THE UNIVERSITY OF MELBOURNE

Melbourne
Dental School
Department of
Medical Education

Preparation for practice of newly qualified dental practitioners in Australia

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Published: March 2021 Melbourne Dental School, The University of Melbourne VIC 3010

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This project was commissioned and funded by the Australian Dental Council (ADC).

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We acknowledge the Traditional Owners of the lands on which our School is located and where we conduct our research and teaching. We pay our respects to ancestors and Elders, past, present, and future.

Suggested citation for this publication: Mariño R, Delany C, Manton D, Reid K, Satur J, Wong R, Crombie F, Adams G, McNally C, Celentano A, Morgan M, Lim M, Lopez D. (2021) Preparation for practice of newly qualified dental practitioners in Australia. Melbourne Dental School, The University of Melbourne.

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Executive Summary

Introduction

Contemporary dental practice is more complex than at any preceding time. The introduction of new procedures and technologies have created an environment that requires complex skills and knowledge, often when there may be multiple interpretive options.[1] This has been referred to as 'supercomplexity'[2]. The determination of whether a dental curriculum provides the opportunity for graduates to practice safely and at an acceptable standard is therefore important in a defendable health system.

This report describes the aims, methods, findings and outcomes of a study conducted to explore the preparation for practice of newly qualified dental practitioners in Australia (the term 'dental' hereafter will refer to dentists, oral health therapists, dental therapists, dental hygienists and dental prosthetists).

The project commenced in September 2019 at the Melbourne Dental School (MDS), in collaboration with the Department of Medical Education, Faculty of Medicine, Dentistry and Health Sciences, the University of Melbourne.

The project's fundamental research question was: *"How prepared are newly qualified dental practitioners for practice in Australia?* To answer this question, the following questions arose:

1) What are the self-reported perceptions about preparedness for practice of newly qualified dental professional graduates in Australia?

2) How do different stakeholders (e.g., dental course coordinators, dental educators, employers, consumers of oral health care services, and representatives of professional dental associations) evaluate the preparedness for practice of Australian dental graduates?

This report also includes a literature review of published international, national and state documentation and guidelines.

Methods

The study had several phases and used a mixed methods approach to map preparedness for practice from multiple perspectives. The initial phase conceptualised a theoretical framework of preparedness for practice areas and priorities.

A second phase included the collection of data from stakeholders. The perspectives on preparedness for practice of a range of stakeholders, including consumers, educators, employers, final year students and newly qualified (1-3 years since graduation) dental professionals, were collected using multiple methods of data collection (i.e., quantitative, qualitative and triangulation).

Findings

A thorough literature review and consultation with stakeholders allowed for the expansion of the theoretical framework to understand and conceptualise preparedness for practice in dentistry. Based on this review, the research team developed the identified competencies or 'readiness to practice' dimensions, including key additional dimensions to further comprehend the competencies expected for dental professionals in the 21st century. In addition, the barriers and gaps that may hinder effective preparedness were discussed. The review also made evident the need for new instruments to assess a wider set of attributes when evaluating readiness of health professionals for practice.

Results, using this multi-phased, mixed methods research approach, suggested that at the time of graduation new graduates had received adequate theoretical and evidence-based information in their formal learning and teaching activities, which, according to the perception of new graduates themselves and stakeholders, provided them with a good theoretical background and prepared them well as dental practitioners in all of the identified competency domains.

Resultant data indicated that new graduates are particularly well prepared in competencies such as communication skills; social and community orientation; and being aware of limitations, professional attitude, and ethical judgements.

Notwithstanding this, stakeholders and new graduates identified a general lack of experience and confidence to work with the public in more challenging aspects of communication.

Other specific areas where new graduates may benefit from further training and consolidation, as well as areas where higher levels of experience may be of benefit, were also mentioned. The study results indicated that new graduates were less prepared for managing emergencies, both medical and dental. Also, the management and treatment of dental trauma was flagged as an area where more clinical experience might be required. Stakeholders questioned the sufficiency of real-life exposure and preparedness for dealing with new clinical and non-clinical challenges. More specifically, referral of patients, identification of neglect and domestic abuse, and treatment of patients with special needs. In addition, of particular concern among employers were the limited managerial and entrepreneurial skills of new graduate dental professionals. Consistent with the literature, it was generally acknowledged that consolidating competencies in clinical practice is a lifelong learning process which can only be achieved with experience.

Limitations of the study include a low response rate in its quantitative component. Data collection started in late February 2020, just before the COVID-19 pandemic lockdown. Furthermore, the study's time frame precluded extending quantitative data collection. Another limitation was the self-reported nature of the responses. The COVID-19 pandemic has stimulated the use of telehealth, including tele-dentistry. It seems clear that this modality will stay with us, which highlights the need to acquire skills and competencies in that area. Interestingly, the use of Information and Communication Technology (ICT) was only mentioned marginally as a tool for communication and exchange of information with colleagues and patients. Furthermore, the use of ICT as a competence was not mentioned at all by new graduates, students or stakeholders.

Conclusions

An outcome of this multi-phased, mixed methods research project to identify preparedness for practice in dentistry, was the expansion of the theoretical framework to understand this concept in dentistry.

Present findings would indicate that there appear to be good standards of preparedness for practice for graduate dental professionals. The perceptions of new graduates and stakeholders were very similar regarding preparedness for practice of new graduates. Stakeholders viewed new graduates as having a good theoretical foundation with good teaching and training in general dental practice and basic clinical procedures but lacking some specific aspects of clinical practice. However, many aspects of clinical treatment and practice require demonstration and observation of skills or behaviours in addition to knowledge. Most of the limitations mentioned by stakeholders were attributed to limited clinical treatment exposure, the inadequate length of student placements, having other curricular commitments, and other contextual elements of clinical work which cannot be easily provided in simulated environments.

Introduction

Contemporary dental practice is more complex than at any previous time. The registered divisions of dental practitioner in Australia include dentists, dentist specialists, oral health therapists, dental therapists, dental hygienists and dental prosthetists.[3,4 5] Each practitioner group has defined areas of disciplinary practice. Practitioners are required to collaborate with and complement the skills of their dental practice colleagues. In addition, the introduction of new procedures and technologies and the expectation that different dental practitioners will collaborate and provide complementary care have created an environment that requires graduates to apply complex skills and knowledge, often when there may be multiple interpretive options.[1] These requirements of contemporary dental practice raise the question of whether and how dental curricula are adequately preparing dental graduates to practice safely and effectively within such a complex healthcare environment.

Initial Australian dental practitioner education and training is delivered across twelve universities, three Registered Training Organisations (RTO's), two Colleges that offer specialist training and one Registered Higher Education Provider.

Curriculum development is undertaken separately by each provider; developing curricula in consultation with the profession and the community to determine content and delivery mechanisms, informed by adult education and a range of policy and regulatory frameworks. Universities and TAFE institutions have established internal and external accreditation processes to ensure the quality of teaching relevant to the needs of the community with reference to the Australian Qualifications Framework.[6] These processes are also regularly revised and updated. In addition, and specific to the practice and regulation of dentistry, the Australian Dental Council (ADC), has developed, in consultation with and on behalf of the professions, a set of competencies for newly graduated dentists,[3] oral health therapists, dental therapists, dental hygienists,[4] and dental prosthetists.[5]

The explicit competencies for newly qualified dental practitioners required by the ADC include six competency domain areas, namely:

1. Professionalism
2. Communication and leadership
3. Critical thinking
4. Health promotion
5. Scientific and clinical knowledge
6. Patient care

Australian dental practitioner education and training programs are expected to map learning outcomes and the assessments of these learning outcomes to the competencies during the ADC's accreditation process. Accreditation by the ADC requires a dental practitioner program to demonstrate graduates have achieved the required threshold competencies expected of a newly qualified dental practitioner.[7] These accreditation processes, standards, regulatory and policy frameworks combine to define and inform the educational preparation for dental practice of new graduates. Universities and TAFE

institutions, working to these levels, use the resources available to them to provide appropriate education and clinical experience to prepare graduates for practice. Preparation for practice is thus a highly defined and regulated process that draws on the expertise and resources of the educational setting, the professions, the clinical service settings and the community.

However, some authors have questioned whether formal lists of 'competencies' are the most appropriate means of determining outcomes from dental training. For example, Leadbetter and Peck argue that such lists are too fixed or rigid and do not allow for assessment of graduates' capacity to integrate and combine different types of knowledge and multiple perspectives within clinical practice decisions.[1] Dall'Alba suggests that while skills, knowledge and the ability to conceptualise and problem solve are important, what is fundamental is "students' capacity to interpret a situation and essentially think and act as a professional practitioner".[8]

These critiques raise potential questions as to whether current dental curricula adequately train dental students for effective collaboration, responsiveness to the changing expectations of health consumers and ultimately, readiness to be in dental practice. Other concerns include whether dental education programs are overly reliant on 'silo' teaching which may not prepare students to apply more complex procedures, to be resilient and responsive to others, or to draw from concepts of professional responsibility and ethics.[1]

Identifying and evaluating readiness for professional health practice is clearly a complex and multifaceted task. This report presents the results of a project commissioned by the ADC, which aimed to explore the preparation for practice of newly qualified dental practitioners. That is, to answer the question: "How prepared are newly qualified dental practitioners for practice in Australia?" (The term 'dental' hereafter will refer to dentists, oral health therapists, dental therapists, dental hygienists, and dental prosthetists).

It is also expected that the findings will inform the future review and development of accreditation standards, policies, and professional competencies for newly qualified practitioners.

Research design and framework

The project adopted a mixed methods design, using both quantitative and qualitative approaches to effectively explore the main research question. The project comprised the following three main phases, completed over a 12-month period from September 2019 to August 2020, summarised below. The methods, results, and discussion for each of these stages are described in separate sections.

Phases	
Phase 1	Project establishment
Phase 2	Literature review and stakeholders' consultation
Phase 3	Main quantitative and qualitative data collection and analyses

Phase 1 – Project establishment, management, and timeline

Phase 1 of the project comprised:

a) Establishing the project through initial consultations with the ADC designed to finalise the scope of the project and the methodological approach

b) Developing the Terms of Reference for the project's steering committee and convening its constitutive meeting to outline and discuss the research design and the methodology, and to discuss preliminary observations from the phase

c) Obtaining Human Research Ethics Committee clearances

d) Project establishment

The Melbourne Dental School (MDS) in collaboration with the Department of Medical Education (DME) from The Faculty of Medicine, Dentistry and Health at The University of Melbourne were commissioned by the Australian Dental Council (ADC) to explore the preparation for practice of newly qualified dental practitioners. The project was a collaboration between researchers in the MDS and from DME, with the project led by researchers at the MDS.

Project team

The project team members were:

- Prof. Rodrigo Mariño, Project Co-Lead MDS
- Prof. Clare Delany, Project Co-Lead DME
- Prof. David Manton, Project Co-Lead MDS
- Dr. Kate Reid, Project Co-Lead DME
- Prof. Julie Satur, Project Co-Lead MDS
- Dr. Rebecca Wong, Project team MDS
- Dr. Felicity Crombie, Project team MDS
- Mr. Geoff Adams, Project team MDS
- Ms. Clare McNally, Project team MDS
- Dr. Antonio Celentano, Project team MDS
- Prof. Mike Morgan, Project team MDS
- Dr. Mathew Lim, Research coordinator, MDS
- Dr. Diego Lopez, Research Assistant, MDS

Project management

The Advisory Committee for the Preparedness for Practice of Newly Qualified Dental Practitioners project was established in order to:

- Ensure efficient management of the project by providing advice, guidance and timely decision making
- Contribute to the project's strategic policies and therefore its overall success
- Ensure that the project adheres to safe practices by analysing the proposed protocols
- Ensure that the procedures are conforming to set ethical guidelines
- Provide a balanced perspective and to act as the interface between the project and the organisations/groups represented

The advisory committee met four times over the course of the project. The dates were:

- 14th of October 2019
- 13th of December 2019
- 13th of March 2020
- 30th of May 2020

Advisory Committee members were:

- Dr. Martin Hall, Dental Health Services Victoria (DHSV), Chief Oral Health Advisor.
- Dr. Bill Suen, CEO DHAA (Dental Hygienists Association of Australia).
- A/Prof. Matthew Hopcraft, CEO ADA VB (Australian Dental Association Victorian Branch).
- Mr. Jeremy Irvine, CEO ADPA (Australian Dental Prosthetists Association).
- Mr. Michael Guthrie, ADC, Director, Accreditation and Quality Assurance.
- Mr. Mark Ford, ADC, Manager, Accreditation.
- Ms. Claire Lewison, Australian Dental and Oral Health Therapists' Association (ADOHTA) (VIC).

In April 2020, Mr. Jeremy Irvine concluded his appointment as CEO ADPA and was replaced by Ms. Jenine Bradburn who assumed his position in the AC.

In October 2019, Mr. Michael Guthrie concluded his time with ADC and Ms. Anne Szadura assumed his position in the AC on behalf of the ADC.

Ethics clearances

Stage 2 of the project was approved by the Human Research Ethics Committee of the University of Melbourne, Melbourne, Australia (1955282.1).

Stage 3 of the project was approved by the Human Research Ethics Committee of the University of Melbourne, Melbourne, Australia (1954334.1). Subsequent amendments to the original ethics approval were sought, firstly, in order to undertake the data collection remotely in response to the COVID-19 pandemic and, secondly, to provide a reimbursement for consumer participants for their time.

Phase 2 – Literature review and stakeholder's consultation

The goal of this phase was to synthesise the literature and empirical data to better understand the concept of work readiness in general, and the domains that make up 'work readiness' for dental practice. This included strategies to identify key concepts and definitions of 'preparedness for practice' for graduating dental clinicians and other health professionals.

The aims of the literature review were to:

a) Understand how preparedness for practice is conceptualised

b) Identify barriers and enablers for preparedness for practice for dental practitioners and other health professionals, as well as gaps in this understanding

c) Develop a theoretical framework which captures and defines the key elements of appropriate preparation for practice safely and competently in different areas of dental practice

Methodology

Literature review

Emphasis was placed on identifying definitions, qualitative and quantitative indicators, and on studies which represent the 'Gold standard for preparedness for practice' for education for dental graduates. This gold standard was considered instrumental in identifying minimum data to be collected in the next stage; and in identifying the instruments and guidelines for interviews that could be used to collect this data.

Electronic literature searches were conducted by a single member of the research team (AC) on September 12, 2019, in the Medline (Ovid), Embase (Ovid), and Web of Science (ISI) databases. The citations identified for further evaluation were imported into the reference management software package EndNote X8 (Clarivate Analytics, PA, USA). This literature review encompassed empirical studies, opinion pieces, pedagogical discussions and published Australian and international education program guidelines. The literature search was performed with the date of publication restricted to articles published from January 1, 2009 to September 12, 2019 (the latter being the date of the database search).

Full-text articles were potentially eligible for inclusion if they:

- Involved any dental, oral health or medical professions which presented concepts and definitions of preparedness for practice, qualitatively explored preparedness for practice with health professionals, or evaluated the perceptions of preparedness of health professionals
- Were in English, Italian, Portuguese, or Spanish
- Used quantitative, qualitative or narrative methods

Publications were excluded if they:

- Evaluated the readiness for practice of actions specific to other health professions (i.e., setting an intravenous cannula)
- Evaluated practice of actions that cannot be generalised to new dental graduates (i.e., disclosing terminal illness to patients)
- Evaluated the curricula of educational institutions instead of new graduates' preparedness

Removal of duplicates was achieved using the Endnote software and manually by two blinded reviewers (AC, ML). Ineligible publications were excluded based on sequential review of title only (AC, ML). A review of titles and abstracts was completed by eight blinded reviewers to determine eligibility for inclusion (AC, ML, RW, FC, RM, DM, JS, DL). Publications included for full-text review were allocated to one or more predetermined domains and allocated a category code. A full-text review of the selected publications was undertaken for each domain (AC, ML, RW, FC, RM, CM, KR, CD, DM, DL). Relevant information relating to concepts of preparedness for health practice discussed in these publications was extracted.

The data extracted were the following: author(s), year of publication, country, title, health profession, study methods, and preparedness for practice concepts and definitions. A narrative overview approach was taken to understand how preparedness/readiness to practice is conceptualised in the literature following the recommendations of Green and colleagues.[11] Included publications were read several times to allow recognition and familiarisation with concepts and keywords. Themes were created using a deductive approach, based on existing literature,[9] and new themes were created where required. Each publication was analysed and where appropriate, themes were condensed and integrated to create a final minimum set of definitions and concepts. At each step, two researchers evaluated publications independently. The reviewers' decisions were compared, and any disagreement was resolved by discussion among the reviewers until consensus was reached.

The purpose of the review was to summarise and interpret existing information and knowledge about health and dental practitioners' preparedness for practice, and to identify specific themes to guide the development of a tailored survey to be used during Phase 3 of this project.

Results were reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.[9]

Stakeholders' consultation

Drawing from the concepts of work readiness identified in the dental and health professional education literature, qualitative consultations involved discussions with selected expert educators, curriculum designers and employers. This enabled a deeper understanding, identification, and evaluation of how these literature-based concepts were interpreted and eventually implemented.

The purpose of these interviews was also to determine whether there were any additional themes identified in the consultations that did not emerge from the literature.

Expert consultations took place with:

a) A sample of course coordinators from the different dental profession educational programs

b) ADC assessors of dental profession educational programs

c) Representatives of larger employers. The health departments of the Commonwealth and each of the states and territories. (e.g., DHSV), as well as other health provider organizations

d) Services, community and corporate dental service providers, military health services, etc.

e) Dental and oral health professional organisations such as ADOHTA, ADA, DHAA and ADPA

Advice was sought from both the research project Advisory Committee and the ADC to identify potential candidates for the interviews. Using a qualitative methodology of in-depth interviews meant a smaller sample of participants was asked to explore the concept of readiness to practice and the resulting rich data could be used by other stakeholders to understand and connect with the ideas. Thus, we did not set out to have a fully generalisable sample, but instead we sought to obtain rich, meaningful and transferrable data about the concept of work readiness for dental practice.

The qualitative data gathered in this consultation phase comprised in-depth interviews. This qualitative approach enabled stakeholders to discuss what they thought mattered for work preparedness and what type of education or experience was necessary to achieve this. Those identified as suitable interview candidates were approached via e-mail by the ADC. The e-mail included an introduction to the project and its aims as well as a copy of the Plain Language Statement (PLS) (Appendix 1). Participants who responded to the initial approach e-mail were then contacted by a member of the research team to schedule an appropriate time to conduct the interview. All interviews followed a series of standardised core themes developed by the research team and based on the Phase 2 scoping review (Table 1).

Table 1. Topics discussed in interviews about definitions, qualitative and quantitative indicators, which represent "preparedness for practice'

1	Are you aware that the ADC has published professional competencies for newly qualified dental professionals?
2	How have the ADC defined competencies been incorporated into current educational programs?
3	Do you think that the professional competencies published by the ADC are reflective of what it means to be ready for clinical practice today?
4	What do you think readiness for practice means?
5	Do you think you/your students/graduates/practitioners are ready to practice?
6	What do you perceive are the barriers to achieving adequate preparedness or readiness for practice?

Interviews were conducted between November 2019 and January 2020 by a single member of the research team (ML). Interviews were either conducted at an agreed location or over the phone, depending on the preference of the interviewee. Prior to the interview commencing, the researcher provided the participant with a copy of the Plain Language Statement and verbally clarified the aims of the study and explained the interview and analysis process, data security, and the individual's right to withdraw. The interviewer then requested verbal consent from the participant.

All interviews were audio recorded (with permission from the participants) and transcribed for further analysis using "Go transcribe".[10] Additionally, the interviewer scribed general notes of the responses throughout the interview. Both the notes and transcriptions were reviewed by the researcher conducting the interviews, the project lead, and another member of the research team to ensure accuracy and consistency.

Qualitative data were analysed using thematic analysis[11] to explore and understand the important influences on the individual conceptualisations. Further higher-order categories were constructed to outline interrelations between these themes.

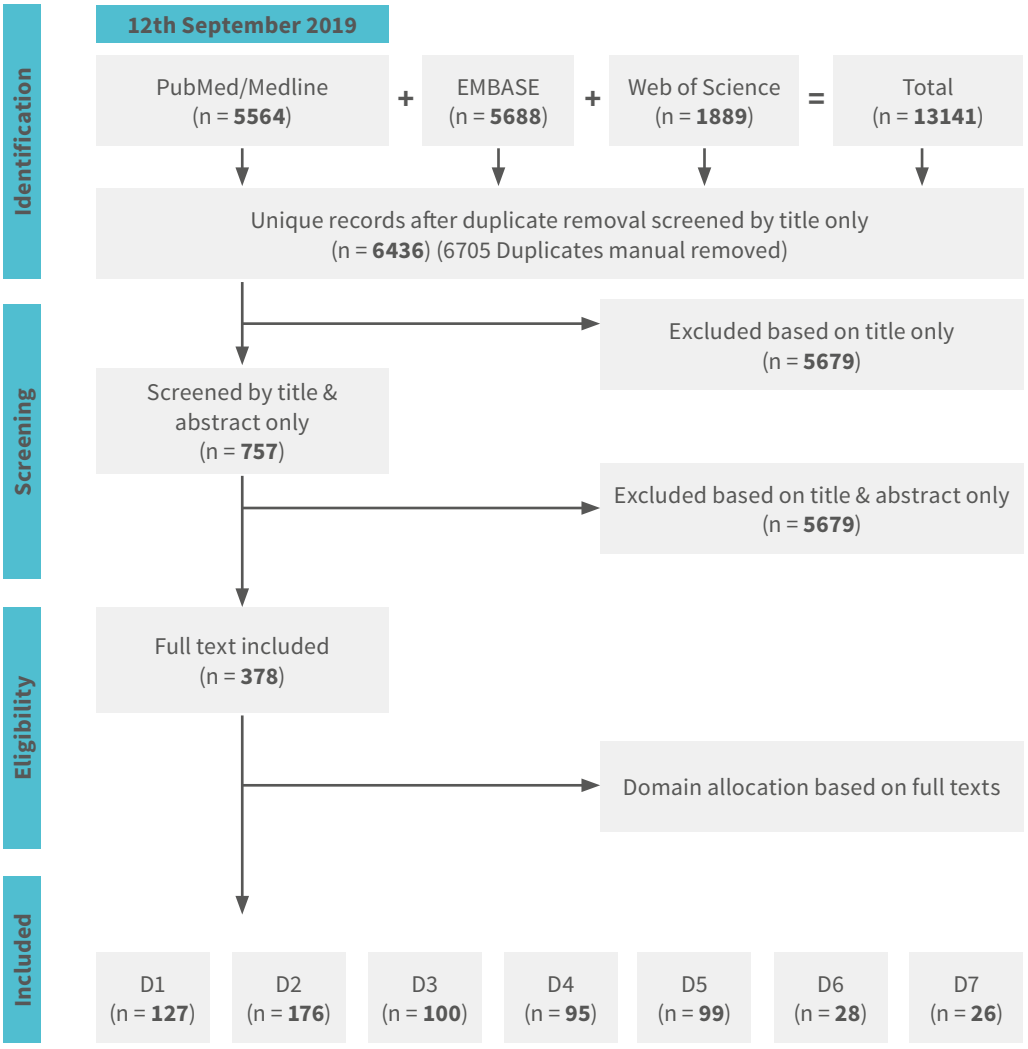
Results

Literature review: Results

Study selection and characteristics

The selection process for publications, based on the search and inclusion/exclusion strategies for this systematic review, is summarised in Figure 1. From the original 6436 unique records, 378 remained for full text review. These retained articles were then allocated to one or more of the domains D1-D7 (i.e., one article could be assigned to multiple domains) as follows: D1=127, D2=176, D3=100, D4=95, D5=99, D6=28 and D7=26.

Figure 1. Prisma flow chart



In line with the aims of the scoping review, seven pre-identified domains were used as an overarching framework to explore different aspect of preparedness for practice (Figure 2). The scoping review identified the main themes related to the preparedness for practice of dental professionals based on the seven pre-identified domains. The results of the full-text assessment and data analysis performed for each domain are presented stratified by domain.

Figure 2. Pre-identified domains of preparedness for practice

DOMAIN 1	Conceptualisation of preparedness/readiness to practise
DOMAIN 2	Descriptors (tools/instruments identification) of competency/readiness/preparedness
DOMAIN 3	Investigative approaches used to explore readiness
DOMAIN 4	Self-perception/opinion/view of final-year medical/dental students/1st year out graduates
DOMAIN 5	Curricula, pathways, and guidelines to preparedness to practice
DOMAIN 6	Barriers and gaps to readiness/preparedness
DOMAIN 7	Support and interventions to fill gaps/ overcome barriers (leading up to graduation/ post-transition) (e.g. CPD courses)

DOMAIN 1 Conceptualisation of preparedness/readiness to practise

A consistent body of literature has been dedicated to the understanding of the concept of preparedness for practice of health practitioners, including dental practitioners. From a total of 127 publications included for full-text review against the inclusion criteria, after full-text review only 30 were deemed potentially relevant by the reviewers. From the thematic analysis, 18 concepts emerged that were related to perceptions of preparedness for practice and they were integrated into nine themes:

- *Theme 1: "Dentistry knowledge and clinical skills".* In general terms, this included the theoretical knowledge and technical abilities to practice evidence-based dentistry. Based on the fact that this was the most frequently mentioned theme, it could be suggested that this is a core item in the conceptualisation of preparedness for practice emerging from all included publications.[12-41]
- *Theme 2: "Communication and interpersonal skills".* This theme was mentioned often, reflecting its importance as a part of the concept of preparedness for practice. The theme included the skills and abilities to communicate and build effective networks across time and place with colleagues, patients, other professionals and the general public. This theme emerged from 26 publications.[12,14,16-18,20-29,31-41]
- *Theme 3: "Protective mechanisms and adaptive skills".* This theme included the ability to adapt to adverse and/or unexpected circumstances demonstrating self-preservation, resilience and restorative capacity in coping with the demands of clinical practice. This field emerged from 11 publications.[17,18,20,23,24,26,29,31,33,36,41]
- *Theme 4: "Self-directed learning skills and reflective practice".* This theme described the need for continuous academic and technical development accompanied by reflective practice to keep up to date with scientific knowledge. This field emerged from 15 publications.[12,14,16,17,20,21,23,25,27,29,33,36-39]
- *Theme 5: "Cultural safety and competency".* This theme explained the ability to have cross-cultural communication and provide a culturally safe dental care service which respects individuals, their tradition, culture and language while also considering the impact of culture on attitudes, behaviours and oral health. This domain was mentioned in 10 publications.[2,14,17,18,22,29,31-33,38,39]

- *Theme 6: "Ethics and Professionalism".* This theme included the ethical and professional attitude of putting patients' interests first and safeguarding them, respecting patients' dignity and choices and protecting their privacy and confidentiality. Another component of this domain was unprofessional behaviour. Mak-van der Vossen and colleagues described some 30 unprofessional behaviours that have been categorised into four themes, namely "failure to engage", "dishonest behaviour", "disrespectful behaviour" and "poor self-awareness".44 This theme emerged from 21 publications.[12,14,16-18,20-24,27,29,31-39]
- *Theme 7: "Management and economical skills".* This domain included the ability to manage a dental practice in relation to financial solvency and operate a business within the health industry (e.g., administrative skills, marketing skills, training non-dental personnel (i.e., assistant) and leadership). This theme was mentioned in 10 publications.[14,16,17,20,21,23,31,33,38,39,41]
- *Theme 8: "Population and community health ability".* This theme described the skills needed to understand and evaluate the impact of social determinants of oral health, health promotion and education to address the needs of patients. This theme emerged from 13 publications.[12,14,17,20-22,31-33,37-39,41]
- *Theme 9: "Legal dentistry and health system".* This theme explained the need for an understanding of the composition, organisation, economics and other interrelated dynamics of health service provision in addition to the knowledge and application of the legal framework that regulates the practice of dentistry. This domain was mentioned in 16 publications.[12,14,16,21,23,24,26,27,31,33-38,41]

These themes included the specific competencies required for preparedness for practice according to the perceptions of authors and study participants. The authors described 'preparedness/readiness to practice' as a compound definition which involved separate dimensions. The research team grouped all of the identified definitions and competencies into Figure 3, to suggest an introductory theoretical and working framework to understand the different dimensions of preparedness for practice of dental practitioners. Our analysis identified a complex theoretical array of these themes which in combination represent three conceptual groups of the 'preparedness/readiness to practice' dimension (Figure 3).

The first level (inner circle) relates to the basic 'dental student' core knowledge needs and what technical, communication and social skills they should have. In the literature, authors tended to describe this conceptual group as the fundamental basis for any 'dental student'; academic knowledge and skills that provide graduates with the background, oral health knowledge, initial clinical skills, and technical competencies, as well as the communication and interpersonal skills required to achieve safe patient care.

The second level (middle circle) focuses on patient care practices as part of a wider social structure and environment, including social determinants of health and the ability of graduates to provide 'patient-centred' oral health care, along with responsiveness to all groups within the community which they serve. In the literature, four themes were mentioned frequently: protective mechanisms and adaptive skills; cultural safety and competency; population and community health ability; and ethics and professionalism.

The third level (outer circle) provides a legal and health system specific context and discussed the need for continuous professional development. As such, the authors mentioned the professional, policy and legislative environment, legal framework and regulatory environments of dental care, and how dental care services fit into those system. Management and financial skills are also included in this level. The authors discussed management and financial skills to address the challenges of how a dental clinic operates as a business within the health industry. Finally, the self-directed learning skills and reflective practice skills are also highlighted in the literature, as part of the need for continuous academical and professional development, and continuous critical professional reflection of both the education and practice.

Figure 3: Preparedness/readiness to practice– a three-level working model.

DOMAIN 2 Descriptors (tools/instruments identification) of competency/readiness/preparedness

The literature search identified 176 potentially relevant publications related to tools or instruments to assess readiness for practice amongst health professionals. Of the 176, 55 (31%) were from the USA,[17,29,35,39,42-92 29] (16%) from the UK,[12,34,41,93-118 15] (9%) from Canada,[19,40,119-131 11] (6%) from Germany[18,132-141] and 9 (5%) from Australia,[142-150] with the remaining 57 publications from 34 other countries.[20,21,33,37,121,151-194] A majority of authors utilised quantitative methods, in particular, questionnaires assessing self-reported competence or readiness amongst new graduates with only a small number using qualitative investigations (e.g., interviews or reflective exercises). 174,187,195 The self-reported competence/readiness assessment is an aspect that has been thoroughly analysed and is reported in Domain 4.

Many of the publications reviewed assessed individual competencies within smaller groups or the outcomes of new educational programs. Examples of assessed publications ranged from assessment of measurable activities that physicians are expected to undertake, at varying levels of competence or trust or supervision, as residents on Day 1,[74] to preparedness in antibiotic prescribing among dental students.[174] Where broader, more general concepts of preparedness for practice were examined, the themes and questions were largely adapted from published competencies within their respective fields. A commonly reported reference was the competencies published by the Accreditation Council for Graduate Medical Education (ACGME).[33,195-199]

In addition, most publications focussed on assessing the views of a single group with few using multiple groups within the health profession to assess competence (e.g., student groups and clinical supervisors). Most authors did not provide a sample of the tool used, even as supplementary material. As a result, no tools were identified from the full-text publications through the primary literature search. A secondary search of the references of these manuscripts identified two previously used tools to assess preparedness for practice of dental graduates: the Dental Undergraduates Preparedness Assessment Scale (DU-PAS)[175] and the Graduate Assessment of Preparedness for Practice (GAPP) questionnaire.[200] The DU-PAS is a measurement tool that has been demonstrated to evaluate a broad range of skills and attributes expected from dental students at the time of graduation.[175] The questionnaire consisted of two parts, with Part A including 24 items and investigating preparedness in clinical procedures and Part B including 26 items and investigating preparedness relating to cognition, communication and professionalism skills.[175] The GAPP questionnaire is a postal questionnaire that uses a 4-point Likert scale to assess self-perceived preparedness in 59 competencies, grouped together in nine competency domains.[200]

DOMAIN 3 Investigative approaches used to explore readiness

Investigative approaches cover the first three levels defined by Kirkpatrick (reaction, learning and behaviour)[201] and can be broadly summarised into one or a combination of four categories:

1. Self-perception-based
2. Portfolio-based
3. Examination-based observer instruments
4. Workplace-based observer instruments

In their 2009 report, an advisory group convened by the ACGME to evaluate entry to practice assessments did not identify any assessment methods as meeting the criteria to qualify as *"recommended as a core component of the program's evaluation system".* The best rating achieved, that of *"can be considered for use as one component..."*, was given to the mini-clinical evaluation exercise (mini-CEX), medical record audit and feedback and objective structured assessment of technical skills.[202] Several studies described assessment packages that included a variety of the approaches.[120,203-205] Method specificity has been reported as more relevant for some domains than others, for example communication skills. Objective Structured Clinical Examinations (OSCE) did not display convergent validity for clinical competence or the doctor-patient relationship whereas the workplace-based approaches studied did.[203]

OSCEs and clinical simulations are the predominant observer-based examination instruments reported in the literature for assessing readiness for practice.[206-209] These methods are generally well received by both candidates and assessors; however, the costs (time, resources and financial) associated with these tools are often raised by researchers as a barrier.[21,206-208] This may be of particular importance for dental contexts given the highly technical nature of dental practice. In a 2015 Canadian study, a Generalizability analysis determined ten technical stations and seven non-technical stations would be required to achieve a G-coefficient (Generalizability (G)coefficient) of 0.80; a five station OCSE for 41 candidates had cost them approximately AU$37,300 (not inflation-adjusted based on contemporary exchange rate), not including model purchases.[207] Simulated patient exercises used as part of the United States Medical Licensing Examination have also highlighted a significant disparity (59.6% versus 78.1%) between performance in practical (physical examination) skills compared to history taking.[210]

Authors report a moderate correlation of OSCE results with post-graduate training performance, significant improvement in intern competencies comparing pre- and post-testing,

performance commensurate with level of experience when testing readiness over every year level of a course, and that simulation exercises can identify core competency deficiencies. But they did not formally use results to determine readiness and cautioned that it may be premature for use as a high-stakes, summative tool on an individual basis.[64,206,209,211] High-stakes assessments must be valid and reliable. In a Kane's argument-based approach analysis of one simulation study of Entrustable Professional Activities (EPAs), reliability of some EPA scores was only moderate for some examiners and could be influenced by factors such as the duration of observation/interaction.[208] The authors recommended further investigation but suggest the instrument could be used to compare readiness for practice across training programmes or individuals.[208] Strong predictive validity of a high-stakes OSCE for a "practice-ready/not practice-ready" post-rotation decision has been reported, but it was also noted that checklist scored assessments emphasised thoroughness over coherence and so were higher than global scores assigned in workplace-based assessments.[120] Global assessment approaches were preferred, however there were associated additional challenges in assessor training and standardisation.[120]

In their 2018 article, Dewan and Norcini supported medical training that prepared students to graduate capable in core EPAs and proposed a shift in course design to allow assessment to extend beyond the current standard approaches which evaluate learning (Kirkpatrick's level 2) to include level 3 and 4 outcomes - behaviours and results.[212]

DOMAIN 4 Self-perception/opinion/view of final-year medical/dental students/1st year out graduates

Perceptions of final-year students and newly graduated health professionals regarding their readiness for practice have been reported in 95 publications identified in the literature search. Of these, 13 were deemed to be relevant: two from the USA,[213,214] two from Ireland,[215,216] two from Germany,[140,217] and one each from Australia,[218] Croatia,[219] France,[220] Kenya,[221] Switzerland,[182] the Netherlands[192] and the UK.[222] Most of the studies (9/13) were about the medical profession[215,217,219] with the remainder relating to dentistry.[39,182,213,220] All except for two studies (11/13) used quantitative methods.[140,215,217-219] The two remaining studies used qualitative[221] and mixed methods.[216]

Although the individual publications reviewed had varying aims and objectives, all discussed the self-perceived views or opinions of final-year students or first year graduate medical or dental practitioners regarding their preparedness for clinical practice.

Among medical students and graduates the outcomes varied between location and setting with some expressing low levels of confidence[215,217,219], while others felt well-prepared for clinical practice.[218] A relatively consistent finding among medical trainees was that perceptions of preparation varied across competency domains. For example, despite medical students feeling well-prepared across all competencies, they felt best-prepared to manage and treat patients with respect and confidentiality and least-prepared to understand the regulatory obligations related to practice.[192] In addition, medical graduates often expressed a feeling of unpreparedness for procedural tasks.[36,215-217,221]

The literature relating to the perceptions of dental students was less extensive and tended to evaluate curricula.[39,168,182,213] In terms of clinical skills, dental students generally reported feeling competent in their ability to perform what was perceived as 'general dentistry', but believed that dental skills at a more specialised level, such as implant placement, managing paediatric dental trauma and patients with complex medical needs, were areas of weakness.[168] This was consistent with the views of dental practice owners who also reported that new graduates lacked basic surgical skills and the ability to manage more complex dental treatment including implantology, orthodontics and paediatric dentistry.[182] Dental graduates tended to be most confident in the tasks performed frequently during their training, such as diagnosis, treatment planning and preventive dentistry.[40,187] In addition, students felt generally unprepared for the business side of dentistry involving the complexity of running and working in private practice.[168,182,213]

DOMAIN 5 Curricula, pathways, and guidelines to preparedness to practice

In relation to curricula and guidelines to ensure preparedness for practice of health professionals, 99 publications were identified by the literature search. After full-text review, 77 publications were deemed to be relevant. Ten concepts emerged from this area and could be summarised in the following five themes:

- *Outcome-based and competency-based education* was the most commonly mentioned type of curriculum. This broadly student-centred approach is based on clearly defined statements of competency, and identification of learning outcomes with experiences and assessments that support and measure attainment in these areas. This concept was discussed in 14 publications.[84,223-235]
- *Case-based learning and simulation-based medical education* described the use of educational activities that replicate clinical scenarios, thus allowing the student to make

mistakes and learn from them without the fear of causing harm to a patient. This form of teaching was mentioned in four publications.[20,236-238]

- *Clinical experience and entrustable professional activities* discussed the use of observable units of practice (entrustable professional activities (EPAs)) that could be entrusted to trainees once the required competencies were attained, thus enabling trainees to be supported in the development of their knowledge and skills. This practice was discussed in five publications.[20,84,233,234,236,239]
- *Reflective curriculum and feedback* involved the practice of allowing students to reflect on their experience and receive feedback to allow them to identify how their knowledge linked with practice and to understand their strengths and weaknesses. This concept was mentioned in six publications.[20,105,213,226,227,235]
- *Standardisation and interprofessional education* related to the need for common articulations and assumptions that promote patient safety, foster continuous quality improvement, enable the spread of best practices, homogenise learning outcomes and cultivate collaborative practice. It was discussed in six publications.[105,229-231,239,240]

DOMAIN 6 Barriers and gaps to readiness/preparedness

Barriers and gaps contributing to the preparedness of health professionals for practice have been discussed in the literature. The initial search strategy identified 26 publications with 10 excluded following review of the full-text manuscripts. Eight concepts relating to the perception of barriers and gaps to preparedness for practice emerged from the publications reviewed and could be summarised in the following four themes:

- *Inadequate experience and induction:* This barrier related to inadequate training, lack of preparation for the use of equipment or technology, and/or commencing work in a new work environment with uncertainty from inadequate orientation or induction. The uncertainty from both resulted in difficulty in transitioning from an educational to workplace environment. This theme emerged from 10 publications.[12,197,215,221,223,240-244]
- *Insufficient exposure to emergency situations and special needs patients:* This barrier was associated with the problem encountered by new graduates when presented with particular situations or patient groups and involved a lack of exposure to these circumstances during their training. This was discussed in seven publications.[12,197,215,223,239,241,243,245]
- *Unmet graduate expectations and feeling unsupported:* This barrier involved difficulties encountered by graduates due to differences between their expectations and the realities of clinical practice and thus their perception that they were unprepared for clinical practice. This concept was mentioned in six publications.[221,223,244-247]
- *Non-standardised programs and examinations:* This barrier pertained to the impression amongst graduates that a lack of accreditation of educational programs or assessments may result in different standards of training and thus deficiencies in their preparedness for practice. It was discussed in five publications.[58,215,239,240,243]

DOMAIN 7 Support and interventions to fill gaps/ overcome barriers (leading up to graduation/ post-transition) (e.g. CPD courses)

The literature search identified 26 articles that potentially discussed supports and interventions to either fill or overcome gaps and barriers to preparedness for practice. Six concepts emerged that could be summarised into the following three themes:

- *Intensive transition or capstone courses*: Included short courses within the education to clinical practice transition period with the main focus of reinforcing the knowledge and confidence of new graduates and their ability to cope with stressors. These courses were discussed in 11 publications.[206,245,246,248-255]
- *Mentoring and shadowing:* Involved the practices of peer-teaching, supervision and mentoring in the transition period with the objective of increasing the confidence of new graduates in their clinical skills and workplace acclimatisation through interaction with an experienced health professional. This concept emerged from five publications.[212,249,256,257]
- *Handbook or clinical guide:* The provision of a handbook as a quick reference guide was discussed in three publications.[137,147,249]

Summary of literature review

This systematic narrative review evaluated the existing literature in relation to concepts and definitions of preparedness for practice of dental professionals and the factors that may influence their readiness. A systematic search of the literature was completed to inform this subsequent narrative-based synthesis of discussions and concepts focused on literature discussing dental students but also included a broader investigation of students from other medical

professions. The concept of preparedness for practice is complex, as verified by the results of this literature review. Preparedness for dental practice can be defined as having the adequate technical skills and clinical knowledge, as well as the ability to communicate appropriately with the patient and dental staff, supported by entrepreneurial skills, protective mechanisms and adaptive skills, community health knowledge and the ability to practice in a culturally safe manner within the context of ethical and legal expectations and the health care system. These skills and knowledge should be constantly refined through self-directed learning and a reflective practice. As such, the findings from the literature search were consistent with the competencies described by Mohan and colleagues[20] but a broader literature search enabled some expansion of this concept with the addition of three new competencies: self-directed learning and reflective practice, cultural safety and competency, and the legal context of dentistry practice and dentistry in health systems.

Stakeholder consultation: Results

Thirteen stakeholders were invited to participate in the interviews. Eight stakeholders responded to the invitation and were interviewed. After review, it was considered that data reached saturation and recruitment did not continue. These eight stakeholders included four dentists, one oral health therapist, and two dental prosthetists, as well as one consumer. The practitioners had a range of private and public professional roles, as well as educational experience and had worked with new graduates across both metropolitan and rural settings. Four of the interviewees were directly involved in the teaching of or coordination of education programs for dental professionals. In addition, the other participants had all been involved in teaching at some point in time and all, except one, were able to respond to this question.

All except two of the interviewees were trained in Australia and only one was not actively practicing dentistry. A range of metropolitan and regional educational institutions were represented in the sample as well as professional organisations including ADPA, ADOHTA, and the ADA. An advocate for Aboriginal and Torres Strait Islander people was also included in the sample. Five interviews were conducted in person with the remaining three completed over the phone. Interview lengths ranged from approximately 15 to 49 minutes with an average length of 29 minutes. These interviews included 6 questions and generated 55 pages of transcript. The analysis identified six main themes in the interviews. The main characteristics of these themes are described below.

The aim of this consultation was to deepen the understanding of the results of the scoping review. Although a small sample, the questions aimed to gain a more in-depth understanding of the concept of workplace readiness through the 'eyes' of practitioners and other stakeholders.

Theme 1: Awareness of ADC's professional competencies for newly qualified dental professionals

All interviewees, except for the consumer representative, were aware that the ADC had published competencies for newly qualified dental professionals. Although none was able to specifically identify all the domains at the time of the interview, respondents were generally aware of the content of these documents.

Theme 2: Level of integration of ADC's competencies into current educational programs

All participants currently involved in dental education explained that the ADC competencies were important to develop the key objectives and outcomes of individual subjects as well guiding assessments. Several also described these competencies to justify to students the inclusion of certain aspects of the curriculum or to explain the importance of certain portions of the course. Many discussed these competencies as being important reference material to guide their educational programs.

Those representing professional organisations and employers also talked about competencies as being important for setting a benchmark for achievement for local graduates. The theme of standardisation amongst educational institutions and examinations for overseas-trained dental professionals was strongly represented in the responses.

In terms of integration into educational programs, in addition to discussing how the competencies guided assessments, many discussed the importance of providing students with a breadth of exposure and experience and the importance of integrating theory and clinical practice to ensure relevance for students and adequate preparation for practice. In contrast, some of the respondents representing employers in the public and private sector raised concerns about the adequacy of current assessments and perceived or actual changes to clinical requirements, such as the use of logbooks. One educator also raised concerns about the shift in focus away from essential skills in clinical practice such as communication in favour of clinical requirements. Additionally, interviewees involved with private practice, in particular, mentioned entrepreneurship.

Theme 3: Level of manifestation of ADC's professional competencies into current readiness for clinical practice

All participants agreed that the current ADC competencies were reflective of what it means to be ready for clinical practice. The two interviewees who disagreed with this statement suggested that the standards were too low and did not reflect the current expectations of the profession or public. To some degree, these views were also reflected amongst those who provided an affirmative response.

Many believed that the competencies needed to be updated and with greater input from outside the education sector. Another common theme from educators was the desire for the competencies to be more specific or descriptive to better guide their programs. Two respondents with extensive private sector experience in particular, felt that the competencies were not the issue but that educational institutions were either not meeting current standards or using the minimum benchmarks for graduates when a higher standard was expected by the profession and public.

Theme 4: Understanding the meaning of readiness for professional practice

There were several other attributes that were raised by stakeholders as being important for preparedness that largely related to these community and professional expectations. All interviewees provided their reflection on the concept of 'readiness for practice'. These included attributes associated with ethical and professional conduct and the ability to treat each patient as an individual. Another common theme, particularly amongst clinicians, was the concept of clinical competence and safety. Interestingly, this was not identified by the consumer representative, who instead discussed issues around the concept of cultural safety and competence. The concept of cultural safety was discussed by several stakeholders but was particularly reinforced by the consumer advocate. Several participants also emphasised patient-centred care.

Other common themes identified by the participants included effective communication, especially the ability to manage adverse outcomes, and an understanding of all sectors of the dental profession including both private and public settings as well as practising in metropolitan and regional areas. Those with private practice experience discussed the importance of understanding the business within the health sector.

Less common themes that were raised by approximately half of participants included the need for an emphasis on professionalism and ethics and fostering the skills of critical thinking and self-development.

Theme 5: Perceptions about students/graduates/ practitioners' readiness to practice

All participants expressed a view about the readiness to practice of new graduates. Most interviewees understood that newly graduated practitioners were less skilled in all clinical areas due to their lack of experience; however, some also felt that newly graduated dental professionals were ready to practice. Nonetheless, some respondents were concerned that despite the existence of competencies, some graduates 'fell through the cracks' and were not suitable or ready to enter the profession. These respondents were generally reflecting the views of their professional organisations and the nature of complaints they received. Interestingly, they also mentioned that complaints usually involved more experienced practitioners, rather than newly qualified graduates.

The need for new graduates to be prepared for and to understand their roles and responsibilities within the health system was a theme raised by stakeholders representing employers and the private sector. In particular, this related to acknowledging the inherent differences between working in the private and public sector and the need to appreciate the business of dentistry. These informants emphasised their perceptions that graduates were mostly prepared for the public sector because of their educational experience within the public health system and would benefit from greater exposure to different environments.

In a similar manner, several stakeholders also discussed the need to ensure that the skill sets of graduates were adequate to prepare clinicians for rural and regional locations. When explored, this concept related to several previously mentioned themes such as the need to have acquired a certain level of clinical skills and for graduates to be prepared to work in a potentially 'less supportive' clinical environment. The theme was also consistent with themes that emerged about the need for clinicians to adapt their skills to the changing clinical environment. The need to receive formal mentoring and the ability of graduate health professionals to be 'critical thinkers' was commonly linked with professional and community expectations that health professionals should continue to update their knowledge and skills to ensure they were current.

Two participants felt that newly graduated dental professionals were not ready to practice. Both respondents were dentists, one working in the public sector, and the other largely with private sector experience. From the public sector perspective, the main issue was around deficiencies in communication skills, patient education and the treatment of a patients as a whole. In private practice, the stated reasons why graduates were not ready for clinical practice related to concerns about a general lack of more extensive clinical experience, in particular, on how that sector works.

One respondent reported serious concerns about deficiencies within specific clinical areas, such as removable prosthodontics (fabrication of dentures), molar endodontics (root canal treatment), and surgical exodontia (surgical removal of teeth). The two stakeholders who responded negatively towards the preparedness for practice of new graduates, however, acknowledged the challenges of providing sufficient clinical experience and felt that these could develop with suitable post-graduation experience. However, they raised concerns about the lack of emphasis in educational programs about aspects of patient management and communication that often were required to complement the clinical aspects of provision of dental treatment.

Theme 6: Perceived barriers to achieving adequate preparedness or readiness for practice

The participants offered a range of responses about perceived barriers to achieving preparedness for practice amongst new graduates. Those representing professional organisations commonly expressed the difficulty presented by the transition from a teaching environment to an independent working environment as the greatest challenge. Those working at educational institutions or involved in teaching tended to identify barriers such as access to appropriate patients or clinical environments to provide students with a comprehensive experience representative of clinical practice. Some also identified the limited time within programs and the move towards graduate programs, meaning that students tended to be older and were thus required to balance other life commitments with their studies, as potential barriers.

Employers also raised concerns about adequate exposure to clinical experience as a barrier but also mentioned some apprehension towards the use of alternative technologies to either supplement or replace real-life clinical experience. Likewise, the change in requirements or assessments in educational programs was a repeated theme amongst employers.

Interestingly, two interviewees, the representative of one professional body and an educator, both with extensive private practice experience, raised concerns about the loss of focus within educational institutions, mainly that there was limited funding and resources dedicated towards improving the clinical experience of students and rather focused towards other pursuits such as theoretical knowledge, the search of evidence, and conducting research.

Many of the participants acknowledged that training institutions were only required to provide graduates with the basic skills to practice safely as dental professionals and that, perhaps, professional organisations could play a greater role in either demanding a minimum standard for graduates or providing greater opportunities to support the transition of new graduates to independent clinical practice.

Stakeholder consultation: Conclusion

Drawing on the concepts of work readiness identified in the dental and health professional education literature, subsequent qualitative consultations involved discussions with selected expert educators, curriculum designers and employers. This enabled a deeper understanding, identification and evaluation of how these literature-based concepts are interpreted and eventually implemented.

The perspectives of key stakeholders were largely consistent with the available literature. For this group, key concepts that define ‘readiness to practice’ are clinical knowledge and technical skills, communication, patient management, understanding the health system and the ‘business’ of dentistry, critical thinking, ethics, professionalism, and cultural safety. Of importance, however, is the need for a minimum standard of these competencies to be established that is reflective of the expectations of the dental profession and the wider community. In particular, preserving and upholding the concept of ‘patient safety’ is seen as central to ensuring newly graduated dental professionals are prepared for clinical practice.

Phase 3 – Main quantitative and qualitative data collection and analyses

Phase 3 of the project explored the preparedness for practice of newly graduated Australian dental professionals by addressing the following questions:

1. What are the self-reported perceptions and concerns of new graduates from the different dental practitioner groups about their preparedness for practice in Australia?
2. What do the different stakeholders perceive as the barriers and enablers for preparedness for practice of dental practitioners?
3. How well prepared for practice are recent Australian dental graduates?
4. How well are Australian dental graduates supported by their workplace to develop their skills and knowledge?

This Phase commenced after ethics approval was obtained and comprised the collection of data from stakeholders. Objectives for this Phase were achieved using two approaches:

1. A quantitative survey component to gather the views of a range of stakeholders
2. A qualitative interview component to further explore the findings generated through the quantitative research

Methods

Quantitative component: online survey

The quantitative component of this Phase adopted a group-comparison (e.g., of dental professions), cross-sectional design. Participants were asked to anonymously complete an online questionnaire. Potential participants were briefed on the aims of the study and invited to respond to the online survey.

The survey was delivered using Qualtrics™, to capture the perspectives of a range of stakeholders.

The stakeholder groups approached to complete the survey included:

- Newly qualified dental practitioners (not more than 3 years from graduation)
- Final-year dental profession students
- Dental course coordinators from the different dental professions' educational programs
- Dental clinical demonstrators
- Australian Dental Council assessors of dental professions' educational programs
- Representatives of larger employers in both the public and private sectors
- Dental and oral health professional organisations, such as ADOHTA, DHAA, ADA, and ADPA

The recruitment process involved the ADC emailing a research invitation to groups associated with the aforementioned stakeholders in a targeted manner to ensure the recruitment of participants from all relevant groups, across all Australian states and territories, rural, regional, and metropolitan locations, and in the public and private sector. This was achieved in the following manner:

- Institutions affiliated with all accredited programs were contacted by the ADC and asked to forward the research invitation onto final-year dental students, new graduates, dental course coordinators, and dental clinical demonstrators
- Dental professional associations were contacted by the ADC and asked to forward the invitation to newly graduated dental professionals, public and private-sector employers, and their members
- The ADC directly forwarded the research invitation to ADC assessors
- Representatives of larger employers, both in the public and private sectors, were invited to participate in this research. The public sector, (i.e., State and Territory Dental Public Health Services) was approached by the ADC and forwarded the research invitation.

The research invitation was sent by email stating the aims of the project and including a link to access the questionnaire. The plain language statement (PLS) and participant consent form were embedded into the Qualtrics survey. In addition to the original research invitation, two subsequent reminder emails were sent to groups involved in recruitment.

The instrument utilised for data collection was adapted from the Graduate Assessment of Preparedness for Practice (GAPP) questionnaire[258] with modifications informed by the literature review and qualitative interviews with stakeholders. The online questionnaire was comprised of seven sociodemographic items and 48 items in the main questionnaire. The items in the main questionnaire were based on the domains identified by the literature review using Likert-type scale questions. For the data analyses, the participants were classified into two groups according to their reported professional group: (a) newly graduated dental professionals (students and new graduates with 3 years or less since graduation as a dental professional) and (b) other professional groups (colleague of new graduates, employer of new graduates, ADC assessor, involved in student teaching and member of professional organisation).

The questions from the survey were assigned the domains identified by Mohan[20] and collaborators: "Academic and technical competencies", "Communication and interprofessional skills", "Protective mechanisms and adaptive skills", "Professional attitude and ethical judgement", "Clinical entrepreneurship and financial solvency", and "Social and community orientation". Additionally, the question: "Overall, how well-prepared for clinical practice do you feel you were when you first started practising?" was included. Answers were recorded on how participants felt according to a 7-point Likert score from 1 'Completely unprepared' to 7 'Fully prepared'. New graduates and students self-rated their own perceived preparedness for practice and other stakeholders rated the perceived preparedness of newly qualified dental graduates.

Cronbach's alpha was used to determine the internal consistency of the GAPP instrument. The reliabilities of the six scales were found to be in the range of 0.79 to 0.96. Construct validity of the scale was assessed through a factor-analysis of the instrument's 48 items using the maximum-likelihood estimation method with VARIMAX rotation.[259] The analysis indicated that the factor structure of GAPP scale approximated the six dimensions of the instrument.

Comparisons between the Likert scale scores from the new graduates' group and those from other professional groups were performed using non-parametric tests (i.e., Mann-Whitney test). All analyses were carried out using the statistical software SPSS (release 26; IBM Corporation, NY, USA). The quantitative analysis served to inform key themes warranting a deeper qualitative analysis and guided the interviews in the next stage.

Qualitative component: in-depth interviews

The quantitative analyses served to further inform key themes warranting a deeper qualitative analysis. After preliminary analysis of the quantitative data themes were explored (Table 2).

Interviews were conducted by a single member of the research team (ML). These interviews were semi-structured in nature with an outline of core questions and several themes developed by the research team based on the results of the quantitative survey.

Table 2. Qualitative themes explored with semi-structured interviews

1	Self-assessed levels of preparedness for practice by new graduates and the dental profession.
2	Particular areas that you felt new graduates are less prepared for after having completed the survey? If so, which area(s)?
3	Clinical areas that new graduates expressed some uncertainty about were managing (i) medical emergencies and (ii) dental trauma.
4	Areas where both the profession and new graduates indicated that they felt new graduates were less prepared: (i) identifying signs of neglect and abuse; and (ii) managing individuals with disabilities or special needs.
5	Concern about how both the profession and new graduates felt about new graduates practicing as health care professionals. In particular, (i) the interface between clinical practice, (ii) patient care and legal obligations; (iii) explaining treatment costs, negotiating fees and the financial pressures of business; and (iv) managing time and stress, balance.
6	Perceived preparedness of new graduates.

Key informants from the stakeholder's groups (in relation to state, public and private sectors, rural vs urban, dental profession, etc.) were interviewed, including consumers and consumers' organisations. Stakeholders were recruited by means of a question at the end of the survey where participants were asked to indicate whether they would be willing to be contacted to participate in a follow-up interview. Participants who agreed were asked to click on a link directing them to leave their name and email. These data were not linked to the survey results.

Consumers of dental services interviews were limited to the state of Victoria. Consumers were approached through one larger public oral healthcare provider (Dental Health Services Victoria). Consumer were asked to register their interest in participating in interviews and were subsequently contacted by the research team. With the approval of the University of Melbourne Ethics committee and under the advice from consumer organisations, a small incentive (a $25 voucher) was offered to consumers to compensate them for their time in participating in this study.

All interviews were audiotaped (with the permission of the participants) and transcribed for further analysis. This data was analysed using thematic analysis[11] to explore and understand the important influences on individual perceptions. Further higher-order categories were constructed to outline interrelations between these themes.

Results

New graduates/students and other stakeholders: Quantitative findings

A total of 152 participants completed the online survey. From those who participated in the survey, 32 were eliminated due to incomplete data, leaving one-hundred-and-twenty available cases for full data analysis. The distribution of participants according to sociodemographic characteristics is described by new graduate/student status in Table 3. In both groups, most participants were female (68.9% for new graduates and 58.1% for stakeholders). The most common year of first registration for stakeholders was prior to 2006 (48.9%) and most of the participants worked primarily in urban settings (72.7% for new graduates and 67.3% for stakeholders). Most of the Queensland (40%) new graduates studied in universities and training institutes, and most of the other stakeholders were from New South Wales (25.8%). The distribution of the age groups indicates that for new graduates/students, as expected, the majority (53.3%) were in the 20-24 years group, followed by 25-29 years (20.0%). In contrast, the majority of the stakeholders were 45 or more years old (72.6%); and with 15 or more years of professional experience (73.8%). For stakeholders involved in education, the mean number of hours dedicated to teaching activities per week was 21.8 (SD 11.1; range 1-50) hours.

Table 3. Demographic characteristics of included participants. (N = 120)*

Demographic characteristics	New Graduates / Students N (%)	Stakeholders N (%)
Gender		
Female	31 (68.9)	36 (58.1)
Male	14 (31.1)	24 (38.7)
Not indicated	0	2 (3.2)
Age groups		
20-24	24 (57.1)	0
25-29	9 (21.4)	1 (1.6)
30-34	2 (4.8)	6 (9.7)
35-39	4 (9.5)	3 (4.8)
40-44	3 (7.1)	7 (11.3)
45-54	0	16 (25.8)
55-64	0	20 (32.3)
65+	0	9 (14.5)
Year of first registration		
<2006	0	45 (73.8)
2006-2010	0	6 (9.8)
2011-2015	0	6 (9.8)
2016-2020	44 (100)	4 (6.6)
Primary work setting		
Urban	24 (72.7)	59 (67.3)
Regional	9 (27.3)	26 (32.7)
Primary work setting		
Private	6 (33.3)	4 (6.5)
Mix	9 (50.0)	36 (58.1)
Public	3 (16.7)	11 (17.7)
Teaching	--	6 (9.7)
Other	--	5 (8.0)
Location of studies		
New South Wales	4 (8.9)	16 (25.8)
Victoria	5 (11.1)	9 (14.5)
South Australia	1 (2.2)	6 (9.7)
Western Australia	5 (11.1)	5 (8.1)
Queensland	18 (40.0)	14 (22.6)
Other or not reported	12 (26.7)	12 (19.4)

*Figures may not add due to missing values.

Table 4. Cross tabulation of participants groups by registration division.

	Dental students	New graduates	Employer of new graduates	ADC assessor/ Teaching	Other	Total
Dentist	11	9	5	24	1	50
Dental Specialist				16		16
OHT/DT	2	4	2	8	6	22
Dental Hygienist		1		2	5	8
Dental Prosthetist	3	4		3	1	11
Not specified	12			1		13
	28	18	7	54	13	120

OHT: Oral Health Therapist; DT: Dental Therapist

The distribution of participants according to registration division by participant groups is described in Table 4. Most of the participants were ADC assessors or involved in training of dental professionals (n = 54), followed by students (n = 28) and new graduates (n = 18). The most common dental profession reported by participants was dentist (n = 50), from which 11 reported being a student and 9 new graduates.

Participants' perceptions of preparedness for practice

The next section describes analyses of students' and stakeholders' perceptions for each of the six dimensions of preparedness for practice as identified by Mohan and her collaborators.20 The following analyses are useful for identifying more and less important aspects of students' and new graduates' perceptions of their preparedness for practice.

Overall perception of preparedness for practice

We asked final-year dental students and new graduates about their overall perceptions of their level of preparedness. Twenty-eight students and eighteen new graduates responded to the online questionnaire. Among students, 39.3% were dental students, another 10.7% were dental prosthetist students, 7.1% were Oral Health Therapist (OHT) students, and 42.9% did not specify their area of studies. Half of the new graduates were dentists, another 22.2% were OHTs, one (5.6%) was a DH and another four (22.2%) were dental prosthetists.

Students/New graduates were asked about how well-prepared for clinical practice they felt according to a 7 score Likert scale. Most students (56.5%) indicated that they were 'Undecided', or unprepared for practice (Table 5). In contrast, new graduates (n = 14) felt that they were better prepared for practice (i.e., codes 5 or above; 85.7%).

Table 5. Proportion (%) of students' and new graduates' self-reported level of preparedness for practice

	1 Completely unprepared	2	3	4	5	6	7 Fully prepared
	Students %/ **New graduates %**						
Overall, how well-prepared are Australian new graduates of dental professions for clinical practice?	4.3/**7.1**	17.4/**0.0**	8.7/**7.1**	26.1/**0.0**	26.1/**50.0**	13.0/**35.7**	4.3/**0.0**

Table 6. Proportion of stakeholders' assessment of the level of preparedness for practice of new dental graduates (%)

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Stakeholders %						
Overall, how well-prepared are Australian new graduates of dental professions for clinical practice?	0.0	7.0	8.8	7.0	49.1	26.3	1.8

Table 6 presents the overall perception of the preparedness for practice of new graduates from: (1) Dental course coordinators from the different dental professions' educational programs; (2) Dental clinical demonstrators; (3) Australian Dental Council assessors of dental professions' educational programs; and (5) Representatives of larger employers in both the public and private sectors. A total of 54 dental professionals were involved in either Australian Dental Council assessor or in teaching dental students, seven employers, and 13 colleagues of newly graduated participated in evaluating the preparedness of new graduates. The characteristics of the clinical supervisors are presented in Tables 3 and 4.

Stakeholders were asked to rate how well-prepared new graduates were for clinical practice. The majority (77.1%) indicated that they were, either 'Prepared' (49.1%), 'Well prepared' (26.3%), or 'Fully prepared' (1.8%) to practice (Table 6). Stakeholder average ratings of preparedness were not statistically significantly different from the average ratings of new graduates.

Perceptions of academic and technical competencies

Final-year students and new graduates were asked to rate their level of preparedness for conducting 23 clinical activities on a scale of 1 (Completely unprepared) to 7 (Fully prepared). Table 6 shows mean ratings of their perceived preparedness for practice on each of the academic and technical competence activities items.

As shown in Table 7, there was a spread of ratings across the activities in this domain. Five activities had, at least, 50% of ratings greater than 5 on the seven-point scale ("Obtaining, interpreting and recording a comprehensive patient history"; "Providing relevant, comprehensive, evidence-based preventive advice to patients"; "Appropriately documenting clinical findings and treatment in patient records"; "Complying with current best practice guidance in decontamination procedures and maintenance of a safe environment"; and "Showing compassion and respect to each patient and understanding the patient as a whole person rather than looking at his or her teeth in isolation"). Another three items approached 50% (i.e., between 44% and 49%) (See Table 7).

In comparison, for the areas "Managing dental trauma"; and "Identifying, assessing, and managing medical emergencies", more than half of respondents were undecided or unprepared for practice. To a lesser extent, three other activities ("Managing dental emergencies"; "Being able to identify the signs of abuse or neglect in patients and raise concerns appropriately"; and "Effectively managing patients with disabilities and other special needs") approached 50% (i.e., between 44% and 49%) of respondents who rated their preparedness at the midpoint or below of the scale.

Differences between students and new graduates' ratings in this domain did not reach statistical significance ($p<0.05$), for all but three items. In these three cases ("Managing dental emergencies"; "Analysing and integrating all relevant information gathered to formulate differential and definitive diagnoses"; and "Providing required treatment to manage most clinical presentations"), new graduates tended to rate themselves as more prepared for practice compared to final-year students. In addition, on average, students had fewer activities that scored 5 or higher compared with new graduates (14.4 vs. 18.6). However, this difference did not reach statistical significance.

Stakeholders were also asked about their perceptions of the academic and technical competencies of new graduates (Tables 7). Statistically significant differences were present in "Showing compassion and respect to each patient and understanding the patient as a whole person rather than looking at his or her teeth in isolation", where stakeholders scored new graduates lower, but still towards the prepared side (Prepared: 95.4% vs 84.2%, graduates and stakeholders, respectively), compared to Students/New graduates themselves ($p<0.001$).

Table 7. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the academic and technical competencies domain

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Students and new graduates% / **Stakeholders%**						
Obtaining, interpreting and recording a comprehensive patient history	0.0/**0.0**	2.3/**1.7**	2.3/**5.2**	9.1/**1.7**	29.5/**24.1**	36.4/**58.6**	20.5/**8.6**
Performing an examination and accurately identifying health, disease and abnormalities of the dentition, mouth and associated structures	0.0/**0.0**	0.0/**3.4**	11.4/**1.7**	11.4/**6.8**	43.2/**40.7**	29.5/**44.1**	4.5/**3.4**
Appropriately recommending and/or undertaking relevant special tests to aid diagnosis	2.3/**0.0**	2.3/**5.1**	4.5/**5.1**	9.1/**11.9**	34.1/**42.4**	36.4/**30.5**	11.4/**5.1**
Investigating and identifying risk factors for disease/trauma in the dentition, mouth, and associated structures	0.0/**3.4**	2.3/**1.7**	15.9/**3.4**	13.6/**16.9**	31.8/**33.9**	25.0/**36.3**	20.5/**5.1**
Analysing and integrating all relevant information gathered to formulate differential and definitive diagnoses	2.3/**0.0**	0.0/**6.8**	7.0/**8.5**	20.9/**8.5**	37.2/**49.2**	25.6/**23.7**	7.0/**3.4**
Formulating an appropriate treatment plan with the patient, taking into account the risks and benefits of treatment options	0.0/**3.7**	2.3/**3.7**	4.7/**3.7**	20.9/**7.4**	34.9/**51.9**	25.6/**22.2**	11.6/**7.4**
Providing relevant, comprehensive, evidence-based preventive advice to patients	0.0/**1.7**	0.0/**5.2**	6.8/**12.1**	9.1/**32.8**	22.7/**36.2**	38.6/**12.1**	22.7/**12.1**
Managing dental emergencies (within the scope of practice)	7.0/**1.8**	9.3/**10.7**	11.6/**7.1**	16.3/**12.5**	27.9/**44.6**	20.9/**14.3**	7.0/**8.9**
Identifying, assessing, and managing medical emergencies	9.1/**4.0**	15.9/**6.0**	6.8/**14.0**	20.5/**18.0**	20.5/**36.0**	22.7/**16.0**	4.5/**6.0**
Managing dental trauma (within the scope of practice)	9.1/**0.0**	18.2/**13.2**	6.8/**13.2**	25.0/**17.0**	22.7/**34.0**	15.9/**18.9**	2.3/**3.8**
Identifying, assessing, and managing pain related to the dentition, mouth and associated structures	4.5/**0.0**	2.3/**6.8**	6.8/**5.1**	20.5/**13.6**	38.6/**47.5**	20.5/**22.0**	6.8/**5.1**

Table 7. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the academic and technical competencies domain (Cont.)

Possessing the knowledge and skills to assess most clinical presentations	4.5/**0.0**	0.0/**5.1**	2.3/**6.8**	13.6/**11.9**	43.2/**44.1**	25.0/**25.4**	11.4/**6.8**
Providing required treatment to manage most clinical presentations	2.3/**0.0**	4.7/**3.4**	2.3/**6.8**	11.6/**11.9**	39.5/**44.1**	32.6/**32.2**	7.0/**1.7**
Using behaviour management strategies to manage patients	2.3/**1.8**	4.7/**7.0**	14.0/**15.8**	7.0/**8.8**	30.2/**36.8**	30.2/**24.6**	11.6/**5.3**
Evaluating and monitoring the progress of treatment and dental outcomes	2.3/**3.4**	4.7/**3.4**	2.3/**13.8**	14.0/**5.2**	30.2/**34.5**	27.9/**34.5**	18.6/**5.2**
Appropriately recommending and/or administering drugs and therapeutic agents, including local anaesthesia (within the scope of practice)	2.3/**0.0**	0.0/**3.5**	4.7/**7.0**	14.0/**12.3**	37.2/**33.3**	25.6/**38.6**	16.3/**5.3**
Being able to identify the signs of abuse or neglect in patients and raise concerns appropriately	9.3/**4.2**	11.6/**12.5**	18.6/**14.6**	9.3/**25.0**	27.9/**18.8**	16.3/**22.9**	7.0/**2.1**
Referring patients appropriately for advice, assessment, or treatment	4.7/**0.0**	2.3/**3.4**	4.7/**5.1**	9.3/**8.5**	37.2/**21.1**	27.9/**44.1**	14.0/**11.9**
Appropriately documenting clinical findings and treatment in patient records	0.0/**0.0**	2.3/**2.3**	4.7/**6.9**	4.7/**3.4**	23.3/**24.1**	41.9/**57.7**	23.3/**12.1**
Complying with current best practice guidance in decontamination procedures and maintenance of a safe environment	2.3/**0.0**	2.3/**5.2**	2.3/**1.7**	4.7/**3.4**	32.6/**29.3**	18.6/**46.6**	37.2/**13.8**
Effectively managing patients with disabilities and other special needs	7.0/**0.0**	16.3/**14.0**	11.6/**12.0**	9.3/**24.0**	32.6/**26.0**	18.6/**22.0**	4.7/**2.0**
Showing compassion and respect to each patient and understanding the patient as a whole person rather than looking at his or her teeth in isolation ***	2.3/**0.0**	0.0/**3.5**	0.0/**3.5**	2.3/**8.8**	11.6/**29.8**	20.9/**35.1**	62.8/**19.3**
Possessing core scientific knowledge to support clinical practice and clinical skills necessary to provide general dental care	0.0/**0.0**	2.3/**3.4**	9.5/**6.9**	14.3/**3.4**	31.0/**32.8**	23.8/**43.1**	19.0/**10.3**

***: p<0.001; ** p<0.01; * p<0.05

Perceptions of communication and interprofessional skills

Table 8 shows the mean ratings of the four activities in the communication and interprofessional skills domain for the sample of students and new graduates. In three activities, at least 60% of ratings were greater than five on the seven-point scale. In the remaining activity ("Discussing sensitive issues with patients and caregivers, negotiating payment options, and communicating effectively in a professional team"), 40.5% of the participants rated at the midpoint (i.e., undecided) or below of the scale. The analysis indicated that there were no significant differences between students and graduates in any of the activities in this domain.

Stakeholders were also asked about their perceptions of the communication and interprofessional skills of new graduates (Table 8). Statistically significant differences were present in "Discussing diagnosis and treatment plans effectively, explaining the benefits, risks and discomfort related to treatment, preventive health strategies and post-operative instructions". Stakeholders scored new graduates lower, but still towards the prepared side, compared to Students/New graduates themselves (Prepared: 85.7% vs. 75.4%, graduates and stakeholders, respectively; $p < 0.05$).

Perceptions of protective mechanisms and adaptive skills

Table 9 shows the spread of ratings across the protective mechanisms and adaptive skills domain activities. In two activities of this domain students and graduates rated at or above the midpoint of the scale. In the item "Being able to cope with diverse work situations, managing time, coping with stress and effectively balancing work and personal life", 40.5% of the participants rated at the midpoint or below. The analysis indicated that there were no significant differences between students and graduates in this domain.

Stakeholders were also asked about their perceptions of the protective mechanisms and adaptive skills of new graduates (Table 9). Statistically significant differences were present in "Understanding the importance of keeping up to date and committing to lifelong learning, understanding the importance of reflective learning, feedback and development" (Prepared: 90.4% vs 81.1%, graduates and stakeholders, respectively; $p < 0.05$).

Perceptions of professional attitude and ethical judgement

Table 10 shows the spread of ratings across the professional attitudes and ethical judgement domain activities. Students and new graduates did not differ on how they rated the various activities. In all three activities, at least 75% of participants rated at or above the midpoint of the scale. Students and new graduates did not differ on how they rated the various activities in this domain.

Stakeholders were also asked about their perceptions of professional attitude and ethical judgements of new graduates (Table 10). Statistically significant differences were present in four out of six activities. There were statistically significant differences in the assessment of stakeholders compared with those of the students/New graduates: "Respecting patients' dignity and choices and providing care according to the patient's needs and culture" (Prepared: 88.1% vs 82.1%, graduates and stakeholders, respectively; p=0.011); "Understanding the roles of, and cooperating effectively with, other members of the healthcare team in the best interest of patients" (Prepared: 88.5% vs 75.4%, graduates and stakeholders, respectively; $p = 0.014$); "Recognising the importance of and demonstrating personal accountability to patients, the regulator, the team and wider community, and putting patients' interests first and acting as their advocate where appropriate" (Prepared: 88.9% vs 71.2%, graduates and stakeholders, respectively; $p = 0.029$); and "Leading, managing and taking professional responsibility for the actions of colleagues and other members of the team involved in patient care " (Prepared: 88.9% vs 59.6%, graduates and stakeholders, respectively; p=0.001).

Perceptions of clinical entrepreneurship and financial solvency

Table 11 shows students and graduates' ratings on clinical entrepreneurship and financial solvency items. The pattern of answers across the three areas suggest that both students and graduates see themselves as less prepared in this domain. The majority of participants scored greater than 5 on the seven-point scale, in only one activity (Understanding the interface between clinical practice, patient care, and operating a business in conjunction with one's professional and legal obligations as a health professional). For the other two activities, the majority (55% or above) scored below 5, which indicates a tendency towards unprepared. There were no significant differences between students and graduates' perceptions in any of the activities in this domain.

Stakeholders were also asked about their perceptions of the professional attitudes and ethical judgements of new graduates (Table 11). There were no significant differences between new graduates and other stakeholders' perceptions for any of the activities in this domain.

Perceptions of social and community orientation

Table 12 shows students and graduates' ratings on social and community orientation activities. Most final-year students and graduates saw themselves as prepared in this domain. Across three activities, at least 60% of respondents' ratings were greater than 5 on the seven-point scale. There were no significant differences between students and graduates for any of the activities in this domain.

Stakeholders were also asked about their perceptions of the social and community orientation of new graduates (Table 12). Statistically significant differences were present in "Evaluating the impact of social factors on illness, holistically understanding the social situations of one's patients and their families and/or carers". Stakeholders scored new graduates lower than students did themselves (Prepared: 80.5% vs 60.8%, graduates and stakeholders, respectively; p=0.05).

Table 8. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the communication and interprofessional skills domain

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Students and new graduates% / **Stakeholders%**						
Discussing diagnosis and treatment plans effectively, explaining the benefits, risks and discomfort related to treatment, preventive health strategies and post-operative instructions*	0.0/**1.8**	2.4/**1.8**	2.4/**10.5**	9.5/**10.5**	21.4/**31.6**	47.6/**38.6**	16.7/**5.3**
Communicating appropriately, effectively and sensitively at all times with and about patients, their representatives and the general public, and obtaining informed consent	2.4/**0.0**	2.4/**1.8**	2.4/**7.0**	7.1/**8.8**	21.4/**35.1**	35.7/**31.6**	28.6/**15.8**
Discussing sensitive issues with patients and caregivers, negotiating payment options and communicating effectively in a professional team	0.0/**0.0**	11.9/**16.7**	7.1/**11.1**	21.4/**16.7**	26.2/**24.1**	21.4/**24.1**	11.9/**7.4**
Communicating feedback appropriately with colleagues from dental and other healthcare professions, and raising concerns when problems arise	0.0/**0.0**	4.8/**5.4**	9.5/**8.9**	23.8/**19.6**	35.7/**33.9**	11.9/**23.2**	14.3/**8.9**

* p<0.05

Table 9. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the protective mechanisms and adaptive skills domain

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Students and new graduates% / **Stakeholders%**						
Understanding the importance of keeping up to date and committing to lifelong learning, understanding the importance of reflective learning, feedback and development*	0.0/**0.0**	2.4/**3.4**	2.4/**5.2**	4.8/**10.3**	21.4/**22.4**	21.4/**34.5**	47.6/**24.1**
Evaluating clinical research and evidence and adapting to relevant, emerging and new technology and techniques	0.0/**0.0**	9.5/**5.4**	2.4/**5.4**	14.3/**21.4**	33.3/**25.0**	19.0/**32.1**	21.4/**10.7**
Being able to cope with diverse work situations, managing time, coping with stress and effectively balancing work and personal life	2.4/**0.0**	9.5/**11.1**	7.1/**13.0**	21.4/**18.5**	26.2/**33.3**	14.3/**16.7**	19.0/**7.4**

* $p<0.05$

Table 10. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the professional attitude and ethical judgement

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Students and new graduates% / **Stakeholders%**						
Respecting patients' dignity and choices and providing care according to the patient's needs and culture*	0.0/**0.0**	0.0/**3.6**	0.0/**3.6**	11.9/**10.7**	16.7/**26.8**	31.0/**41.1**	40.5/**14.3**
Recognising and acting within the Dental Board of Australia's standards and within other professionally relevant laws, ethical guidance and systems	0.0/**0.0**	0.0/**3.6**	2.4/**1.8**	14.3/**16.1**	19.0/**17.9**	28.6/**37.5**	35.7/**23.2**
Understanding the roles of, and cooperating effectively with, other members of the healthcare team in the best interests of patients*	0.0/**0.0**	0.0/**3.8**	2.9/**9.4**	8.6/**11.3**	17.1/**28.3**	34.3/**28.3**	37.1/**18.9**
Recognising the importance of and demonstrating personal accountability to patients, the regulator, the team and wider community, and putting patients' interests first and acting as their advocate where appropriate*	0.0/**0.0**	0.0/**1.9**	2.8/**7.7**	8.3/**19.2**	19.4/**19.2**	44.4/**40.4**	25.0/**11.5**
Leading, managing and taking professional responsibility for the actions of colleagues and other members of the team involved in patient care***	0.0/**2.1**	2.8/**6.4**	0.0/**8.5**	8.3/**23.4**	30.6/**29.8**	36.1/**23.4**	22.2/**6.4**
Recognising and complying with local and national systems and processes to support safe patient care, including the safe use of equipment and materials	0.0/**0.0**	0.0/**3.7**	8.6/**3.7**	14.3/**14.8**	20.0/**25.9**	28.0/**38.96**	28.6/**13.0**

***: $p<0.001$; * $p<0.05$

Table 11. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the clinical entrepreneurship and financial solvency domain

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Students and new graduates% / **Stakeholders%**						
Understands the characteristics of the health system he or she is employed in and the associated financial pressures and obligations of these systems	2.8/**2.1**	5.6/**19.1**	25.0/**12.8**	22.2/**14.9**	16.7/**21.3**	22.2/**21.3**	5.6/**8.5**
Being able to explain treatment costs, negotiate with patients around fees and deal with other stakeholders and finances to ensure survival in business	2.9/**4.9**	22.9/**22.0**	17.1/**14.6**	14.3/**17.1**	22.9/**19.5**	14.3/**14.6**	5.7/**7.3**
Understanding the interface between clinical practice, patient care, and operating a business in conjunction with one's professional and legal obligations as a health professional	2.8/**2.1**	5.6/**18.8**	16.7/**20.8**	16.7/**10.4**	19.4/**22.9**	25.0/**14.6**	13.9/**10.4**

Table 12. Proportion (%) of students' and new graduates' level of self-reported preparedness and stakeholders' evaluations in the social and community orientation domain

	1 Completely unprepared	2	3	4 Undecided	5	6	7 Fully prepared
	Students and new graduates% / **Stakeholders%**						
Providing culturally safe care that recognises the distinct needs of Aboriginal and Torres Strait Islander Peoples in relation to dental care provision	5.6/**2.3**	8.3/**4.5**	8.3/**6.8**	19.4/**18.2**	19.4/**27.3**	22.2/**29.5**	16.7/**11.4**
Understanding the current issues relating to inequalities in dental, and how to plan to address these needs	0.0/**0.0**	5.6/**8.0**	11.1/**8.0**	19.4/**22.0**	27.8/**22.0**	16.7/**30.0**	19.4/**10.0**
Evaluating the impact of social factors on illness, holistically understanding the social situations of one's patients and their families and/or carers*	0.0/**0.0**	2.8/**5.9**	2./**9.88**	13.9/**23.5**	36.1/**29.4**	25.0/**21.6**	19.4/**9.8**

* $p<0.05$

Summary quantitative results

The self-assessed perspectives of preparedness for practice from a range of stakeholders (i.e., educators, employers, final-year students, graduates, practitioners and professional associations) were captured using an online survey in which participants were asked to anonymously answer questions related to the concepts of preparedness for practice. A total of 120 participants provided complete information for the online survey. Participants were from several Australian states and territories; from regional, rural and urban locations; and working in the public and private sector. Their answers provided insight into the preparedness for practice of new graduates. Due to the small sample size, analyses of group differences must be treated as exploratory.

As shown in Tables 8 to 12, there was some spread of ratings over the 41 activities. Students and new graduates generally felt prepared for activities in all of the identified domains. Activities involving the dimension of clinical entrepreneurship and financial solvency was the dimension where students and graduates felt least prepared (e.g., explain fees, negotiate finances) compared to any other of the six dimensions. To some extent, in the domains involving clinical and technical competencies, and clinical entrepreneurship, new graduates self-assessed as less prepared for practice. For example, around clinical competencies, students and new graduates self-assessed as less prepared around managing dental trauma; and identifying, assessing, and managing medical emergencies. In fact, activities around dental trauma and being able to explain treatment costs to patients were given the lowest ratings. To put these results into context, it must be noted that, although some dental training providers operate their own clinics (e.g., Melbourne Dental Clinic), most dental training in Australia involves providing care to public patients where treatment is fully subsidised –– therefore, there is limited exposure to private dentistry or a chance to gain experience in these contexts. In addition, and to a lesser extent, they identify discussing sensitive issues with patients and caregivers, as an area of less preparation.

On the other hand, activities around social and community orientation and to a lesser extent professional attitude and ethical judgement were the dimensions where students and graduates feel the most prepared. The highest rating was given to aspects such as professional attitude and ethical judgement and social and community orientation (i.e., showing compassion and respect to patients). Interestingly, this was followed by an item in the protective mechanisms and adaptive skills dimension (e.g., committing to lifelong learning). Stakeholders evaluated new graduates in these domains in a similar manner.

Students and new graduates generally felt unprepared for coping with stressors (i.e., anxiety and patient expectations), for the business aspects of private dental practice and for the complexity of managing a private dental practice. These findings are largely consistent with domains in which graduates felt more insecure from the literature.[168,182,213]

Overall, the new graduates' group reported higher scores of preparedness than those from stakeholders. On eight of the 41 comparisons, differences reached statistical significance ($p < 0.05$). As expected, graduates felt more prepared for practice than final-year students. However, it must be acknowledged that the students were surveyed basically at the beginning of their final-year and therefore still had some months of additional training before graduation. Their perspectives may have been different just after the end of teaching.

Additionally, when stakeholders and new graduates were asked about how well-prepared for clinical practice new graduates were, the majority indicated that they were, by and large, 'Prepared' with no statistically significant differences. Nonetheless, when new graduates were compared with final-year students, final-year students felt less prepared. One explanation for this pattern may be the additional experience of engagement in dental practice by itself, which acknowledges that in the acquisition and development of a skill, a professional moves from different levels of proficiency: from novice or advance beginner, towards expertise, with increasing exposure to work.[260] Another explanation for this finding might be that students do not have the same confidence, compared to graduates, to be able to complete clinical tasks independently, therefore they feel less prepared.

Relative to the size of the population, the survey sample for stakeholders and new graduates and students was low, and therefore the trends presented here should be treated as exploratory. Nonetheless, despite a modest response rate, the findings point to the benefit for graduates of active involvement and exposure to real-life wider clinical situations including exposure to the business/financial aspects, involvement in general practice, and interacting with other health professionals, where students and graduates can benefit and learn.

New graduates/students and other stakeholders: Qualitative findings

Semi-structured interviews with stakeholders

The survey responses informed the individual interviews with stakeholders in dental practice. These interviews were designed to explore the key themes emerging from the stakeholder survey. A total of 15 stakeholders participated in qualitative interviews for this study. Interview participants included clinical demonstrators (n = 9; 2 OHTs; 5 dentists; and 2 prosthetists), dental course convenors (n = 4), as well as representatives of large public employers (n = 2). Six stakeholders were from Queensland; four from NSW; two from Western Australia; two from ACT; and one from Victoria.

The stakeholder groups and types of data collected in this research generated a rich body of data concerning preparedness for practice of new dental graduates. All analyses were performed using the qualitative data analysis software tool NVivo version 12 (QSR International Pty Ltd, Vic, Australia).

Codes relating to the focus of this research have been resolved into seven higher order categories, as follows:

- academic and technical competencies
- clinical entrepreneurship
- communication and interprofessional skills
- professional attitude and ethical judgement
- protective mechanisms and adaptive skills
- social and community orientation
- support interventions to increase preparedness

Academic and technical competencies

This theme explored stakeholder opinions and perceptions of the preparedness of graduate dental professionals with respect to their knowledge and clinical skills upon entering the profession.

There was consensus on the good quality of their basic training. Stakeholders consistently reported that the knowledge of dental profession graduates was at the required level to enter practice in Australia in a safe way.

They also considered that their competency would only increase with time. Stakeholders reported that once a graduate was immersed in professional practice, and had exposure to the clinical environment, this would consolidate their knowledge and allow them to keep abreast of new developments in their fields, and develop as professionals, primarily due to graduates' good knowledge base and motivation:

> *"…they are prepared to a certain degree with basic knowledge to be able to perform treatments safely. But I do not think it really prepares them until they actually get out there and start doing it 24/7 with those extra pressures on them. Like the communication, or the time management, or the difficult patient that there might be". (Stakeholder 6)*

However, stakeholder opinions about adequacy of clinical exposure during training and the translation of knowledge into clinical practice were varied:

> *"The knowledge base is certainly there, but when it comes to actually putting it into practice…there are limitations in the experience of the dental students..." (Stakeholder 8)*

Stakeholders mentioned areas where new graduates were comparatively better prepared. One was infection control:

> *"Any new graduate will develop their skills over time so that is probably the weakest point, but their knowledge, especially around workplace health and safety and infection control, is very good". (Stakeholder 13)*

Another one was health promotion:

> *"I'm just thinking health promotion is a really hard one and there's a real difference between bachelor of oral health undergraduates and dental graduates. I think bachelor of oral health graduates have a better understanding of health promotion". (Stakeholder 7)*

Stakeholders also acknowledged that new graduates are better prepared for closing the gap between academia and clinical practice, via an evidence-based practice, than previous cohorts of dental professionals.

> *"I know when I graduated, I would not have known a very good study from a poor study. You know, now there is a lot more review articles a lot more you know secondary reviews and tertiary review articles. So yeah. So, hopefully they can discern good research". (Stakeholder 3)*

On the other hand, other stakeholders considered that knowledge of clinical experience was limited, making them somewhat unprepared for practice, due to the practicalities of their training:

> *"… definitely more clinical experience would be great". (Stakeholder 2)*

Stakeholders identified the training in procedural aspects of oral health care as a potential issue for graduates on entering practice. They identified this as potentially being due to a lack of hands-on training throughout the entirety of the training program:

"It's more that… I think it's quantifiable deficiencies in skill... from deficiencies in technical skills, and they are very good with the theory in many ways…" (Stakeholder 9)

They also appreciated that the working scenario was far more complex, and with additional demands in the contemporary environment compared to previous experiences. For example, one stakeholder mentioned the legal scenario as much more complex:

"Now they've got a lot of things to watch out for. And much more serious repercussions if things go wrong. … nothing like that "Dr. knows best", if you made a mistake, people would forget and let you off it. They do not do that now. I think they feel under a lot more pressure than I felt". (Stakeholder 5)

The financial and time pressures being placed on both the curriculum and institutions to deliver their programs were additional barriers to achieving a better outcome:

"I think the bottom line is, every school in Australia is deficient when it comes to their budget. Every school in Australia has fewer staff than they should have". (Stakeholder 4)

Another limitation highlighted by participants was the need to be selective with patients for teaching purposes. Sometimes it is difficult to get enough cases for students, who usually come from public oral health care services, at the different level of their training. Thus, some stakeholders understood that, for those reasons, new graduates are prepared to a certain extent, but they're not going to be exposed to everything that they might see in a textbook as there is limited exposure until they start working in the "real world". In this respect, one stakeholder indicated that new graduates were aware of that and provided this advice to them:

"… you have got to find a really good mentor, because you have got so many deficiencies in your training. and they realize that". (Stakeholder 9)

Clinical entrepreneurship

The clinical entrepreneurship theme explored participants' experiences with graduate preparedness for managing the financial considerations of patient care, both from the perspective of business (i.e., generating an income) and confidence with managing patient expectations of the cost of dental care.

Stakeholders typically began with broad judgements about graduate approaches to the financial aspects of dental practice. There was a general sense of lack of preparedness:

"Of course, they're not prepared to talk about money". (Stakeholder 8)

"They come out of university never having to speak to patients about costs and money and for a lot of new graduates…it's also very awkward to talk to patients about money and about costs and dealing with reactions of people who might find the costs quite shocking". (Stakeholder 9)

For some this was due to the nature of the clinical exposure and patient base:

"I think that in the university environment we're very focused on public sector […]. Perhaps there does need to be something else included that's more focused towards private sector". (Stakeholder 7)

How to address these concerns was only discussed by a few stakeholders. Some questioned the role of dental schools in preparing dental graduates for the entrepreneurial aspects of the professions:

"I'm not sure where the education goes back to the dentist who is working the corporate job, to try and encourage them to stand up to the corporate or go back to the corporate and say well you know they, your employee dentists, do have a responsibility for it but I cannot deny the dangers to employment. That's the catch". (Stakeholder 13)

Still, there was some emphasis on how clinical training in the private sector might be able to provide exposure to the financial aspects of patient care:

"…I say private sector's importance is that the students have to know how to do financial consent. Which is different, slightly different to informed consent." (Stakeholder 15)

"…a little bit more of a business head would be quite useful because it's trickier than it used to be and more competitive than it used to be. So probably some business kind of teaching as well would be helpful". (Stakeholder 2)

Although one participant provided a contrasting view:

"…I think there are other things that they should be learning or spending more time on rather than how to speak to patients about charging fees. So, I would be very firmly in the camp of 'okay it's an issue, but the university can't teach the students everything that they need to know when they graduate". (Stakeholder 10)

There was also recognition of experiences and exposure to these aspects in some dental schools. One participant commented:

"Yeah I think it's the lack of experience. Melbourne, I believe has started a private practice thing. Sydney started a trial as well. Anyway, three or four students received it very well I think I had them in paed[ontic]s a couple of weeks after". (Stakeholder 7)

Stakeholders also commented on the fact that students can push some entrepreneurial and commercial aspects, but for the benefit of the patients:

> *"Students also, and particularly my oral health students, they are also very good at recommending and selling oral health high tech oral hygiene products so toothbrushes, electric toothbrushes." (Stakeholder 15)*

Another stakeholder also identified a challenge related to the cost of becoming a dental professional, and how this may play into patient care decisions and discussions:

> *"The pressure to make it quick to make a living. Because as you said they are graduating with a huge debt. So, you know who is going to support them with that huge debt that they have got, they have to make it quick and they have to pay back the loans…" (Stakeholder 8)*

In contrast, stakeholders also expressed some concerns that the financial pressure was high and to a level that may affect their clinical decisions:

> *"I do worry that there is a lack of professionalism coming out with the new graduates from the point of view that they are under so much pressure with the commercialism". (Stakeholder 8)*

Private versus public practice was also explored by a number of participants, with a particular focus on the contrasting financial pressures:

> *"I suppose if you work for a dental hospital you get a set salary and if you are in private practice, you're on commission, 33 percent, and it warps your thinking a little bit…" (Stakeholder 14)*

But also, the perceptions of private versus public practice and how the dental professions present these to graduates:

> *"…the ADA is designed for private practice. It is not designed for public sector. And often from the graduates coming out, the public sector is its second-best choice. You know, if you cannot get a job in private practice, you will have to work in the public sector". (Stakeholder 8)*

Furthermore, numerous examples were expressed about the dangers of the emphasis on the entrepreneurial aspects of the profession, and increased exposure to private practice. For example, one participant expressed some concerns about the impact of these issues on graduate dental professionals:

> *"But it is still driven by the drill, fill and bill mentality and the attitude of many of the students remains that, and the behaviour of people on graduation remains that". (Stakeholder 11)*

> *"…continuing to grow that the patient is the priority not the dollar". (Stakeholder 13)*

Other stakeholders indicated that students may be misled about the benefits of private practice:

> *"They have this idealised sort of picture of dentistry of easy private, in one way a bit naughty, but they are easier, cleaner, healthier way of practice". (Stakeholder 1)*

Communication and interprofessional skills

Stakeholders were invited to comment on the level of communication skills exhibited by graduate dental professionals. This dimension was considered by many participants in this study as a key element in bridging the division between the clinicians and patients across ages and SES differences, as well as in the success of treatments.

> *"You really need to be able to interact with the whole family unit and be able to communicate with everyone from birth to elderly". (Stakeholder 5)*

It was also appreciated that new graduates might be better at asking more sensitive questions then previous cohorts of dental professionals:

> *"I know that that they are pretty okay with asking patients at the hospital about cannabis drug use, even some 15-year-old in pain. They have said: any possibility you could be pregnant?; any recreational drugs? I have because I do listen in on them it's an open clinic yes. It's surprising that you say that because I actually think they're more comfortable than a lot of other like my cohort". (Stakeholder 7)*

Despite this, communication was identified by stakeholders as one aspect of graduate practice that was challenging. Many stakeholders related that better communication skills could help new graduates develop a better rapport with patients. Specific groups in the community were highlighted as areas of deficiency in communications. For example, with certain age-groups:

> *"…generally, I think the new graduates are excellent at working with all age groups actually." (Stakeholder 5)*

However, while language might not be a problem for basic communication, communication difficulties occurred also because of differing cultural meanings or interpretations, therefore limiting communication.[261] Dental professionals should recognise the implications of these cultural differences.

The need to be proficient in working with culturally, and linguistically diverse (CALD) groups was highlighted. Australia is a culturally and linguistically diverse country. Within this socio-cultural context, the Australian dental workforce must not only be clinically competent, but also have the ability to communicate effectively with diverse patients and be culturally safe in providing treatment as well as throughout the entire consultation as an essential part of the dental practice:[262 263]

> *"They just do not have the verbal skills [to communicate with a patient where] …English is not their first language. Students particularly struggle in my experience. I do not think they get enough training in it". (Stakeholder 15)*

Stakeholders suggested that this challenge arose from the inclusion of communication skills training in pre-professional programs:

> *"See that's the thing, they don't get taught the art of listening because communication is more about listening than actually telling and showing them how much you know". (Stakeholder 14)*

However, some programs appeared to be addressing these issues, albeit based on the experiences of academics undertaking other (i.e., clinical governance) roles:

> *"… And it goes throughout the entire program and there are specific assessment tasks that are linked to communication skills. And we also started investing to make our students do certain activities that are really directed at communication". (Stakeholder 7)*

Stakeholders also provided some discussion of the context for communication as being an influence on the graduate:

> *"What they might struggle with is actually dealing with more demanding patients. I suppose the ones that are, if they go into private practice, are paying for their treatment …" (Stakeholder 4)*

Communication issues are common in complaints across all professions. Apart from notifications against dental practitioners because of clinical care issues, other main issues for dental practitioners were billing, communication, and informed consent, all of which related to communication. Some stakeholders identified other clear benefits of good communication skills in terms of their "work-readiness" as the avoidance of complaints.

> *"… 90% of those complaints were about lack of communication and the patient did not understand what was being told, that they get told to sign off on this paper and they had no idea". (Stakeholder 14)*

Good communication skills and empathy help to foster a good practitioner-patient relationship, regardless of the patient's ethnic or cultural background, but these professional characteristics are particularly important when helping patients who might remain attached to their original values and health practices.[264]

Empathic care and communication were also addressed by a number of stakeholders; however, it was not a particularly strong theme. This consideration of empathy included both the teaching and learning of empathic skills and attitudes:

> *"And we know from our experience that sometimes with some people you cannot teach ethics and you cannot teach empathy. We certainly try to feed all of that in and then let them know that the regulators are there to protect the public". (Stakeholder 4)*

Professional attitudes and ethical judgment

This theme explored graduates' preparedness for clinical practice with respect to professional issues as a primary goal for preparing dental practitioners to deliver effective and safe oral health services within an ethical framework. Some stakeholders focused on this theme with respect to the training provider and saw it as an opportunity to raise awareness of the regulatory schemes governing dental practice:

> *"I am completely paranoid that our students will leave and do something wrong. You know, I find because I speak about the regulators quite often and I actually find that a lot of practitioners actually don't know what the role of the regulator is. And that is a little scary". (Stakeholder 4)*

Others continued the theme of awareness of national standards and other system- based issues that may influence graduates' perceptions of risk:

> *"…but just being aware of the national standards and that, you know, hospital health service districts have to go through accreditation and make the national standards now. And just having even cited them, know they exist because I tell you what, it's a huge part of our role and everyone - it's what we do every day". (Stakeholder 1)*

Consideration was also given to the legal aspects of dental practice:

> *"They do have a knowledge of the basics of the legality of what they are practicing and things around that, and that's a dynamic situation that changes a lot". (Stakeholder 13)*

Stakeholders also considered the role of multidisciplinary care in the management of dental issues:

"…it [patient care] needs to be a multidisciplinary approach not just an oral health therapist, [when a patient] comes in for a clean and scale, it really has to be part of uniform seamless clinical handover between whoever and that patient as they get dentally fit…" (Stakeholder 1)

One stakeholder was particularly enthusiastic in his/her desire for greater integration with other health professionals to optimise patient care:

"…we simply have to get better integration with medicine. […] So, my models are broad cadre of primary community health workers integrated". (Stakeholder 11)

Stakeholders indicated that new graduates are also exposed to commercial pressures. While graduates recognised their responsibilities, they were not always able to navigate these tensions as well as they wanted to:

"I know several young graduates come and talk to me and say …" I did this and I did this, and I did that... and I should not have really, I know that. And you know… my boss is asking me to do this…" (Stakeholder 9)

However, they also expressed concern about how dentistry is currently practiced. In particular, the decline in professional values related to the commercialisation of health care systems in which the primary concern for investors was the maximisation of income.[265]

"I do worry that there is a lack of professionalism coming out with the new graduates from the point of view that they are under so much pressure with the commercialism." (Stakeholder 8)

Dental practitioners working in the private sector provide dental services through small businesses participating in a commercial market on a fee-for-service basis, deriving their income directly from patient fees or from patients with private health insurance. A dominant discourse was related to risk management skills and knowledge:

"I think that they are aware of a lot… making sure that things are documented, and I think that comes back to a risk aversion, that we taught Risk Management pretty well and they are pretty good at it making sure things are properly documented". (Stakeholder 13)

Protective mechanisms and adaptive skills

This theme explored the stakeholders' views of the skills and attributes displayed by graduate dental professionals to manage their own health and well-being. Stakeholders' perspectives were varied from generational comparisons, to a role modelling duty:

"There is a lack of resilience in some of the younger people. And I think, I think when they come to university as well, we have to assist them with that." (Stakeholder 4)

Stakeholders also commented on the preparedness of dental profession graduates to reflect on their practice. For some stakeholders, reflection also appeared to overlap with resilience:

"..it's [reflective practice] a good thing to aspire to and sum up and take it terribly hard when they don't get an excellent grading… someone even burst into tears. Practice is going to be tough if you have that sort of problem". (Stakeholder 15)

Reflection and encouragement in Continuous Professional Development (CPD) and self-directed learning were also considered to be a part of the professional training of dental professionals:

"There's always going to be some aspect of self-directed learning - and I know the students hate those three words - but you're always going to have to go and have a chat to a more senior clinician or pull out your books to try and decipher what you might see in front of you, or refer to a specialist". (Stakeholder 4)

In general, stakeholders were positive about the self-reflecting skills of new graduates:

"I probably say most people that will go into this line of work are super critical of themselves and just want to do the best. So yeah that probably comes naturally with the type of people that apply for the course". (Stakeholder 2)

But this was not consistent across the stakeholder group. It was also acknowledged that the ability of some graduates to reflect on and/or evaluate their own performance might be challenging. Still, this skill was suggested to be important:

"…new graduates who are overestimating their skill levels. And we all know the type. You know the ones the overconfident ones and they're the ones that will be the ones that will get themselves into strife because they're going to take on the cases that they probably shouldn't". (Stakeholder 4)

As in every profession, occupational health risks are a reality. Occupational health concerns in dentistry most often impact hearing, musculoskeletal function, and psychological equilibrium. Consistent with this concern, consideration, albeit limited, was also given by stakeholders to the impacts of practice on a practitioners' musculoskeletal health:

"…dentistry is a hard profession. It is taxing on your back. Your neck, musculoskeletal". (Stakeholder 1)

Social and community orientation

This theme explored stakeholder perceptions of dental professional graduates' preparedness with respect to knowledge and ability to provide culturally safe care for patients from a variety of culturally and linguistically diverse backgrounds, including Aboriginal and Torres Strait Islander Peoples. Stakeholders perceived the new graduates to have undertaken a degree of training around cultural safety, competence, and awareness:

> *"That course also does an Aboriginal and Torres Strait Islander course. I think with their practical placement that they have in some of the local health districts in New South Wales, there's an online cultural competency course that they might have to do". (Stakeholder 4)*

However, stakeholders also suggested that a true appreciation, or application of this awareness, was only able to be gained from their own learning, as firsthand exposure and practice:

> *"They probably have a limited understanding, but I don't think until they get out into the real world - and I'm speaking more in Aboriginal remote communities or island places". (Stakeholder 4)*

> *"You have to spend time in a community to see the effect." (Stakeholder 1)*

Although stakeholders considered cultural safety, competence, and awareness issues to be important for inclusion in dental curricula, some felt that although necessary, the emphasis may be far greater than it needed to be:

> *"But really, it's a misdirected and overemphasized part of a dental curriculum. But it is necessary to expose people, to sensitize people to these very important issues". (Stakeholder 4)*

Stakeholders also commented on the preparedness of graduates to care for patients with special needs. Several stakeholders identified relationships with organisations where exposure to special care populations was available (e.g., mental health, adults with special needs). They also generally agreed with the need for these populations to be included in the curricula, and were cognisant of the challenge in doing so, particularly in clinical exposure:

> *"They are probably not getting the exposure that they feel they want, or they need. But again, it's hard because you can't hand-pick patients that come to the clinic to be able to give them that exposure". (Stakeholder 12)*

Stakeholders also commented on the preparedness of graduates to manage clinical scenarios with a domestic violence or abuse component. There was recognition of the fact that graduates were exposed to this area through the curricula:

> *"…now they have had lectures on if they suspect domestic violence or child abuse, the mandatory reporting. There is a lot of information they get [on] mandatory reporting". (Stakeholder 4)*

However, one stakeholder suggested more could be done in this regard:

> *"And I'm very aware that the students aren't aware of [domestic violence] and I think a lot of General Practitioners experienced folks aren't particularly aware of it either. It's something our profession could do with more education". (Stakeholder 15)*

Support interventions to increase preparedness

Stakeholders provided several recommendations on strategies to optimise opportunities for new graduates' preparedness for practice. Individuals representing all stakeholder groups provided several suggestions for more structure or additional supports for students and graduates, such as internships, mentoring, and clinical placement, which would improve new graduates' preparedness for practice.

Mentoring was consistently identified as one aspect that could be beneficial for a newly graduated dental professional. They acknowledged that new graduates were highly motivated, they represent the future workforce and as such should be looked after:

> *"New graduates, they are certainly motivated and they're our future workforce and we need to look after them" (Stakeholder 1)*

Several ways to achieve this outcome were put forward. Stakeholders described the benefits of formal mentoring in a variety of ways from addressing mental health and well-being, and as beneficial for everybody, but certainly with recent graduates:

> *"Mentoring from a work point of view, but also from a spiritual point of view that are trying to help them get organized, not to get upset about things that go wrong through the day, but they really need someone helping them to learn the case and treatment planning I guess". (Stakeholder 1)*

Stakeholders also appeared to see the clinical tutors/educators mentoring role as starting in the pre-professional curricula and continuing throughout their professional life.

> *"Perhaps there is a necessity for all universities to set up a strategic mentoring program for when their students leave". (Stakeholder 9)*

Preparedness for practice was viewed through an 'exposure' lens by some stakeholders. Exposure to private practice was mentioned. However, it was also acknowledged that private practice does not offer the same level of mentoring programs for new graduates as in the public sector.

Also 'exposure' to rural practice was identified as being another element needed in pre-professional dental curricula:

> *"But even sending them a few hours away from those major cities into the rural areas might give them a little bit more exposure than what they do in the clinic stage today. I'm a big advocate for going rural…" (Stakeholder 4)*

Clinical areas to be enhanced

Many participants commented on clinical areas to be enhanced to maximise students' learning opportunities and new graduates' practice outcomes. The main concerns of new graduates can be identified as clinical and non-clinical domains. In addition to financial and business skills, which have already been mentioned, stakeholders mentioned areas such as:

- Management of dental and medical emergencies
- Referral of patients
- Identification of neglect and domestic abuse
- Dental trauma
- Treatment of patients with special needs

It was recognised that new graduates are generally prepared for these topics and issues in theory. However, the perception was that there was a lack of exposure, which as explained, is due to the case selection to fit training purposes, and to availability. However, there was also a recognition that clinical experience allows for concepts and theories to come together and be applied into practice, consequently, this lack of exposure would affect confidence in treating patients.

Management of referrals and dental and medical emergencies
Stakeholders acknowledged that students/new graduates needed more experience with both referral to General Practitioners and specialists, and medical and dental emergencies, but it was acknowledged that this was difficult in practice because those would happen sporadically. Still, it was thought that new graduates should have exposures to those aspects on an ongoing basis.

> *"medical emergencies are hard, but you know that's got to really try with them. So, I just think it's just an ongoing training thing that everyone needs to have". (Stakeholder 1)*

Regarding dental emergencies there is also limited exposure:

> *"you have one or two sessions a week in the emergency clinic. So, it just… yeah whatever comes in the door. It's a bit potluck ..." (Stakeholder 6)*

Identification of neglect and domestic abuse
Although it was mentioned that current graduates are more prepared than any previous cohort of dental professionals to identify signs of neglect and abuse, there was scope for further development.

> *"…lectures on if they suspect domestic violence or child abuse, the mandatory reporting there is a lot of information they get a mandatory reporting". (Stakeholder 14)*

However, graduates also require the communication skills to discuss sensitive issues like this and/or have difficult conversations:

> *"You see the young woman come in black eyes broken front teeth and you had a very good suspicion of what happened and say well what happened? 'I don't want to talk about it I tripped and fell over'. Where do you go with that?" (Stakeholder 14)*

Dental trauma
Stakeholders held similar views on dental emergencies and dental trauma; there was no significant exposure to these experiences due to lack of cases:

> *"I think they are prepared knowledge-wise, but I don't think they probably feel prepared until they've actually done a trauma victim. Realistically, they are so few and far between. You don't get an avulsed tooth every week walking into a clinic". (Stakeholder 4)*

Special needs patients
Participants also indicated that students have only limited exposure to special needs patients. However, this exposure varies as some schools have integrated opportunities to treat patients with special needs, patients in nursing homes, mental health patients, etc.

Interviews with consumers
Consumers were also invited to provide their perspectives on the preparedness of newly graduated dental professionals for practice. Four consumers provided comments about their experiences with dental professionals generally but also their experiences with graduates and student practitioners. There were two male consumers, one female, and one self-identified trans-male. One lived in regional Victoria, the rest in Melbourne. By age, two were in their 50s, one in the late 30s and one in the 18-25 age-bracket.

The consumers expressed a degree of comfort with seeking care from student and graduate dental professionals:

> *"I would have been quite happy to walk down there the next week and found out that she [fourth year dental student] had graduated and quite comfortably sat in the chair." (CS1)*

"I would definitely trust them for some reason, I guess, like, I would feel more comfortable with a younger dentist than an older dentist, I guess." (CS2)

"They seem to know what they're doing…, I'm not impatient. Like I know sometimes that a student might take a bit longer or I have to tick a few boxes or whatever…." (CS3)

Although, the experience of one consumer was more negative with respect to the supervision received, this consumer also appreciated the bind that this put the student in when it came to patient care:

"I know they were training the dentist, but they [supervisor] were rude." (CS1)

"…if he [student] turned around and walked off and said, look, I can't do this. It reflected on him. Where in actual fact that should have reflected on the, on the teacher themselves." (CS1)

Communication was an area of practice raised by the consumers. In one consumer's experience with dental students, they appeared to appreciate that describing the treatment plan using dental jargon could be challenging:

"And they explained everything as good as they could, which really is a little pointless. As you know, they are talking about the number of the teeth, what they got to do or inclusions or that sort of stuff, they tell you, but most people wouldn't have a clue what they're talking about." (CS1)

Another consumer also suggested that discussions about cost were important to them when seeking dental care:

"…[be]cause what's the cost? Cause it's like what is the flow on cost of that is another appointment and other time that puts things back again." (CS3)

Consumers also reflected on the training received by student and graduate health professionals and areas that could be improved. They believed that training to be a dental professional should include aspects related to the mental health of patients and self-care of the professionals themselves:

"I think that there should be something on how to treat a patient that has…some form of mental illness or a mild cognitive, or, or just simply a cognitive impairment." (CS1)

Consumers also indicated some areas of concern about dental professionals' own health and wanted to express their opinion that those aspects should be well covered during their training as professionals. One of these areas was their well-being:

"…something about like self-care, you know, like about how do you keep yourself, you know, when you're working long hours or you might see some distressing stuff with certain people or, you know, like […] about the child abuse possibilities of that or this." (CS3)

Consumers were aware of the pace of new knowledge and were interested in the dental professionals' ability to maintain their skills and knowledge:

"Oh yeah. Cause like I said, the difference in dentistry in the last 20 years, how they do things, I can imagine that in the next 20 years, that the basics will be the same but how they treat things may change a great deal." (CS1)

And their ability to work in a professional and safe way with a variety of populations and members of the community:

"Like more how to deal with like, you know, like trans [transgender] patients, but also like people from different cultural backgrounds and like, you know, low socioeconomic backgrounds as well because people from those demographics are really scared to get their teeth done. And if they have one bad experience, it's going to put them off from going to the dentist completely because I've known people like in the trans community, for example, who like fits all those demographics, who are terrified to get their teeth done, even though it's really bad and it's really hurting, but they're really scared to go to the dentist." (CS2)

Interviews with new graduates/students

A total of 22 new dental graduates (NGs) and final year students (DS) participated in a series of qualitative interviews for this study, including seven dentists, six OHTs, two dental hygienists; and three dental prosthetists. Additionally, four final year students participated in the interviews; two dental students and 2 dental prosthetists students (Table 13).

Table 13. New dental graduates and final year students interviewed for study.

Qualifications and year of graduation	Place of study	Sex	Location	Practice Descriptor Sector	Practice Descriptor Urban/ Rural
MDent 2019	LaTrobe	M	Vic	Public	Regional/rural
DDS 2019	MDS	F	Vic	Public	Regional/rural
DDS 2017	MDS	M	Vic	Private	Regional/rural
DDS 2017	MDS	F	Vic/NSW	Private	Regional + metro
BDS 2019	JCU	M	Tas	Private	Regional/rural
BDS 2018	JCU	M	Qld	Private	Metro
BDS 2018	JCU	F	Tas	Public	Metro
BOH 2019	CQU	F	Qld	Private	Regional/rural
BOH 2019	CQU	F	Qld	Public	Regional/rural
BOH 2019	MDS	F	Vic	Public	Metro
GDDT 2017	Griffith	F	Qld	Private	Metro
BOH 2018	MDS	F	Vic	Private	Metro
BOH 2018	MDS	M	Vic	Private/public	Metro
BDP 2018	TAFE Qld	M	Qld	Private	Metro
BDP 2018	TAFE Qld	M	Qld	Private	Regional/rural
BDP 2018	TAFE Qld	M	Qld	Private	Metro
ADOH 2019	TAFE SA	F	Qld	Private	Regional/rural
ADOH 2018	TAFE SA	F	WA	Private	Metro
Dental students					
DMD	UWA	F	WA		
DMD	Sydney	M	NSW		
BDP	TAFE Qld	F	Qld		
BDP	TAFE Qld	M	Qld		

Academic and technical competencies

Dental students and new graduates were invited to comment on their perceptions of preparedness for practice with respect to the academic and technical competencies required for dental professional practice. Overall, the dental students and new graduates reported a positive experience in their program of study and largely felt prepared for their early practice years:

> *"I think it definitely gave us a lot of insight into managing disease, being able to examine thoroughly and very well considering different aspects of the patients…" (NG5)*

Among dental students, there was also a sense that their final year placements, together with the theoretical aspects covered during the course, would prepare them well for practice after graduation.

> *"I think we're all quite at peace with the fact that we can develop those [technical] skills as we go along." (DS2)*

There were, however, a number of graduates who did not appear to feel as well prepared. Some new graduates identified the transition between being supervised during their program to wholly independent practice as being a concern. For most this was due to a strong reliance on demonstrators and supervisors during training:

> *"I think the biggest thing was probably just jumping from supervised to independently, that there were a few things where you would get the occasional complex thing or difficult thing where you would need help in diagnosis and treatment planning." (NG18)*

For other NGs, this concern was based on a lack of sufficient exposure to some clinical procedures. However, they also appeared to understand and accept that not everything could be taught within a dental professions course, but they were provided with the resources to direct their own learning in practice or seek out their own learning upon entering practice:

> *"There always will be things that you haven't been exposed to and things like that. Also, that dental school has sort of provided us sort of resources and places to go to when we do find those situations. So, I think it has been, you know, pretty good in preparing us that way." (NG1)*

Dental students and new graduates consistently identified areas of practice that they would have valued greater exposure to as part of their training. These areas concentrated on clinical restorative aspects including endodontics, prosthodontics (both fixed and removable), but also paediatric dental care, and some surgical interventions such as dental extractions and implants. In some of these perceived deficiencies, NGs acknowledged that they received some exposure, but it was not extensive, and it would come with more clinical practice. The perceived areas of deficiency were varied across the dental students and new graduate participants.

A number of new graduates also addressed this issue of exposure in terms of what they were actually able to experience in their clinical learning. New graduates were aware that there will always be situations that students had not been exposed to. However, there were also reports that at the dental school, students were provided with resources and alternatives to find those exposures. One participant commented on this situation:

> *"I think it has been pretty good in preparing us for that." (NG1)*

There were also programs that appeared to be proactive in addressing this concern about exposure:

> *"I think our experience as a whole was quite good, that if you wanted something [dental procedures], you would generally be able to swap [dental procedures] and we had a system where students were able to put down on the list things that they hadn't had an opportunity to do. And… even at my placement site, supervisors would ask us, what would you like to do? What would you like to get some experience in while you are here? "(NG16)*

The new graduates' experience of their clinical learning, particularly the consistency of clinical reasoning and advice from clinical demonstrators that might be not in agreement with what NGs had been taught, was identified by several participants as an area that could possibly be addressed within programs to better prepare them for practice.

> *"If the dentist gives me, like a true treatment, I will actually question that treatment afterwards and say, can you give me a reason behind this and this? But I would say from a lot of people from my class or from previous classes, they would say they would probably just accept the treatment plan and without any questions at all." (NG15)*

Also, some structural issues were mentioned as barriers to developing clinical competencies. These barriers go beyond exposure to information, valuable resources, and high-quality demonstrators and academics:

> *"… probably still not enough to be honest, I think given the clinic time. There's a lot of students, big classes, not enough chairs and having that time cut. We definitely need to boost that, there's just not enough." (NG5)*

Suggestions for improvements to dental profession programs also extended to other elements of the curriculum, although this was not universal. One dental prosthetist commented:

"So, if I was to tell them to change one thing if they rang me up and said, "You get to change one thing what would it be?" And I would say more lab time or more lab subjects." (NG2)

In addition, this was a common concern for dental and oral health therapy background participants. Thus, all dental graduates commented on a desire for more exposure to practical issues, more laboratory time, hands-on skills, etc.

New graduates also expressed a desire for more exposure to aspects of patient care, beyond oral health complaints. Participants felt that a greater volume of learning could focus on how other aspects of a patients' life influenced oral health treatment and care, as well as a more holistic view of patients:

"…I think just in the curriculum in general, not focusing just on the physical, but also a greater emphasis on how socioeconomic things or disadvantaged culture, family types, that sort of thing, influences treatment." (NG5)

More specifically, another issue that affected the preparedness for practice of the new graduates involved the special needs patient's management:

"special needs patients is an area that we don't get as much exposure to, unfortunately." (NG1)

"hasn't really been a lot of very good teaching around how mental illness relates to impairment other than the fact that anecdotally we all know cases of people" (DS3)

In a similar way, new graduates felt insecure in dealing with domestic abuse, and suggested more specific teaching around, for example, recognising the signs of negligence and abuse. In particular, participants identified the need to have clearer protocols on how to deal with those issues.

"There needs to be a bit of a protocol or a guideline of how to manage those things. Who is the manager, who is the point of call, what should happen in those situations? If someone is feeling upset, who can they speak to about it? I think better referral pathways as well." (NG5)

There was some concern that not all areas where abuse or neglect may occur were covered during their training (e.g., paediatric patients, or geriatric patients). New graduates also identified specific aspects of practice that they would have liked to have received additional training or exposure to:

"I remember the very first time I dealt with this (abuse/neglect). I think the stepmother of a child came in and I was like, "Oh, there are rampant cavities, we need to discuss diet". And then the stepmom was like, "she's lucky that she even gets fed really" (NG4)

New graduates shared their insights on clinical aspects that could be improved as part of their training and hence their preparedness for practice as a dental professional. One of the most common areas identified by participants was dental trauma, and to a lesser extent dental and medical emergency. In both cases, most NGs indicated that they received the theoretical knowledge on how to manage these clinical situations and hoped that, when faced with those situations, their preparation would be adequate.

A new graduate suggested that it was the rural placements during the final year, that gave the NG the confidence to act in those situations:

"I was not nervous about approaching difficult procedures. I was more confident in dealing with difficult patients or understanding how to keep safe or how to manage people if they are suffering from medical emergency. So, going from that across the year, I think it was the rural rotation that was the first big point of final year where I noticed a massive change." (NG5)

Communication and interprofessional skills

Overall, communication with patients and interprofessional skills were deemed to be important competencies by most of the NGs. Effective patient communication was considered essential to improve patient satisfaction, compliance, and outcomes. However, some of the NGs felt that their courses did not prepare them adequately enough for different scenarios.

New graduates indicated that they received good training in communication and in obtaining informed consent. They were also aware of the difference between training and the real world - between theory and practice. The importance of informal teaching by demonstrators and tutors was highlighted. Whilst new graduates agreed that theory helped them improve their communication skills, they felt that a practical approach to communication skills training would be more suitable:

"Yes, you can learn it within theory and all that. We did do a communication subject, but how much of that did we really take in?

It's not until you actually see it being applied, the way he treated patients, the way he talked to them, the way he greeted everyone. I mean, that's something that I absorbed the most, I would say." (NG1)

Moreover, they commented on some of the issues affecting this domain and their feeling of preparedness for practice. An especially challenging issue mentioned by the new graduates was communicating with a wider range of patients in their practices in particular, difficult, problematic, or abusive

patients. The new graduates felt that more could have been done in their training to prepare them for how to approach this type of patient:

> *"I think one thing we weren't exposed to at uni was probably difficult or abusive patients. There has been a lot of patients where they're swearing, they're yelling, people were threatening to sue. That did not come up in university." (NG5)*

Similarly, some new graduates felt unprepared for communicating with a parent or guardian, due to age differences:

> *"Talking to parents and explaining to parents. I am quite confident in being able to handle the child, but I find it difficult lecturing a parent, especially being a bit younger, ..." (NG4)*

Other issues mentioned in relation to preparedness in communication skills were issues around charging patients and describing treatment plans to the patient in order to obtain the best possible clinical outcome. Nonetheless, they understood that this was also related to the practicalities of clinical training at dental school, where more difficult cases were dealt with by more experienced professionals or specialists, and due to the fact that most training occurs in public settings:

> *"It's not just about the money side, but also about clinical side, if you want to. You know that a perio[dontal] debridement is needed to treat periodontal disease, but the communication skills, we were trained in, it was not adequate enough or comprehensive enough to explain to the patient and motivate them to actually pay you and then get the treatment done for the best clinical outcome you can do, not just because of the setting problem, like we work in a public hospital and mostly community centres, but also the supervisors haven't or the university haven't provided us with that kind of a concept." (NG15)*

On the other hand, there were participants that believed that although it was a big leap from student to independent practitioner, their training and exposure to those issues during training was well covered:

> *"So, having to talk to the patient about treatment plans and costs and all that, that's the biggest jump I would say for me. Just managing, just being independent and all that, that's always a big jump, but I think, again, the university has prepared me pretty well for it. And in that, in our final year we were able to be a bit more independent…" (NG11)*

In addition, a number of the new graduates believed that communication with the patient had become too scripted in some cases:

> *"A lot of people just do it in a very robotic way, not in a way that you will. I don't think I'll carry it into practice. They're only doing it now because it's on the form and they're told they have to read it" (DS3)*

However, this was also understood as lack of practice or experience in communication:

> *"you're seeing a lot more volume of different patients. Just simply the different patients basically." (NG12)*

Another area in which new graduates reported not feeling prepared was professional communication, that is, referring patients to other dental professionals.

> *"I think mostly, probably for me, just like referring and who to refer to and how to refer "(NG3)*

Protective mechanisms and adaptative skills

Dental students and newly graduated dental professionals were invited to comment on the protective mechanisms and adaptive skills that they had developed prior to, or in the early phases of, their practice. This appreciation of scope and competence was also described by the new graduates:

> *"And I feel like we were definitely told, "this is your scope of practice. Like you only do what's in your scope, what you've being trained in and are competent in". (NG4)*

Dental students' reflections on themselves as future practitioners also appeared to accept their limitations, whilst at the same time, trying to extend themselves within this scope:

> *"I think it's going to be a pressure of trying to achieve a balance between being not adventurous, … and we keep growing and developing new skills, but also being somewhat sensible and practicing within the scope about limitations and putting our patients at risk." (DS2)*

NGs commented on the need to always provide relevant, comprehensive, evidence-based treatment planning and preventive advice to patients.

> *"You just have to present with some theories behind to support your evidence-based treatment planning*
>
> *…, you'd be a bit more critical about what they're putting out and you are just got to make sure you look at the evidence and stuff like that." (NG11)*

Overall NGs felt well prepared to join the workforce and felt that they received good foundations for safe practice:

"I think it was actually pretty good. The whole entire foundation of dentistry, which is like diagnosis, treatment planning. I think University of [name of university] did actually a really good job in terms of cementing that into the University of [name of university] grads." (NG6)

Upon entering the profession, the new graduates described their starting point quite frankly:

"…we were lucky enough to have experienced … kind of our whole clinical experience. I think that definitely prepares you to be ready for the job when you leave. I think that gives you a lot of confidence as well." (NG18)

New graduates were also aware of their limitations as NGs and of the need to continuously upskill their knowledge base. NGs described the need for continuing professional development to keep up-to-date and improve their skills and knowledge.

"It's…I think once you graduate, it's more… the onus comes on you as the individual, to either develop and become the best dentist that you can be or just kind of stagnate." (NG16)

Confidence, particularly overconfidence of colleagues, was a consistent theme among the new graduates. Their expression of this confidence suggested an appreciation of how this could be problematic in the early years of practice, but it was also the reflection of the acquisition of critical self-assessment skills:

"…one of the people in the course may have been overly confident. And I think it's those personalities that are the ones that are overstepping the boundaries." (NG4)

New graduates and dental students also described a level of anxiety in their early years in practice, not only with the program of study, but also with patient care:

"… I felt like in the moment I actually did a really good job of dealing with it, but I found it a little bit more difficult to cope afterwards." (DS4)

Some new graduates recognised that they adopted maladaptive coping strategies, such as self-doubt and self-criticism:

"I used to always focus on what went wrong, but I never gave myself credit for what went right or what worked. And I was always making lists of things that I could change rather than things that worked…" (NG5)

For others it was more a matter of gaining confidence and applying what they had learned during the dental courses.

"… I think a lot of it is just self-doubt. Self-doubt that probably is not warranted in the beginning because you have been trained in a good program and you have good experience. Enough to get into workplace and practice safely." (NG6)

… or a matter of asking for help from a more senior colleague to assist them to develop as a practitioner:

"…and I think that's where a lot of people, I speak generally, but I think a lot of people struggle with asking for help because they don't want to seem weak." (NG9)

In fact, asking for help from a more senior colleague was not generally seen as problematic, but rather a strategy to develop confidence and experience as a practitioner:

"That's probably the biggest thing you learn that it's not a problem of asking for help. I mean, if people take it as you don't know or you can't do, that's their problem in terms of you just want to do the best you can do for your patients and for your employers as well." (NG14)

Although this appeared to be somewhat dependent upon the practice where the graduate was employed:

"I have heard from a few of my friends where they are scared to ask for help. … And in those cases, I think they would be less inclined to ask for help just because they think that it reflects badly on them and their performance." (NG11)

Another issue under this domain for dental students is being able to cope with work situations, managing time, coping with stress and effectively balancing work and personal life. One NG commented on the potential for increased student support during the course, particularly with respect to mental health and well-being:

"I think mental health-wise, it probably needs a bit of improvement, to be honest, because I find that a lot of students who I knew who had a lot of potential just resort to either dropping out of the course or choosing something completely different, or feeling like they have to harm themselves or they're unable to talk to people…" (NG5)

Professional attitude and ethical judgement

All of the new graduates were aware of the legal and ethical frameworks related to their dental professions and understood the value of this domain in delivering effective and safe oral health services.

"I think I'll always give it a try and give it a shot, but sometimes I do take a step back and have a look and say, "look, that's way beyond my capabilities" (NG11)

New graduates also reported feeling unprepared to deal with the legal aspects of dental practice. They felt somewhat concerned, and even anxious about their lack of preparedness in this area:

"Basically, the teaching of law has been like all of you are going to get a complaint at some point, or all of you are going to get sued at some point. So just accept it and don't worry about that, kind of thing, which hasn't really put any of us at ease" (DS3)

Furthermore, new OHT, DH and DP graduates commented that their scope of practice was not well known by the other dental professions, in particular the awareness of OHTs' and DHs' by dentists:

"I know what part of my scope was, but what the dentist thought of my scope was a completely different story at the beginning." (NG14)

This issue with awareness of scope was also mentioned by a dental hygienist who commented:

"For example, like we would carry out the job as a dental hygienist, we do perio, the perio debridement, treatment planning, all these things. But some of our supervisors, even at the hospital, some of them even if it is like a perio, they often just call in the dentist and then do the treatment planning." (NG15)

Another OHT participant highlighted the need for more dental team emphasis during training:

"I felt like the university, hasn't prepared us really well like on theory, yes, we know that we work as a dental team, but no matter in a community setting or hospital setting, the dental school hasn't prepared well enough to know like our place in the dental team" (NG15)

Additionally, they reported feelings of being a less valuable member of a dental team:

"That makes us, you know, that the some of the private practice will not treat us like we're not treated like an equal member in the dental team." (NG15)

Similarly, new BOH graduates reported that their scope of practice was misinterpreted by other dental professionals. This issue may lead to them feeling pressured by the supervisor or colleagues to perform procedures, which they have not been formally trained to do:

"I know people in private in my cohort feel like they don't know if some of the dentists are just not aware that's not in their scope or if they just feel pressured to go over those boundaries." (NG4)

Nonetheless, as mentioned before, there was a general sense that NGs were able to self-evaluate their own abilities and training in order to provide safe dental care.

Issues around the provision of care according to the patient's culture were also discussed by the informants. Participants commented that, while they received training to treat them, not much coverage or emphasis was given to cultural and psychological aspects during training:

"…things about safety and more about the psychology, understanding emotions and even cultural differences as well, that would be a good addition to the degree, not just looking at the medical aspect. Those sorts of emotional social factors probably are not touched on or emphasized as much in the degree. "(NG5)

Clinical entrepreneurship and financial solvency

Dental students and new graduates were invited to share their perceptions of the entrepreneurial and financial aspects of dental practice. Both groups appreciated the role that their training in the public healthcare system had played in their impressions of managing the financial aspects of practice. This was seen as an advantage, as well as a limitation:

"…we are at an advantage in the sense that we do not really need to navigate the tricky financial side of things, that we don't need to really adapt our treatment plans accordingly." (DS2)

The contrast between public and private practice became more evident when new graduates entered practice. New graduates perceived two different, contrasting ways, to be prepared for practice oral health care.

"I think a lot of the dental schools prepare us really, really well for the public system." (NG11)

Nonetheless, the entrepreneurial aspects of dental practice were mentioned by informants of all dental professionals as decisive and highly influential in their decision. Some graduates made a concerted choice to become public dental practitioners to reduce the need to have financial discussions with patients:

"…that's like, honestly the main reason I went into public, because it stressed me out thinking about having to try and justify how much money I'm making at work and just all those types of things." (NG4)

For the dental students and new graduates, discussion of cost in private practice was somewhat daunting. They did not feel they could charge the patient as much as more experienced practitioners:

"…that first year of getting out, that first week I actually felt really nervous quoting my treatment plan. This is a lot of money. I feel odd getting someone to give up that money so I can perform treatment on them." (NG6)

However, NGs commented that once in practice, they felt prepared to have those discussions, albeit with the possibility of additional training or exposure during their course, or practice-specific strategies such as quoting:

> *"I do think we have been prepared, but I think it's, again, a matter of exposure, the more we have to do it, the better we are at it." (NG11)*

> *"I think where I've worked so far has been pretty good with printed quotes and giving quotes on the phone. So, I haven't really had any problems with that yet." (NG3)*

Both the dental students and graduates commented on the varying levels of training they received in the financial aspects of dental practice. For some NGs, the level of training appeared to be non-existent, not meeting expectations and varied based on the new graduate's university and dental profession. An OHT commented:

> *"…but if it's for a private practice perspective, I don't think any, well, from mine, from [dental school] perspective, I don't think any graduates from [dental school], have received enough training and preparation to get into the private world." (NG15)*

On the other hand, a dental prosthetist commented that the exposure and training was enough to prepare them for the financial and entrepreneurial aspect of the practice:

> *"I think there was a dental practice management unit. It was a whole unit for the semester, which explained pretty much everything that could have been required to set up and run a practice there." (NG10)*

Participants also believed that other financial issues would be useful to address, both for patients and for their own employment. New graduates described practical aspects of employment including more information on preparation for interviews, understanding contracts, etc. that helped them prepare for the transition from student to new graduate:

> *"I don't know if it was just me, but I thought what they could probably touch on more was contracts and how to read a contract or what to look out for and a good employer, bad employer, type of things. How to handle interviews and things like that. I think that could have been more prepared to some extent." (NG4)*

However, other NGs felt that courses properly prepared them for the transition from student to new graduate:

> *"I think the uni did provide us with a lot of information, like how to make your resume. We got quite a few seminars on LinkedIn profiles and what employers look for. And I think that's super important. I think they did enough within kind of the realm of what they had to teach you." (NG9)*

NGs also commented on financial aspects like private health insurance, health funds, different rebates, item numbers and codes, and third-party payments related to private practice. Although some NGs also mentioned that there were some experiences on placements and exposure to a mix of private and public patients during their courses' final years.

Social and community orientation

The interviews investigated the new graduates' perceptions and preparedness related to knowledge and ability to manage patients from a variety of culturally and linguistically diverse backgrounds, including Aboriginal and Torres Strait Islander Peoples. Most of the graduates believed that they received exposure to patients from culturally diverse backgrounds during their training, however, they believed that this exposure occurred in an ad-hoc manner:

> *"Yeah, I guess we've got quite a diverse patient base, so I guess we got some passive exposure depending on your patients of course." (DS2)*

As a result, new graduates felt that they were unprepared to manage patients with different cultural and linguistic backgrounds. The new graduates identified challenges in their training in providing culturally safe dental services:

> *"Like we can treat them professionally. I wouldn't say that we treat them sort of as well as we could because we don't really get to really understand the nuances of their culture" (NG1)*

Some of the new graduates felt that cultural training was not sufficiently in-depth. In fact, some new graduates considered that most of their cultural and social perceptions evolved from their upbringing, high school and primary school education, and past personal experiences. Dental students were very particular on this:

> *"But from an Australian perspective most of us have had some exposure within the high school curriculum or even the primary school curriculum to these issues and, I have to say that the way the cultural competence curriculum is currently framed, it really just is exactly the same as the exposition we had in high school. It does not extend; it does not really cover any issues that are included on it. It's really a box ticking exercise for you." (DS3)*

Other issues involving social and community orientation that affected the preparedness for practice of the new graduates concerned social factors and health inequalities. In fact, several NGs mentioned these aspects during the interviews:

"Probably, needs a bit more time, and patient management. I think just in the curriculum in general, not focusing just on the physical, but also a greater emphasis on how socioeconomic things or disadvantaged culture, family types, that sort of thing, influences treatment…" (NG5)

Empathy was also stressed as a major issue by some NGs. Although one NG commented about a more wholistic approach, as an issue needing to be addressed or emphasised during dental training:

*"They say, my patient is such a big ****, and I'd say well, your patient has gone through a divorce; your patient is under financial strain; your patient has to pay for a taxi to get to the hospital, or she has to walk upstairs and she's on crutches or using a walking stick…*

So, I do not see patients as just the mouth, I see them as the whole person, when someone's sitting a chair and they are crying. I do not just tell them here is a tissue, let's go on with the restoration. I always follow up and I'll ask about that." (NG5)

Discussion

The purpose of this project was to explore the perceptions of a range of stakeholders about the preparedness for dental practice of Australian graduates. The project was conducted using a mixed-methods approach with the quantitative survey informing the qualitative interviews. Responses were organised into the seven key domains identified with respect to preparedness for graduate dental practice by Mohan and her collaborators:

1. Academic and technical competencies
2. Clinical entrepreneurship and financial solvency
3. Communication and interprofessional skills
4. Professional attitude and ethical judgement
5. Protective mechanisms and adaptive skills
6. Social and community orientation
7. Support and interventions to increase preparedness

Academic and technical competencies

Stakeholders were largely satisfied with the knowledge base of newly graduated dental professionals. There was an acceptance on the part of employers that the knowledge of new graduates was more contemporary than their own and this was perceived positively. New graduates expressed a similar sentiment and felt well prepared for graduate practice from a knowledge perspective. This appeared to be consistent, regardless of the institution graduates came from. These outcomes suggest that the Australian training programs are producing graduates with the required knowledge for safe dental practice. The addition of a national theory examination for dental professionals would appear to be of little value, only serving to increase costs and the regulatory burden on graduate dental professionals.

With respect to the technical competencies, the stakeholders felt that newly graduated dental professionals were able to start practicing safely within their scope. Both the employers and new graduates themselves understood that it would take time to develop technical competencies in some areas of practice. For example, the new graduates identified a range of areas of practice, including trauma and endodontics, where they were not particularly confident with the technical aspects, however, they felt their knowledge base was adequate. Continuing professional development and support from colleagues were described by several of the new graduates as strategies to assist in developing confidence and competence in these areas of practice.

A significant finding was the preparedness of newly graduated dental professionals for independent practice. Employers were largely of the opinion that graduates were prepared for independent practice and that the graduates had access to resources (including other professionals) to assist them in the early stages of graduate practice. However, the new graduates themselves described the transition from supervised practice in their training program to largely independent practice, as an aspect of the professions that could be improved. 'Mentoring' was a word consistently used by newly graduated dental professionals. Many of the newly graduated dental professional participants felt they were not able to access either formal or informal mentoring in their early practice years. This concern also extended to asking for assistance from more experienced professionals to assist the graduate with a challenging case, or potentially be a sounding board for a patient care strategy.

Clinical entrepreneurship and financial solvency

This theme centred on the preparedness of new graduates to understand and manage the business aspects of dental practice. Stakeholders identified that training in this area of practice occurred during a program of study, however, the volume of learning appeared to be variable. The participants identified that those graduates from programs in the Vocational Education and Training sector received training that was consistent with the respective training packages. For those graduating from a university program, the level and volume of learning about the business aspects of practice was variable. Employers' comments also reflected this variability in knowledge and skill in this aspect of practice, identifying it as an area that could be improved.

Newly graduated dental professionals similarly described variability in their learning about the business aspects of practice. From the interviews with newly graduated dental professionals, it would appear that they learn these business skills once they graduate and are exposed to daily practice. The graduates highlighted limited knowledge of third-party payments (i.e., workers compensation) and private health insurance rebates. They did, however, appreciate the costs of running a practice (albeit at a high level) including materials, rent and employment of dental assistants.

Much of the commentary from the new graduates on this theme centred on their limited exposure to private dental practice in their training. For the most part, the clinical exposure was limited to public health settings where different cost drivers are in play. Comments from the new graduates suggested that this exposure did not help them with understanding the costs associated with care where the patient was responsible for payment. Graduates from universities where a private clinic had been established as part of the training program, felt this exposure to be valuable in helping them to understand the business elements of dental practice.

Further, the new graduates reported a level of unease with having discussions about cost of care with a patient or their parent/guardian. The new graduates reported having, or wanting to have, an opportunity to practice these discussions albeit in more of a simulated setting, rather than with patients during their clinical learning.

Communication and interprofessional skills

Most stakeholders indicated that the communication skills of graduate dental professionals were acceptable for practice. Employers reported that new graduates were communicating effectively with their patients, guardians or carers and that communication skills were not a particularly significant concern for them. New graduates reported a similar experience, particularly with 'run of the mill' cases and informed consent discussions. However, new graduates identified more challenges with communicating with patients from culturally and linguistically diverse backgrounds, and patients with mental health concerns.

Newly graduated health professionals suggested that their communication skills were developed during their training program and were further solidified in their clinical learning. The new graduates did, however, express a desire for greater communication skills training, particularly for populations with special needs, consistent with some of the data informing Theme 1 (Academic and technical competencies). There was also commentary from the new graduates that communication skills training could extend to cost-of-care discussions with patients, along with communicating with parents, guardians or carers, particularly for paediatric patients, abuse/neglect, and also patients who may be more 'difficult' to deal with. Although not routinely mentioned by the stakeholders, there was some consideration given to referral communications with other dental professionals. The cursory mention in the new graduate interviews suggests either this is not a significant concern, or that an understanding of referral practices occurs in early years practice.

To address some of the concerns raised in this theme, training providers could consider including simulation-based activities to assist students to develop their confidence and competence to manage different patient groups and ease the transition to practice in this respect. The new graduates did appreciate that it was not possible to prepare them for every scenario so the use of simulation-based activities that capture and display key communication concepts would be valuable to improve preparedness. Again, the role of mentoring, identified in Theme 1, could also assist new graduates to debrief with more experienced colleagues or seek advice about strategies to manage patients with differing care needs.

Professional attitude and ethical judgement

Stakeholders generally considered that new graduates displayed a professional attitude to their work and made ethical judgements in patient care and professional decision making. Employers were generally satisfied with these aspects of new graduates' practice where they noted that the graduates took a more conservative approach to practice. The new graduates themselves identified scope of practice, and their own professional capability, as the most significant issues. Scope of practice was considered both from the *"what am I able to do based on my training"* and *"I'd like to try it to learn it"* perspectives.

New graduates also commented on the knowledge of the scope of practice of other members of the dental team. Significantly, the discussions were usually provided by an OHT or a Dental Prosthetist participant providing an example of where a dentist was unfamiliar with a scope of practice. Those participants in the OHT and Dental Prosthetist professions reported often feeling less valued as a member of the dentalcare team. These outcomes point to a need to consider stronger interprofessional care education within dental training programs. Given a significant number of providers offer multiple dental training programs, or have a relationship with other providers through health services, there is an opportunity to engage in formalised interprofessional activities to strengthen the understanding of the scope of practice of others in the oral health care team.

Whilst few stakeholder discussions addressed non-dental professionals being involved in patient care, there was a commentary on aspects of professional attitudes and care related to the psychosocial aspects of a patients' health, and cultural considerations. Newly graduated participants reported feeling unprepared for these elements of practice. Although one employer suggested that the new graduates were far better prepared to address cultural aspects of care than themselves. With respect to the psychosocial aspects, a variety of stakeholders suggested that new graduates were not necessarily well prepared to 'look outside of the mouth' or look at the patient as a whole. This aspect of health professions training appeared to be lacking in dental training programs and given scant attention at one or two points through a training program. It would appear that whilst providers are improving teaching to ensure graduates can meet the needs of culturally and linguistically diverse populations, including Aboriginal and Torres Strait Islander Peoples, there is an opportunity to strengthen the theoretical and clinical teaching and engagement with psychosocial aspects of care.

Protective mechanisms and adaptive skills

The new graduates felt prepared to join the workforce, with their clinical learning preparing them for some of the more common challenges in dental practice and patient care. The participants felt comfortable with their foundational knowledge and skills. Similar to the professional attitude and ethical judgement domain, the concept of scope was also seen as a way for the new graduates to 'protect' themselves. A number of new graduates reported that their training reinforced that they should not extend beyond their scope, and should reflect on their practice and utilise these thoughts to seek appropriate professional development opportunities. There was recognition from within the new graduate participants that professional development was not only a registration requirement, but a strategy to develop as *"…the best dentist that you can be…"*

In dealing with challenges that arose in the early practice years, new graduates articulated the use of a range of coping strategies. Significantly, many of these strategies would be considered to be maladaptive. Examples of these maladaptive strategies included self-blame and self-criticism. It could be that these strategies are associated with the high-achieving nature of dental programs and/or perfectionist mindsets that may not be realistic for dental practice. Training providers may be able to focus resources on encouraging their learners to adopt adaptative coping strategies to manage some of the challenges of practice. These resources could also extend to support for learners and new graduates to manage any mental health issues that may become more problematic during clinical learning or upon entering the workforce.

Seeking assistance from more senior colleagues was seen by the new graduates as being either a sign of weakness, or a sign that one is aware of their scope and limitations and is willing to ask for assistance. Where a new graduate fell on this spectrum appeared to be related to the practice the new graduate was employed in – some practices were more supportive than others. The transition from supervised clinical learning to independent practice may contribute to an unwillingness to ask for assistance.

Evidence-based practice was also described by both the employer and new graduate participants. The new graduates routinely described evidence informing their patient care strategies, both in their clinical learning and upon entering practice. For the employer participants, this was perceived as a positive and some of the employers commented on this as being a strength of more recent graduates from dental programs.

Social and community orientation

All stakeholders recognised the need for new graduates to be prepared to manage patients from a diverse variety of backgrounds. However, the training that new graduates reported receiving for this aspect of patient care was variable. The new graduates reported that the training varied from ad-hoc and passive learning to more formalised learning. However, the new graduates still felt unprepared to manage the nuances of providing culturally safe oral health care.

Tied to the appreciation of the role of culture in providing safe and effective patient care was the appreciation and understanding of health inequalities associated with a variety of cultural groups. The new graduates again felt unprepared in this aspect of practice and the comments from this participant group were similar to those provided about the inclusion of psychosocial considerations in patient care.

None of the stakeholders identified significant concerns about new graduate's preparedness to work with and manage patients from CALD backgrounds. The new graduates themselves suggested that they would still feel comfortable that they were treating these patients professionally but potentially not in a way that would be best practice for the patient's cultural needs and background.

Supports and interventions to increase preparedness

Consistent with the other six themes, the newly graduated dental professionals identified mentoring as the single most beneficial strategy to increase their preparedness for practice and manage the anxiety associated with transitioning to independent practice. Whether this is a formalised mentoring system or an informal system, whereby graduates seek out their own mentor, is a matter of discussion for the professions. Through this project, graduates in some instances sought their own mentor and found this to be beneficial.

The new graduates also identified other professional supports beyond mentoring. Examples included peer groups and other professional networking opportunities. These appeared to be invaluable for the new graduates, particularly the peer support and knowing that they 'weren't going through it alone'. This outcome presents an opportunity for facilitated peer groups for newly graduated dental professionals. Such groups would reduce the costs associated with one-on-one mentoring and may have similar benefits. The additional benefit is extending their professional networks, particularly if the peer groups are facilitated by senior or experienced clinicians.

As described in the Academic and Technical Competencies theme, the concept of an intern year was also raised by a number of the newly graduated participants. However, this was not something that was addressed by the cohort of newly graduated participants. Another new graduate also suggested that national examinations be incorporated into pre-professional training as a strategy to increase preparedness for practice.

Conclusions

Dental schools share a fundamental and serious concern over whether their graduates are entering the profession with satisfactory skills and are safe to work as newly graduated practitioners. The ADC is particularly concerned about protection of the public and has the responsibility for accreditation of programs and quality assurance, thus ensuring that dental professionals have achieved the required professional competencies and are well prepared to meet the DBA's standards for practice. The present study explored the preparedness for practice of Australian newly graduated dental practitioners and produced two main outcomes.

The first outcome is theoretical, involving a thorough literature review and a stakeholders' consultation that allowed for an expansion of the theoretical framework to understand and conceptualise preparedness for practice in dentistry. This report outlined key additional dimensions to further comprehend competencies expected for dental professionals in the 21st century. In addition, the barriers and gaps that may hinder effective preparedness were discussed. This literature review makes evident the need for new tools to address this wider set of attributes when evaluating the readiness of health professionals for practice.

The second outcome is the assessment of preparedness for practice based on self-perceptions and experiences of final year students and new graduates, and from the perspectives of their tutors, educational supervisors, and more senior members of the profession. The opinions of consumers were also sought.

Results from this assessment, using qualitative as well as quantitative methods of data collection and analyses, suggest specific areas of strength and weakness in new graduates' preparedness for practice. Overall, dental schools included in this analysis had different curriculum, approaches to teaching and learning, and different types of student intake. For the qualitative component, participants were selected for being diverse (i.e., different dental professions, interstate, rural/urban based). No substantial difference or trend regarding preparedness for practice between graduates from the different schools represented was determined in this study.

Furthermore, to provide a more realistic measurement of new graduates' abilities and preparedness for practice, we compared the assessment of graduates with those of dental educators and clinical supervisors. Interestingly, the responses were quite consistent across both groups. Any quantitative differences were more in the strength of the response, rather than the direction, which generally scored towards good standards. The themes and categories emerging from the qualitative data analysis reinforced quantitative results.

As anticipated, at the time of graduation new graduates are expected to have achieved certain competencies. Findings would indicate that dental students seem to be getting adequate theoretical and evidence-based information in their formal learning and teaching activities, which, according to the perception of graduates and stakeholders, prepared them well to practice as dental practitioners. Notwithstanding this, specific areas were identified in which new graduates may benefit from further training and consolidation, as well as areas where higher levels of experience might be required. Nevertheless, consistent with the literature, it was generally acknowledged that consolidating competencies in clinical practice is a lifelong learning process which can only be achieved with practice.[266]

Communication skills

This was one of strongest areas of preparedness for practice. Both stakeholders and NGs judged that communication skills had been mastered by new graduates. This included skills in communication with patients and colleagues as well as interprofessional communication. New graduates are generally well prepared in communication skills and have a good theoretical communication background. For example, they can competently communicate treatment plans to patients. However, there were also suggestions that there was a lack of confidence to work with more challenging aspects of communications, where more complex communication skills are required, such as breaking bad news, or discussing more sensitive issues.[267] Additionally, discussing financial aspects and situations where more assertive communication would be needed were challenging. Better communication for referral pathways needed to be developed further and discussions with parents could be challenging. These areas were mentioned by stakeholders, in particular supervisor and employers, but were also acknowledged by new graduates themselves.

Overall preparation and professional attitudes to practice

The findings indicate that it was generally agreed that newly graduated dental professionals are entering the health care system with acceptable levels of clinical skill and there were no specific clinical areas or procedures where preparedness was of concern. Furthermore, stakeholders and new graduates considered that dental training received at dental schools was not an end in itself, and that further clinical experience is required to refine the skills required to work with patients. It is reassuring that the results indicate that new graduates were aware of their limitations and seemed to have developed self-discipline and ethics that would allow them to acknowledge their own limitations and those conditions/situations when they would not have the experience or expertise to provide safe care.

Financial and administrative knowledge

There was a strong perception among interviewed clinical supervisors and other stakeholders that the structure of the course affected the readiness of new graduates to practice in the private sector. The perceptions of stakeholders, in particular supervisors and employers, around lack of preparedness for practice was related to the entrepreneurial, financial and administrative aspects of dental practice. This is an activity to which all new graduates must adjust when they start practicing, particularly, in the private sector. This represents practical issues that new graduates must look after when adapting to the day-to-day administration of a practice. For example, the need for discussion of fees with patients.

Stakeholders were also aware of the contextual elements of clinical work which cannot be easily provided in simulated environments and which may leave students less prepared for the 'real world' setting. For example, discussing and charging fees is an activity that is difficult to teach and is best learned on the job. Thus, there is a limit to the extent to which certain aspects of work could be learned in a classroom setting, simulation, or even in a clinical environment and then transferred to a real-life clinical setting.[36]

Clinical experience

There appear to be some specific gaps in graduates' skills that represented areas of concern for stakeholders. Stakeholders opined that new graduates do not get exposed to some clinical experiences. Findings would suggest that graduates might be less prepared for treating emergencies, both medical and dental. This is consistent with several studies on new graduates. 36 It was acknowledged that this might be due to the practicalities of training students in dental schools, where they need to be provided with a set of basic skills for starting clinical oral health care work as final year students. Some clinical areas were also flagged, for example, dental trauma.

It was acknowledged that the organisation of the course component might give less opportunities for learning with patients. Data from new graduates and stakeholders highlighted the importance of the real-world experience of the clinical environments. For example, treatment away from general hospital settings may give fewer opportunities to have a holistic view of patients, not just their oral health.

Interestingly, qualitative data was collected during the COVID-19 pandemic. The pandemic stimulated the use of telehealth, and it now seems that this modality will stay with us. Nonetheless, the use of Information and Communication Technology (ICT) was only mentioned marginally as a tool for communication and exchange of information with colleagues and patients. Furthermore, the use of ICT as a competence was not mentioned at all by NGs, students or stakeholders. However, these and other developments of ICT such as with artificial intelligence, robotics, self-learning machines or the need to analyse large amounts of data, will require the development of new competencies among dental professionals. According to Fejerskov and his collaborators, these professionals should also be able to communicate with developers, designers, linguists, programmers, engineers or psychologists, with the expertise to understand human behaviours and sociological phenomena to meet the health demands of their community and provide advice to people to adopt healthy behaviours and avoid unhealthy ones.[268]

There was discussion of the most important aspects of dental practice within the constraints of the limited time available at the dental schools. For most, this would depend on the professional background of the stakeholders. Thus, stakeholders' assessments might have been guided by their concept of how dentistry should be practiced, which may not be a universally held view. Preparedness for practice means that the person is ready to function independently in a diverse range of environments, not only being competent for clinical practice. 20 New graduates may not be prepared for the business aspect of private dental practice. However, there were generally no concerns about the clinical skills of graduates, although a few examples were mentioned. Furthermore, a dental practitioner is a professional who is trained to make multiple therapeutic decisions and recommendations that affect the lives of their patients, with professionalism and with a high degree of critical thinking, whether in private practice or in community clinics, hospitals or other public service establishments, including the armed forces. There are also other career paths for dental professionals (e.g., educators, researchers, etc.)[269] which were not mentioned by stakeholders.

Although the study involved considerable planning and sampling considerations, the findings need to be considered and interpreted with a degree of caution. For example, the quantitative component of the study had a low response rate. The research team and ADC were engaged in the distribution of the online questionnaires. A total of 152 responses were recorded, of which, some 120 were usable, given our estimate of around 4010 potential respondents. The final sample, however achieved a representation of all dental professions and most dental schools, and fulfilled minimum requirements for quantitative data analysis, although it did not allow for meaningful comparisons. The sample size in the quantitative data collection represented a low response rate of around 3.8%. Low response rates are not unexpected in online surveys. Based on a previous study, response rates to online surveys about oral health are within the range of 2.5% to 26%,[270,271] our aim was to reach a 10% response rate.

In addition, the invitation to participate was sent in late February 2020, just prior to the COVID-19 pandemic lockdown in many parts of Australia, which may have also contributed to low response rates. Still, the response rate was towards the lowest reported in the literature. Although there is no clear reason for respondents not to represent the new graduate and stakeholders' cohorts, this may question sample representativeness.

Another limitation was the self-reported nature of the responses. For the quantitative component, the endorsement of items was based on self-assessment by new graduates and on perceptions of stakeholders. So, it is possible that the use of self-reported data may have either exaggerated or understated preparedness for practice assessments.

However, the similarities of findings from the quantitative and qualitative data sets agree and so may well reflect the true level of preparedness for practice of new dental graduates. As such, this research adds considerable evidence for the identification of areas in need of improvement, as well as those areas achieving good standards. In the present study, mixed methods and data triangulation were used to help corroborate findings, as any weakness in the data is compensated by the strength of other data sources, increasing the validity and reliability of the results and helping to clarify results. The triangulation approach included data triangulation (i.e. the inclusion of a variety of data sources; NGs, students, consumers, stakeholders, etc.); methods triangulation (i.e. multiple methodologies of data collection; qualitative and qualitative), and data analysis triangulation (i.e. several investigators participated in the data analysis) confirming findings and increasing credibility.[272]

Stakeholders overall viewed new graduates as having good theoretical foundations with good teaching and training in basic clinical dentistry but lacking some more specific aspects of clinical and social exposure. Most of the limitations mentioned by stakeholders were attributed to the limited exposure to clinical treatment, length of student placements, and having other curricular commitments. Given that new graduates have the basic level of preparedness for practice, it is reasonable to expect that experience in general practice will follow, allowing for a rapid consolidation of professional skills. Stakeholders and new graduates indicated some challenges for this transition, as well as offering suggestions on how to move forward.

Appendix

Appendix 1. Plain Language Statement (PLS)

Investigation of the preparation for practice of newly qualified dental practitioners in Australia

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Introduction

The Melbourne Dental School (MDS), The University of Melbourne, in collaboration with the Australian Dental Council (ADC), is conducting a study on the preparation for practice of newly qualified dental practitioners in Australia.

(The term 'dental' hereafter will refer to dentists, oral health therapists, dental therapist, dental hygienists, and dental prosthetists).

This study is funded by the ADC and aims to explore the preparedness for practice and work readiness of dental practitioners from the perspectives of dental course coordinators, dental educators, employers, students, newly graduated practitioners (1-3 years since graduation), representatives of professional dental associations and consumers. The study will help the ADC to assess its effectiveness in achieving the objectives of the National Registration and Accreditation Scheme.

Your participation would be most appreciated. Your participation is voluntary. Should you agree to participate in this study, you would be asked to contribute in two ways:

a) *Completing an online questionnaire.* You will need about 20-25 minutes to answer. To complete the questionnaire, click on the link that appears at the bottom of this statement.
b) *Participating in one interview*. You may also be invited to be interviewed to discuss issues about preparedness to practice. With your permission, the interview will be recorded so that we can ensure an accurate record of what you say. The interview will take around 30-45 minutes and will be held over the phone, Skype (or equivalent), or at a mutually agreed and convenient location for you. You can participate in the survey without participating in the interview.

Benefits of the research

The main goal of this research is to understand preparedness to practice of dental professionals. There is no specific benefit to you. However, your participation will provide a valuable perspective and will assist in the broader goals of the research; to inform future developments of the accreditation standards used in the assessment of education programs, policies, and the professional competencies of newly qualified dental practitioners.

Risks of participation

There are minimal risks associated with participation in this research. Your participation is voluntary, and you have the right to withdraw from this study at any stage and to withdraw any

unprocessed data previously supplied. Your choice to participate or not participate in this research will not affect your relationship with ADC, the Melbourne Dental School (MDS) or other services you may want to use from ADC/MDS.

All data collected will be treated as confidential, subject to legal limitations. The results will be used in a report to the ADC and in scientific publications, but the information concerning your name and/or your institution will not be revealed. Please note that if we receive your completed survey, we will assume that we have your consent for participation in the study. As the survey data is anonymous, it will not be possible to remove it from the study once it has been submitted. If you decide to withdraw from the interview study, please, let us know and the data provided by you will be removed from our archives. Unless otherwise requested, data collected up until the time of withdrawal will be included in the final data analysis.

Only the research team will have access to the data. All data will be stored in a secure place at The University of Melbourne, and security passwords will be required to access electronic files. In accordance with university regulations, the data will be destroyed five years after the last publication of the research.

This project has been approved by the Human Research Ethics Committee of the University of Melbourne (Ethics ID: 1954334.1). If you have any questions about this study or would like additional information, contact the responsible researcher, Dr Kate Reid (email: kjreid@unimelb.edu.au, phone: (03) 9035 8731) or the project lead Prof. Rodrigo Mariño, email: r.marino@unimelb.edu.au.)

If you have any concerns or complaints about the conduct of this research project, which you do not wish to discuss with the research team, you can contact the Manager, Human Research Ethics, Research Ethics and Integrity, The University of Melbourne, by phone +61 3 8344 2073 or email: humanethicscomplaints@unimelb.edu.au. All complaints will be treated confidentially. In any correspondence please provide the name of the research team or the name or ethics ID number of the research project.

If you would like to receive a summary of the main findings, please contact Prof. Rodrigo Mariño, Email: r.marino@unimelb.edu.au.

Thank you very much for your co-operation

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Abbreviations:

ACGME: Accreditation Council for Graduate Medical Education

ADA: Australian Dental Association

ADC: Australian Dental Council

ADOH: Advanced Diploma of Oral Health

ADOHTA: Australian Dental and Oral Health Therapists' Association

ADPA: Australian Dental Prosthetists Association

BDP: Bachelor of Dental Prosthetics

BDS: Bachelor of Dental Surgery

BOH: Bachelor of Oral Health

CALD: Culturally and Linguistically Diverse

CPD: Continuous Professional Development

CQU: Central Queensland University

DBA: Dental Board of Australia

DHAA: Dental Hygienists Association of Australia

DHSV: Dental Health Services Victoria

DMD: Doctor of Dental Medicine

DME: Department of Medical Education

DDS: Doctor in Dental Surgery

DS: Final year student

DT: Dental Therapist

DU-PAS: Dental Undergraduates Preparedness Assessment Scale

EPA: Entrustable Professional Activities

GAPP: Graduate Assessment of Preparedness for Practice

GDDT: Graduate Diploma of Dental Therapy

ICT: Information and Communication Technology

JCU: James Cook University

MDent: Master of Dentistry

MDS: Melbourne Dental School

NG: Dental graduate

OHT: Oral Health Therapist

OSCE: Objective Structured Clinical Examinations

PLS: Plain Language Statement

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Published June 2021 by:
Melbourne Dental School
The University of Melbourne

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