted; *don'ts* describe what should be avoided (as it does not work or may cause harm); and *don't knows* describe concepts or interventions whose effect is uncertain. The authors concluded that transitions should be considered as part of the continuum of experiences, as doctors progress to more independent practice throughout their professional career, not only to the transition on graduation.

Whitney et al (2015), using a questionnaire-based study in Canada, reviewed new graduates' views on the competency statements used in their undergraduate educational programme. These competency statements are often prescribed by the regulator. They found that new graduates rated procedures they had undertaken frequently as the most important. However, there was a disconnect between some of the competencies and the students' confidence in those competencies.

Although not directly about guidance and mentoring, a review study by Magola et al (2018) reported that in the context of the pharmacy workplace, the new professional may be stand-alone and single-handed, immediately taking on a high level of responsibility and accountability. This can be a similar experience for the new young dental graduate. Where there were difficulties in any of the categories of experiences they identified (personal, social or job-related), these could reduce the ability to learn, reduce clinical and professional performance and potentially impact on safe patient care. Such issues, the authors argue, need addressing and we suggest mentoring and guidance might be helpful here.

Summary points
- Evidence from dentistry and nursing supports the on-going value of **mentoring** for the new graduate **(RQ4)**.
- Evidence-based guidance on supporting medical student transition to new doctor has been compiled **(RQ3,4)**.

4.4.4 Student/trainee factors affecting sense of preparedness

4.4.4.1 Gender
Studies show that in most curricula areas, males report feeling generally more confident than females (Gilmour et al 2016). This study from dentistry is supported by Mohan and Ravindran (2018), who report that male students feel generally more prepared than females most probably explained by greater self-confidence. In contrast, Barr et al (2017) detected no difference in views between recent male and female graduates in their study of self-perceived confidence of medical graduates in their preparedness for practice in a retrospective questionnaire study. In this study, the majority of graduates felt prepared in 41 of the 44 defined practice areas.

4.4.4.2 Age
Older students have more life experiences than students who start dental school straight from school. Ray et al (2017), found that those on the shorter four-year courses (mature students) felt more prepared than those graduates from the traditional five-year courses (mainly younger students straight from school). In a later study, they also found that some students, especially the younger ones, had an immature attitude to their learning (Ray et al 2018).

Barr et al (2017) identified four survey items grouped into six broad skills clusters, namely: 'core skills, advanced consultation skills, personal and professional capabilities, patient-centred capabilities, clinical care, system-related capabilities'. They detected links between age and gender and views on preparedness for practice. Older male graduates' retrospective views of their preparedness were at variance with their younger counterparts across a number of the skills clusters which was not the case for female graduates.

Summary points
- Perceptions of preparedness for practice are linked to feelings of **confidence** and there is evidence to suggest that males self-rate their confidence more highly than women **(RQ1,2)**.
- Evidence suggests that older students may also feel more prepared for practice **(RQ1,2)**.

4.4.5 Increasing interaction between stakeholders

Differences in expectations of the new graduate can result in misunderstandings and serve to make the transition from student to new practitioner even more difficult. Cabot et al (2017) ventured an opinion that there was a disconnect between the requirements of the GDC and the expectations of foundation trainers and suggested that there needs to be a closer dialogue between the dental schools and those managing postgraduate training of new graduates across the UK. In a questionnaire survey, Hanks et al (2018) elicited UK dental foundation trainers' views about the preparedness for practice and employability of new graduates. More than half of trainers believed that that their trainees (new graduates), whilst employable, were not adequately prepared. These authors also recommended closer collaboration between the organisations involved in undergraduate education and training and those managing early postgraduate training.

There is evidence in the literature of efforts to enhance engagement between stakeholders. For example, Blaylock et al (2018) in an opinion paper, outlined changes to interaction between the dental school and local postgraduate training organisations in the North East of England. Changes included schools providing practices with individual student's skill sets, and two-way discussion about the 'safe beginner'. The authors felt that these changes had improved information sharing, stakeholder engagement and facilitated initiative developments. This enhanced engagement, they argued, improved undergraduate and postgraduate training and helped students to be better prepared for their future career.

In the medical education literature, Monrouxe et al (2018) write that it would be useful to encourage stakeholders to work together to understand what are the realistic expectations for the new graduate and Watmough and Kennedy (2014) suggest that it would be value if there was greater discussion between the regulatory body (the GMC), universities and hospitals (the training workplaces), about when these clinical skills should be taught at undergraduate and postgraduate levels. Lomis et al (2017) also stressed the need for on-going collaboration across all relevant stakeholders to support the new graduate transition period.

Goldacre et al (2014) compared their survey of medical graduates across the UK, one year after their graduation with the responses they had collated over previous years from four new graduate cohorts. The authors concluded that feedback from medical graduates, to their medical schools, about where the deficiencies in preparedness are would be useful and further, that medical schools could learn from co-operating with other schools and come to a consensus on how preparedness concerns might be addressed.

Morgan et al (2019) investigated student dietician preparedness for the dietetic workforce. One conclusion, on the basis of findings from the five articles that satisfied inclusion criteria, was that co-operation and collaboration across the educational programmes would be beneficial for preparing dietetic students for the workplace on graduation.

Summary points
- Preparedness may be enhanced if there is better **communication and engagement between stakeholders**. Better connections between stakeholders are recommended in the dental and medical education literature and across other healthcare sectors **(RQ1,4)**.
- There are examples of efforts to **enhance dialogue between dental schools, postgraduate trainers and managers**. Through discussion, a shared understanding and clarification of the expectations of the new graduate may be developed **(RQ1,4)**.
- There is scope also to enhance **communication between students and their dental schools and between dental schools (RQ1,4)**.

4.5 Effect of Societal Change

We have referred earlier to the impact of demographic changes (for example limited patient availability to develop certain skills, such as complete dentures) and the changes in dental disease. There is briefly a reference to a 'climate of fear', where litigation and referrals to the regulator are more commonplace (Fox 2019). This opinion article highlights the changes in the working environment arising from changes in society and suggests that educators need to prepare students and foundation trainees to manage these pressures but avoid a defensive, play-safe approach.

Summary point
- In addition to demographic changes, **societal changes** are reported to include a more litigious environment for which students and new graduates need to be prepared to navigate **(RQ2,3)**.

Implications of these findings are described in Part 7 of this review. The findings from these summary boxes are collated together with the evidence from the scoping interviews (see Part 3) and the GDC conference (see Part 6) and presented under each of the four research questions

PART 5 – FINDINGS RELEVANT TO PREPAREDNESS FOR PRACTICE FROM THE COMPANION 'PROFESSIONALISM' STUDY

There are areas of professionalism that are relevant to the issue of preparedness for practice and these can be seen in the accompanying review of professionalism which, in addition to an REA and scoping interviews, included focus groups with dental professionals and members of the public and a survey undertaken as a modified Delphi process. In this part, we provide a brief overview of some of the findings and recommendations from that report which we believe are of particular relevance to preparedness for practice.

In studying professionalism, context and terminology are very important. Unprofessional behaviour worthy of a fitness to practise investigation needs to be distinguished from a lapse in professionalism. A lapse in professionalism may not imply persistent unprofessional actions and remedial action can focus on learning from the mistake.

From our analysis of the literature on professionalism, we identified three key areas of professionalism of relevance to preparedness for practice:
(1) *Expected service experience* which would include:
      a. what is expected from the members of the dental team (and their roles)
      b. safe and clean practice
      c. timeliness of services (getting appointments and being seen on time).

(2) *Interpersonal patient experiences, which focuses on the patient experience of interactions with dental professionals*:
      a. communication skills, including listening, empathy, trustworthiness, conveying a sense of being treated with dignity and respect
      b. being empowered and involved, as a partner, in making decisions about their own care
      c. feeling that decisions are financially fair and are based on their own needs and not the financial pressures on the dentist
      d. being able to understand the proposed treatment and the costs of dental care

(3) *Professionalism in dentistry and the personal and professional divide:* expectations of a dental professional and their behaviour in their personal life (being someone who can be trusted to make an appropriate decision).
From the focus groups (discussing professionalism), the public talked about safety in terms of knowing the treatment risks and being treated by a practitioner with 'safe' hands. For many in the dental professionals' groups, clinical competence was an assumed aspect or pre-requisite for professionalism.

Good communication was paramount to all concerned. The public expect clear explanations, engagement in the decision-making process, being put at ease, made aware of the risks and consequences, and feeling their opinions matter. They do not want to be overwhelmed, confused and told what will happen without consideration of their views. It was recognised that professionals need guidance in cultural differences and changes, differences in workplace environments and patient cohorts.

Students appear to feel that professionalism topics are well covered in the undergraduate curriculum. Applying social media guidelines and determining personal

from professional behaviour is a specific area identified for additional support. Social media was primarily discussed as a risky space where inappropriate behaviours may be revealed to patients. There was acknowledgement that social media is unavoidable for younger generations, but there was very little said about positive uses of social media. However, when used in a considered and appropriate way, it can be a useful learning platform and support sharing expertise to facilitate enhanced patient-centred care.

Although formal curricula for professionalism have been defined, teaching professionalism is recognised as complex. Alongside the formal curriculum, mentoring and reflective practice, role modelling and the hidden curriculum play a notable part in professionalism development. All dentist groups noted how new dentists learn from observing seniors, picking up good and bad habits equally easily. Insight and reflection were viewed as important throughout dental training and professional practice. No one approach is considered to be the most effective or successful for teaching professionalism and multiple approaches are encouraged.

Assessing professionalism is challenging and the use of multiple methods and toolkits is encouraged for evidencing professional development, including workplace-based assessments and measures that are longitudinal and provide a better view of professionalism. Feedback and refection can strengthen the value of assessment.

In conclusion, by implication, these comments on teaching and assessment represent suggestions for strengthening learning and teaching about professionalism to support preparedness for practice at the point of graduation of dental professionals. There is a need to instil a positive ethos of professionalism in students and established professionals and overturn the reported 'fear factor' and 'blame culture' that can easily lead to 'defensive' dentistry. Consistency in approach and engagement were key messages for lifelong learning. This might be promoted through working with education providers across the student/graduate transition and promoting reflective practice, peer discussion and interprofessional reviews via shared learning and experience for students/trainees (possible 'shadowing' opportunities) for early stage career posts.

This short summary provides a flavour of the evidence from the review of professionalism that could be considered of particular relevance to preparedness for practice of dental professionals at the point of graduation. More details are available in the full report bearing in mind that professionalism is one of the main cornerstones of fitness to practise at any stage in a dental professional's career.

PART 6 – CO-PRODUCTION ACTIVITIES

6.1 GDC Preparedness for Practice conference (November 2019)

This learning event was held in London with over 100 delegates, ranging from postgraduate and undergraduate deans, foundation trainers, CDO's, lay members, recent graduates and undergraduate students. A summary of the event is available in Appendix 4. The points raised below have been mapped to the four research questions addressed in this review.

6.2.1 The headline points raised during the event

1. Consideration that in the process of refining the prescribed learning outcomes (2020/21), in order to assist this, the GDC must first define a 'safe beginner' (RQ1,4).

2. Need for clarity of the journey from undergraduate to postgraduate training and the support that is needed along the way – The Transition. As part of this to define the role of the GDC in Foundation Training, and the latter's link to undergraduate training (RQ4).

3. A need for further development of GDC toolkits (or from other organisations), particularly for early foundation dentists (RQ4).

4. The need for a distinction and balance between competence vs. capability (RQ1,2,3,4).

6.2.2 Recommendations arising out of discussion

1. The need for a clear distinction between peer review, mentoring and coaching and what the roles entail (RQ4).
2. The development of a buddying system for Foundation Dentists – supporting the transition (RQ3,4).
3. Increasing awareness and managing expectations – do patients know what to expect from dentists? They need to recognise that they are human (RQ1,3).
4. Alleviating the perceived 'fear factor' surrounding the GDC – need to convey the right message about regulation to new dentists – emphasise what is stated in 'shifting the balance' (RQ3,4).
5. GDC to engage more in how to promote good practice (RQ4).
6. Modernise the dentist act. Currently too prescriptive and outdated in terms of its legal framework (RQ4).
7. Bring together the qualitative and quantitative research findings, literature review and findings from the present workshop discussions into a GDC report. (RQ1,2,3,4).

PART 7 – KEY FINDINGS AND CONCLUSIONS

Preparedness for practice may focus on more than one transition phase. In UK dentistry this can be the transition from student to 'safe beginner', or from ''safe beginner to 'independent practitioner'. The focus of this review is preparedness for practice as a new dental graduate.

In this final section, we map the key findings to the four research questions addressed in this review of preparedness for practice. In addition, we have mapped each statement (key finding) to the Parts of the review – in normal print, the REA; *in italics, the scoping interviews;* **in bold, the GDC conference**. Where a finding relates to one or more of the other research questions (RQ), the additional area number is recorded in brackets after the statement.

Research Question 1: To what extent are new dental graduates meeting required learning outcomes and is this an effective starting point from which to practise safely?

- *Safety and the concept of the 'safe beginner' (one who is independent but knows their own limits) were recognised as important.*
- Evidence suggests that dental foundation trainers tend to hold higher expectations of the new graduate than the standards required to meet the expected outcomes at graduation and believe that standards are declining.
- There was a difference of opinion about the purpose of foundation training; some trainers expect more of an independent practitioner at graduation, others expect a safe beginner ready to further develop skills.
- Members of the UK Faculty of General Dental Practice (FGDP(UK)) desired more teaching in a range of skills at undergraduate level, including aspects of endodontics and orthodontics as well as practice management.
- *It was suggested that students need to be prepared to work with different patient groups in different contexts and be aware that there may be inter-generational differences in* expectations **(RQ2)**. The literature suggests that the new dentist needs an awareness of patient expectations and how expectations can be managed; patients also need to recognise that dentists may not be able to meet all expectations **(RQ3)**.
- A key message from the studies of preparedness for specific clinical skills is that confidence and competence increase with experience, particularly with practical experience. Clinical exposure and practise enhance preparedness and confidence **(RQ4)**.
- Authors suggest that limitations should be rectified through additions to undergraduate curricula **(RQ4)**. However, other authors highlight the challenges to Universities to deliver this because of challenges to finding sufficient and suitable patients on which the students can gain experience and adding to already crowded curricula.
- Perceptions of preparedness for practice are linked to feelings of confidence and there is evidence to suggest that men self-rate their confidence more highly than women **(RQ2)**.
- Evidence also suggests that older students may feel more prepared for practice **(RQ2)**.

Research Question 2: What factors contribute to variance in preparedness for practice, are there specific skills, tasks or knowledge that graduates are achieving or lacking and what evidence demonstrates this?

Specific skills, tasks or knowledge that graduates are achieving or lacking

- Lack of preparedness in the dental field relates more to complex skills (treatment planning, crown/bridge, root canal treatment (especially molar), surgical extractions and diagnosis in orthodontics) where experience is limited by number of cases seen at the undergraduate level (RQ3).
- Some UK dental students lacked confidence in root canal treatment although this was found to vary by dental school.
- New graduates, both dental and medical, felt unprepared for aspects of prescribing and drugs management. Authors suggest the need for review of undergraduate curricula to address this.
- Areas that healthcare/medical undergraduates would benefit from better preparation include referrals, medicines management and prescribing, diagnosis and treatment planning, wound care; delivering emergency care; hand-over; working within a multi-disciplinary team; legal and ethical issues; and managing clinical incidents/errors.
- Studies show that students and/or new dental graduates could be better prepared for managing special needs patients, aspects of patient safety and the critical appraisal of literature.
- Medical students/new graduates felt ill-prepared for clinical leadership and this may be the case for dental professionals. Further, it should not be assumed that all students can manage the simple tasks. If on entering the workplace the new graduate struggles with simple tasks, this can create further difficulties (RQ4).

Factors contributing to variance in preparedness for practice

- As a result of changing demographics and dental disease, students were found to have little experience of some complex tasks such as, complete dentures, molar endodontics and surgical exodontia, compounded by increased student numbers over the last 10 years.
- Findings from the UK on factors contributing to variance in preparedness are similar to those reported from other countries (New Zealand, Pakistan, Malaysia) (RQ3).
- In Europe, student preparedness for exodontia varied by dental school (RQ1).
- Compared to a discipline-based organisation of teaching, evidence from dental education research suggests that integrated, patient-centred teaching is more effective (RQ4).
- Research with students from other health-related professions found that graduates from problem-based learning programmes were prepared better in communication, team working and dealing with paperwork (RQ4).
- The literature recommends the need for close co-operation across the different teaching environments – undergraduate and postgraduate - to ensure a consistent approach to supervision and assessment, through appropriate quality management processes (RQ4).

Research Question 3: What is the potential impact, on both patients and the profession, of graduates being inadequately prepared for practice?

- There was comparatively little evidence found about the impact of being inadequately prepared on patients or on the professionals. However, potential impacts can be expected to arise from areas of lack of preparedness identified under the other research questions
- In addition to demographic changes, societal changes are reported to include a more litigious environment for which students and new graduates need to be prepared to navigate (RQ2). **It was identified in the GDC conference that fear of the GDC needs to be alleviated and an appropriate message about regulation conveyed to new dentists which would emphasise what is stated in 'shifting the balance' (RQ4).**
- *Interviewees gave attention to attitudes and behaviours that were indicators of preparedness for practice. Two of these related to interactions with others, specifically with patients and in teamwork. Being able to communicate well is an important aspect of preparedness (RQ4). These issues can impact on patients and the profession.*
- *Managing complexity and dealing with uncertainty were also identified as important aspects of preparedness for practice, which can impact on the profession and patient care (RQ4).*

Research Question 4: What is the evidence (from dentistry or other healthcare professions) of ways that preparedness for practice has been defined, addressed and evaluated?

Definitions
- Preparedness for practice encompasses not only clinical skills but also behavioural, emotional and attitudinal aspects. *Clinical competence was seen as a fundamental aspect of preparedness for practice although interviewees recognised that it is constituted by multiple elements, including health, mental health and pastoral aspects.*
- **A recommendation at the GDC conference was that in refining the prescribed learning outcomes (2020/21), the GDC should first strengthen and clarify the definition of a 'safe beginner' especially in a changing environment (RQ1).**
- **Likewise, at the same event, analysis shows that it was recommended that support is needed for the transition from undergraduate to postgraduate training. An aspect of this is to identify the way the GDC might engage with Dental Foundation Training, and the latter's link to undergraduate training. This could be facilitated by closer communication across the three stakeholder organisations: undergraduate and postgraduate training organisations and the regulatory body.**

How preparedness for practice has been addressed
- There is much evidence of the value of 'real-world', outreach placements in improving preparedness for practice. Findings from the UK are replicated elsewhere (Sweden, India). Variation in how outreach facilities operate was noted, which could have an impact on preparedness for practice (RQ2). *One of the main reasons why 'real practice' experience is important is that it helps students/trainees to learn to deal with complexity and pressure (RQ2).*

- *Studies of different approaches to curricula design have demonstrated beneficial effects of patient-centred, outcomes-based, integrated, problem-based and interprofessional programmes.*
- There may be difficulties in addressing preparedness through increased clinical exposure, not least because curricula are already full and suitable patients may not be available.
- **The challenges of universities should not be underestimated. All dental schools have had increased student numbers (now reducing) along with difficulties in the recruitment of new staff.**
- **In addition, it was reported in the interviews that some schools experience challenges when faced with a student who is not progressing sufficiently and university reluctance to accept termination of studies and that GDC Fitness to Practise guidance for students, while useful, is effective at the end of the undergraduate programme and not at the time of any incident.**
- Researchers should be mindful of ascribing benefit to the outreach experience solely to increased clinical exposure (which may or may not occur); account needs also to be taken of the effect of a different approach to teaching in outreach centres (RQ2). *An example is the need to appropriately and progressively remove support to the student (scaffolding) to encourage them to gain independence and in so doing increase confidence. Participants in the scoping interviews suggested that the GDC could recognise the need for this progressive approach.*
- Evidence-based guidance on supporting medical student transition to new doctor has been compiled (RQ3). **To support new foundation dentists, further development of GDC toolkits (or toolkits from other organisations) was suggested at the GDC conference.**
- Student/trainee self-reflection, supported by constructive feedback, can assist the development of preparedness for practice. *Regular reflection on practice aids development.*
- Workplace-based experiences include clinical placements, shadowing, assistantships and have been defined and recommended by the GMC. The NMC advocate preceptorships for new registrants. Together with induction processes, these have been shown to support transition from student to new graduate in their first post.
- Evidence from dentistry and nursing supports the ongoing value of mentoring for the new graduate.
- **At the GDC conference it was recommended that a clear distinction between peer review, mentoring and coaching is needed and a description of what the roles entail.**
- Preparedness may be enhanced if there is better communication and engagement between stakeholders, including universities and postgraduate training organisations. Better connections between stakeholders are recommended in the dental and medical education literature (RQ1). **A recommendation from the GDC conference was that the GDC might engage more in promoting good practice.**
- There are examples of efforts to enhance dialogue between dental schools, postgraduate trainers and managers. Through discussion, a shared understanding and clarification of the expectations of the new graduate may be developed, so assisting the transition period. (RQ1, 4)

How preparedness for practice has been evaluated

- Preparedness for practice needs repeated measures over multiple domains, including workplace-based measures. *There needs to be multiple points of assessment, over time using multiple assessors with a consistency of approach to assessment, to check on developing preparedness.* Distinction and balance are needed between competence vs. capability (RQ1,2,3).
- Tools to measure preparedness for practice have been developed including DU-PAS (Dental Undergraduates Preparedness Assessment Scale) and GAPP (graduate preparedness for practice) (RQ1).
- Other means of evaluating preparedness include competency-based assessment and self-reflection (RQ1). Self-assessment can be taught and is a skill for life-long learning.

This synthesis of the relevant literature and analysis of the scoping interview data provides the GDC with evidence which can support the development of their policies relating to preparedness for practice. The review aims to ensure that the GDC's work in relation to UK dental graduates' preparedness for practice at the point of graduation is informed by the credible and current evidence base. Preparedness for practice does not just concern clinical experience, competence and confidence, but also broader skills. In the review, effort has been made to identify what works well in preparing new graduates to be ready for practice as registered dental professionals.

Following analysis of the key findings a series of implications are listed for consideration by the GDC.:

1. *Define, in more detail, what is meant by the 'safe beginner'.* It is important that all relevant personnel/stakeholders understand the meaning, including educators, the new graduate, foundation trainers and members of the public. This descriptor should be applicable to all the dental professionals.

2. *Identify in learning outcomes what range of skills are required and ensure context is taken into consideration.*

   a. This may relate to changes in experience of disease processes as they continue to evolve. Importantly, new graduates should understand their level of expertise, their strengths and their continuing educational, technical and professional needs. They should feel comfortable to share their achievements at graduation and their needs for on-going training and education with their educational/clinical supervisors (and employers) as they enter foundation training or first employment. They should know when to ask for help and when to refer patients on. It will be valuable to take into consideration the changes in disease/ demographics in any new outcomes and to ensure that these outcomes are a clear guide to Universities as to what is expected of a 'safe beginner'.
   b. Given changing patient demographics, it may be timely for curricula review, including consideration of the changes in disease processes. Staff training is needed to support curricula change. Other areas of faculty development include giving effective and timely feedback and managing student failure. Availability of appropriate staff may be an issue. There is an increasing use of part-time general dental practitioners as undergraduate teachers who have professional development needs related to the challenges of clinical teaching.

3. *Support new graduates entering the 'transition phase' from graduation into workforce employment, through foundation training where applicable, and beyond.* This could be enhanced through greater interaction and engagement between dental schools, postgraduate training organisations and the regulatory body. Consideration might be given, in particular to:
   a. Greater ongoing support and mentoring by all stakeholders during undergraduate training and during the early transition phase of foundation training.

b. Enhanced communication between students within their dental schools and between dental schools

c. Use of mentorships and role models, evidence of which is already present in medicine.

d. Provision of 'shadowing' opportunities and apprenticeships, evidence of which is already present in medicine and nursing.

e. Greater support for learning to work in a team.

f. Avoiding the 'fear factor' exacerbated by the pressures of entering the workforce.

g. Strengthening confidence and insight - knowing when to refer and when ask for help.

4. *Provide opportunities for all dental professionals, in training, to experience 'real world' clinical practice situations, for example to:*
   a. experience new working environments - through outreach and community placements.

   b. facilitate an increase in clinical exposure and to try to address the variation in opportunities between dental schools, taking into account the realistic expectations of what can be achieved.

   c. ensure that common/simple clinical and professional activities are not overlooked but continuously monitored and strengthened.

5. *Review assessments and 'toolkits' for measuring and quality assuring preparedness for practice.*
   a. Assessment should be a shared experience for both educator and student/trainee – there is a need to instil a willingness in the latter to have pride in what they have done and share their achievements. In addition, they should be encouraged to reflect on their practice and identify their learning and development needs.

   b. Promote self-reflection, self-assessment and a two-way process of sharing feedback – all to be thought of as 'learning opportunities'

   c. Appreciate that individuals will learn at different rates and put in reasonable support for this. However, where students are not achieving the required standards, there need to be viable options to allow a student to leave training.

   d. Closer engagement between dental schools, their host universities and the GDC could facilitate a better understanding of universities in relation to patient safety, the best interest of students and the need for termination of studies.

6. *Support further research to address gaps in the literature and wider evidence on preparedness for practice. Examples include*:
   a. Reviewing curriculum frameworks and how they address preparedness for practice.

   b. The mentoring role– training, identifying roles and responsibilities, linked to support mechanisms across the 'transition phase'.

   c. Investigate staff recruitment, training and retention and the effect on preparedness for practice.

   d. The role of visiting general dental practitioner supervisors – they need a greater sense of their contribution to education and training.

e. How to strengthen consistency of approach to learning and teaching without stifling innovation and flexibility.
f. Investigating the transition from graduation into foundation training (and further transition stages – e.g. foundation to core, foundation to independent general practice, core to specialty training and returning to general practice at any stage).
g. Identifying ways to strengthen undergraduate experience in specialties but not at the expense of learning and retaining expertise in basic clinical procedures and processes.

On reflection from our analysis of the evidence, we have identified a number of implications, but to address these, some consideration needs to be given to the issue of 'context', in particular, issues around student progression, support and termination of studies.

Universities hosting dental schools, their infrastructure and the staff who provide dental undergraduate training, face challenges. Changes, increases and decreases, in allocated student numbers over the last 15 years or more have accentuated these challenges which include: appropriate staff recruitment and retention; clinical space for treating patients; exposure to wide ranges of procedures to satisfy the required learning outcomes of a new graduate; budget constraints (over which dental schools and their universities have varying degrees of control), limited central funding for education (university funding) and health services (NHS funding) to support primary care patient management by students; the impact on restricted numbers of clinical opportunities influenced by increased pressure, from universities and the NHS, to train UK and overseas postgraduate trainees.

A further significant challenge faced by dental schools/universities are students who have a fitness-to-practise issue during their undergraduate course. Dental Schools are guided by the GDC's requirements and whilst in the students' best interests and/or for patient safety reasons, staff agree that training should be extended or terminated, the university's appeals process, administered centrally, may be at odds with the local decision. The university's appeals systems may not fully appreciate the nature of dentistry as a profession nor the GDC's guidance on student fitness to practise and so allow the student to return to the course. GDC input and advice at this point would be helpful.

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APPENDICES

Appendix 1: Expert Reference Group membership

We are extremely grateful to colleagues who agreed to be members of our Expert Reference Group, namely:

James Ashworth-Holland, Jimmy Boyle, Alice Duke, Paul Knott, Susie Sanderson, Nishma Sharma, Sandra Zijlstra-Shaw

Dental Graduates' Preparedness-for-Practice

PARTICIPANT INFORMATION SHEET: Topic Experts

You are invited to take part in a study of UK Dental Graduates' Preparedness-for-Practice. Before you decide whether or not to take part, please read the following information carefully. If you have any questions, please contact Alison Bullock whose contact details are provided at the end.

What is the purpose of the research?
Our aim is to explore how well-prepared new, UK-trained dental graduates are for practice at the point of graduation and to identify what works well in preparing new professionals for practice.

Who is organising and funding this research?
The study is commissioned and funded by the General Dental Council (GDC). It is co-led by Professor Alan Gilmour and Professor Jonathan Cowpe based in the School of Dentistry and Professor Alison Bullock, School of Social Sciences at Cardiff University.

Why have I been invited to take part in the study?
You have been invited to participate due to your experience and knowledge in the field of preparedness-for-practice.

Do I have to take part in the study?
No, your participation is entirely voluntary. If you *do* decide to participate in the study, we will ask you to sign a consent form. You will be free to withdraw from participation at any time, without giving reason and any data previously collected from you will not be included in the study.
If you decide you *do not* wish to participate, you do not have to provide a reason.

What will taking part involve?
Taking part in the study will involve participating in either a face-to-face or telephone interview where you will be asked about your views on dental (or medical or nursing) graduates' preparedness-for-practice. You are not expected to provide any information or opinion which you do not feel comfortable sharing.
Should you provide permission freely, the interview discussion will be recorded for later transcription at which point all data will be anonymised.

Will I be paid anything for taking part?
No, there are no payments for taking part in this study.

What are the possible benefits of taking part?
Your participation in this study will involve sharing your views on dental (or medical or nursing) graduates' preparedness-for-practice. This information will be used to help identify what works well in preparing dental students to be ready for practice and to guide recommendations to relevant stakeholders. However, there are no direct advantages or benefits to you as a result of your participation.

What are the possible risks of taking part?
The only foreseeable potential risk of participation in this study is some discomfort you may feel in sharing your opinions of dental (or medical or nursing) graduates' preparedness-for-practice. It is not our intent to cause discomfort and you are encouraged to only contribute opinions you feel comfortable sharing.

Will my taking part in this study be kept confidential?

All data that you provide in face-to-face or telephone interviews will be anonymised on transcription. Data collected from you during the study will be kept strictly confidential and any personal information you provide will be managed in accordance with data protection legislation.

What will happen to my personal data?

The only personally identifiable data collected from you and retained will be your consent form (should you provide it), which will include your name and signature. This information is only collected so we know who has consented to participate in the study. All information provided by you will be anonymous and will not be matched to the information in your consent form. Your consent form will be retained in accordance with Cardiff University research ethics requirements and may be accessed by members of the research team and, where necessary, by members of the University's governance and audit teams or by regulatory authorities. Anonymised data will be kept for a minimum of 5 years, or at least 2 years post-publication. Although this research study is carried out on behalf of the GDC, no raw data will be shared with them.

Cardiff University is the Data Controller and is committed to respecting and protecting your personal data in accordance with your expectations and Data Protection legislation. The University Data Protection Officer can be contacted at inforequest@cardiff.ac.uk. Further information about Data Protection can be found at: https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection

In providing data for this research, we will process it on the basis that it is part of our public task as a university established to advance knowledge and education through its teaching and research activities.

What will happen to the results of the study?

The principal output of the study will be a report documenting findings about dental graduates' preparedness-for-practice and what works well in preparing them for practice. This report will be shared with GDC. However, they will not have access to your personal data and will only see the anonymised report. It is expected that this report will be available in February 2020, though this is subject to change.

It is also our intention to report the results in academic journals and at relevant conferences. All data will remain anonymous and participants will not be personally identified in any report, publication or presentation.

What if there is a problem?

Research team members, Alison Bullock, Alan Gilmour and Jonathan Cowpe will be available to answer any questions or queries regarding any aspects of the research study. If you wish to complain or have concerns about the way you have been approached or treated during the course of this study, please contact the research ethics committee at socsi-ethics@cardiff.ac.uk.

Who has reviewed this study?

This study has been reviewed and given a favourable opinion by the School of Social Sciences' Research Ethics Committee at Cardiff University.

Further information and contact details

Should you have any questions or queries about this study, please contact:
Alison Bullock Telephone: 02920 870780 Email: bullockad@cardiff.ac.uk
Cardiff University School of Social Sciences, 12 Museum Place, Cardiff, CF10 3BG

Thank you for considering participation in this study.

PARTICIPANT CONSENT FORM

Title of study: **Professionalism in Dentistry & Preparedness-for-Practice**
Name of Researcher: **Professor Alison Bullock**

<div align="right">Please initial box</div>

I confirm that I have read and understood the Information Sheet dated 13 August 2019 Version 2 for the above study and have had the opportunity to ask questions and these have been answered satisfactorily.	
I understand that my participation is voluntary, and I am free to withdraw from the study at any time without giving a reason and without any adverse consequences.	
I consent to the processing of my personal data provided on this consent form. I understand that such information will be held in accordance with all applicable data protection legislation and in strict confidence unless disclosure is required by law or professional obligation.	
I understand who will have access to the personal information I provide, how the data will be stored and what will happen to the data at the end of the project.	
I understand that the interview discussion will be audio recorded and that anonymised excerpts and/or verbatim quotes from my interview may be used as part of the research report.	
I understand how the findings and results of this study will be written up and disseminated.	
I give consent freely to my participation in this study.	

_____   _____   _____
Name of participant (print)   Date   Signature

Alison Bullock

_____   _____   _____
Name of person taking consent   Date   Signature
(print)

THANK YOU FOR PARTICIPATING IN OUR RESEARCH.

Appendix 3: The All-Wales medical student-trainee-registrant monitoring group.

Our review of evidence about preparedness for practice has identified the transition across undergraduate and postgraduate education and training into career-long employment is an area that needs to be addressed and strengthened. Closer communication between undergraduate teaching institutions (dental schools) and postgraduate training organisations should be encouraged. An example of such interaction, brought to the authors' attention through the scoping interviews, takes place in Wales through a 'monitoring group'. Representatives meet quarterly, from the i) Medical Deanery, HEIW – Foundation School/Programmes, ii) Cardiff and Swansea (graduate entry) Medical Schools, iii) Medical Deanery, HEIW Professional Support Unit (PSU) and final two years undergraduate students and Foundation (years 1&2) trainees. The remit for this 'monitoring group', bearing in mind the issues of data protection and strict confidentiality, includes:

- * developing and monitoring links between the Wales Foundation School and the Schools of Medicine in Wales
    - to be informed of, and contribute to, changes in the medical undergraduate programme
    - to receive and review updates on the processes for recruitment and allocation of F1 and F2 posts and make recommendations to the Wales Foundation School Board
- developing and reviewing procedures for medical students in Wales wishing to apply outside of the Wales Foundation School
- * ratifying applications for F1 and F2 'Special Circumstances'
- receiving an update regarding 'induction'
- * discussing and acting upon matters relating to the 'Transfer of Information' of trainees into and out of the Wales Foundation School, including performance and trainee support
- Being receptive, where invited to:
    - receiving updates regarding e-portfolio and work-place based assessments
    - receiving updates and making recommendations regarding changes to applications for full or provisional registration
    - receiving information regarding the annual review of foundation progression (ARFP) process and completion of the Foundation Programme
- receiving regular reports relating to equal opportunities monitoring
- consolidating and feeding back monitoring information to relevant key stakeholders

Restricted items – trainee/student reps not present:

- * monitoring the progress of local medical students about to embark on the Foundation Programme
- * monitoring the progress of trainees through the Foundation Programme

* Our impression is that in particular the scrutiny of 'progress monitoring', of medical training in Wales, under '*restricted items*' supports the development of links between the undergraduate and postgraduate training environments, the 'transfer of information' and identification of special circumstances. This can strengthen support for young doctors during the periods of transition from graduation in medicine, through to full registration at the end of F1 and into registrant practitioner in F2 and beyond. This is something that could be built on and developed more widely for the dental profession, including all dental practitioner student/trainees.

Appendix 4: Notes from the GDC Preparedness for Practice of UK Graduates, Stakeholder Event, November 2019

Conference held in London with over 100 delegates, ranging from postgraduate and undergraduate deans, foundation trainers, CDO's, lay members, recent graduates and UG students.
CU Team Attendance: Alan Gilmour, Sophie Bartlett

Summary Points
- Strong need to define what is meant by a 'safe beginner'
- Clarity of the journey from UG to PG and the support that is needed along the way
- In the process of refining the prescribed learning outcomes (2020/21)– however to assist this we must first define a safe beginner
- Further development of GDC toolkits, particularly for early foundation dentists
- Distinction and balance between competence vs. capable
- Defining the role of the GDC in Foundation Training and its links to UG training – the 'transition'

Experience / Knowledge Lacking in Foundation Dentists
- New dentists are not prepared for working in the NHS – not familiar with the cost of different treatments and how to have these conversations with patients – disagreement about where this should be taught
- End-to-end patient treatment opportunities are uncommon – students would benefit from following journey – although issues with speed that students work and 'type' of patients available
- Dental school is not a 'real world setting' need an 'assistantship' to bridge the gap between dental school and entering FT – outreach teaching felt valuable in this
- Greater emphasis on PDPs should help with variability across individuals – identifying gaps in their knowledge/skills. This should be used in UG training and then follow into FT
- Period between graduation and foundation is approx. 3 months – long period that would benefit from some practice especially when dentists' skills are so fragile. Issue with where the responsibility would lie here – no longer university, not started employment.
  - Pilots – must perform a take-off and landing every 28 days
- Concerns around unconscious incompetence – this will influence perception of confidence and could be dangerous
  - Part of professionalism is working within your own scope – knowing and working within your limits

Undergraduate Training Curriculum
- Curriculum is too full – possibility of weighting some of the learning outcomes so some are prioritised over others
- Need for modernising the curriculum
- Curriculum is too knowledge heavy – needs more application
- Importance of genuine reflection – not forced and seen as a tick box exercise
- Possibility of greater encouragement of longitudinal learning – e-portfolio that is carried forward throughout a dentist's career
- More guidance on producing treatment plans – particularly difficult if haven't had experience of end-to-end treatment and holistic perspectives

Variations in Experiences

- Need for standardisation *across* dental schools – although there are also variations in experiences *within* dental schools (and in FT)
- Being more selective of placing dentists, ensuring they get richest experience and variety of procedures so as to better prepare them
- Variation both *within* and *between* dental schools – both with *type* and *volume* of patients

Supervision / Mentorship
- Generational element between trainers and DFTs – a view that trainers have 'forgotten' what is was like to be a FD and don't always acknowledge the changes since their qualification
- There's a responsibility of those in leadership roles – to encourage positive reinforcement rather than negative 'punishment'
- Dealing with loss of safety net of close supervision – perhaps more autonomy should be encouraged in dental school so less of a sudden reduction in supervision – however GDC needs to realise this.
- Does there need to be more training for trainers? – especially with the changes since their point of qualification as new dentist. Should training be compulsory?
- 'study day' with both trainees and trainers in order to manage expectations, what is expected from who?
- Mentorship from recently completed FDs to current FDs – one level above current FDs and so can reflect on recent experiences
- Shadowing
- Encourage an environment of 'no such thing as a stupid question'

Additional Support Mechanisms for Newly Qualified Dentists
- There is high stress among students which raises concerns about their mental health
- Should there be the incorporation of an element of wellbeing into CPD?
- Mentor – sounding board and to monitor the balance between confidence and competence
- Support groups for newly qualified – peer reviews, group reflections
- Compulsory tutorials at the beginning of FT – running of NHS, different standards across NHS and private
- Support beyond dentistry – more social supports and general wellbeing, particularly for those who have moved and in rural areas
- Make sure FDs are sure of who they can talk to if they have any concerns or make a mistake
- Coaching – more tailored towards individuals
- Signposting to FDs – who to go to for what

Lapses
- GDC briefing report highlighted 'some dentists' are not adequately prepared for practice or lacking particular skills – needs to be a clear distinction on who these 'some' are – particular dental schools? Regions? Where is it going right?
- Defensive dentistry is much more common (fear of litigation and GDC)
- National recruitment asks questions about lapses and what they would do – suggestion that this could gear them towards something going wrong – but could be positive also be positive as it implies that mistakes will happen but what is important is how to react and address them

GDC Involvement
- GDC to provide toolkits or case studies on examples of scenarios of professionalism
- Greater communication between GDC and GMC in order to share good practice

- Standardisation of competencies from GDC
- Strapline of GDC is quite intimidating to dentists (protecting patients, regulating dentists) – should be more supporting of dentists
- Independent support in addition to mentor/supervisor – should be the role of the GDC to signpost sources of support
- Greater communication and sharing information between universities and FT programmes.
- GDC currently have no regulation of DFT, only UG (and specialist training)

Identity of Foundation Dentists
- Acknowledgement of 'learner' identity and their position
- Terminology – dentists on FT aren't 'trainees' they are qualified – designation of trainee risks undermining them and could also confuse patients

Points to Consider
- Currently missing in the research is NHS involvement and longitudinal monitoring of dentists
- It is not helpful to quantify experience – it needs to be qualitative
- Should DFT be mandatory? Is one year long enough? Should it be a pre-reg year?
- What is a 'safe beginner'? What is expected of them?
- Challenges to implementing change – regulations, time constraints, funding
- Suggestion of a probationary license – to ensure competence – though there are issues with the legality of this

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Next Steps
- Clear distinction between peer review, mentoring and coaching and those roles
- Development of the buddying system for FDs
- Increasing awareness and managing expectations – do patients know what to expect from dentists? They need to recognise that they are human
- Alleviating fear of the GDC – need to convey the right message about regulation to new dentists – shifting the balance
- GDC to engage more in how to promote good practice
- Modernise the dentist act. Currently too prescriptive and outdated in terms of its legal framework

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Next Steps for this Research
- Bring together the qualitative and quantitative research findings, literature review and findings from today's workshop discussions into a GDC report.
- GDC will make recommendations within the report
- Collectively address areas that require further attention
- Publish report early 2020
- Share copy of report with each attendee