





ORIGINAL RESEARCH

A qualitative exploration of the future of nutrition and dietetics in Australia and New Zealand: Implications for the workforce

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Abstract

Aim: We aimed to explore the future roles of nutrition and dietetics professionals, and what capabilities the workforce would need to fulfil these roles.

Method: A qualitative interpretive approach was employed. We conducted individual interviews with nutrition and non-nutrition thought leaders external to the profession. In addition, we conducted focus groups with experts within the nutrition and dietetics profession, academic dietetics educators and students/recent nutrition and dietetics graduates (total sample $n = 68$). Key nutrition-related issues and challenges, drivers for change and potential future roles of the profession were explored. Data were analysed using a team-based thematic analysis approach.

Results: Future roles of nutrition and dietetics professionals were described as food aficionados, diet optimisers, knowledge translators, equity champions, systems navigators and food systems activists, change makers, activists and disruptors. In addition, science was identified as a uniting framework underpinning the professions. An additional 16 critical capabilities were considered to underpin practice.

Conclusion: The results demonstrated that the current and future needs for workforce education and development need to address the impact of climate change, growing inequities, the democratisation of knowledge and the disruption of health and food systems. Education providers, regulators, professional associations and citizens need to work together to realise roles that will deliver on better health for all.

Rachel Boak and Claire Palermo are considered as joint first authors.

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KEYWORDS

education, environment, forecasting, qualitative research, workforce

1 | INTRODUCTION

Food and nutrition are central to optimising health and wellbeing, and crucial to the prevention and management of many diseases.¹ An ageing population, virtual worlds creating increased connectivity, the democratisation of knowledge and expertise, and demand for experience and social relationships have been highlighted as impacting on nutrition.² In addition, climate change, industrialised agriculture, and a globalised food supply all impact on the ability of nations, communities, households and individuals to maintain healthy dietary patterns.^{2,3} Improving future health outcomes and the sustainability of the healthcare system requires shifting focus from treatment of illness to prevention or promoting health and wellbeing.⁴ Complex and multi-strategy responses are needed to address these emerging priorities. The nutrition and dietetics profession, that spans food and health systems, is ideally positioned to address these priorities.¹ Yet, data suggests this workforce is limited in number and may not be adequately prepared to address these priorities.⁵

While comprehensive nutrition and dietetics workforce data is lacking, the data available suggest that the Australian and New Zealand dietetics workforce is small with approximately 6870 practitioners.^{6–8} Traditionally, the public hospital sector was the dominant place of employment for dietitians. Emerging data suggests that employment in private practice is increasing, and separately, a large number of qualified dietitians work in unrelated occupations.^{9,10} Less is known of the nutrition science workforce without dietetics qualifications other than the voluntary register of the Nutrition Societies highlighting approximately 150 registered nutritionists in Australia¹¹ and 208 registered nutritionists in New Zealand.¹² In the United Kingdom and United States, research has explored important future issues and directions for nutrition and dietetics workforces.^{13,14} This suggests a growing demand for nutrition and dietetics professionals in areas such as community-based chronic condition prevention and management, aged care, personalised nutrition, food and agriculture, and technology/digital health.^{13,14} In addition, this data suggests that the profession will be challenged to increase in size and build its professional identity, its diversity, and consider specialisation and employability.^{13,14} It is clear that the provision of nutrition and dietetics services has great potential to generate economic savings and improved population health outcomes based on

prevention, even over nursing and medicine.¹⁵ However, there is limited data describing the future requirements for, and the needs of, nutrition and dietetics professionals in Australia and New Zealand.

Therefore, the aims of the study were to explore the roles of nutrition and dietetics professionals in the future, and describe the capabilities the workforce would need to fulfil these roles. The findings will inform future nutrition and dietetics education and practice in Australia and New Zealand and consider nutrition and dietetics professionals globally as the leaders in the nexus between food and health.

2 | METHODS

We employed an exploratory qualitative study grounded in interpretivism. Interpretivism does not seek a single objective reality but rather privileges multiple perspectives through social interactions drawing on the experiences of researchers and participants.¹⁶ We took a team-based approach to data collection and analysis to support our interpretive approach in ensuring multiple views as we undertook the study. The team of senior dietitian-nutritionist-researchers from across Australia and New Zealand have experience in dietetics education, and practice in a range of settings. Reflexivity was applied during data collection, analysis and reporting, where robust iterative discussions were held between all authors, examining how each author's background and world view was influencing interpretation, and in line with our interpretivist approach to seek multiple meanings and interpretations to the data.¹⁷ Human Research Ethics Committee (HREC) approval was provided by Queensland University of Technology (EC00171), The University of the Sunshine Coast Human Research Ethics (A201389), Monash University Human Research Ethics Committee (24447), Human Ethics the University of Auckland, Latrobe University Human Research Ethics (200000231) and the University of Wollongong Human Research Ethics Committee (2020/199).

A maximum variation sampling¹⁸ using the principles of information power¹⁹ was used to gather the opinions of three different key groups: thought leaders within and external to the profession of nutrition and dietetics, students and recent graduates of the profession of nutrition and dietetics, academic dietetics educators and expert

members of the profession. The potential sample of thought leaders was identified by the research team through brainstorming known leaders in the profession ensuring diversity of experiences. Those external to the profession were identified through web-based searches related to future focused issues relevant to nutrition and dietetics. Many of the thought leaders were known to the researchers supporting the collection of rich data. An initial sample of 45 potential names was identified including participants from Australia, New Zealand, Pacific Islands, Canada, Europe and the United States. Current students and recent graduates from dietetics and nutrition science education programs were contacted through an email invitation or online learning platform by course coordinators from all accredited dietetics programs across Australia and New Zealand ($n = 19$ courses) at the time of the study. Nutrition science graduates were also invited to participate in the study via social media (private Facebook and LinkedIn). Practitioners, researchers, and interest group leaders were invited via the Australian and the New Zealand dietitian professional associations' weekly emails.

Data were collected through in-depth interviews with thought leaders, and focus groups held with students, graduates and members of the profession. The interview and focus group questions were developed through a preliminary search of the literature on the future of nutrition and dietetics practice from other developed countries and related research in Australia^{5,13,14} (Table 1; full question list available from the authors upon request). Questions were adapted for the different participant groups. Informed consent was obtained.

Interviews were conducted by all authors between June and December 2020. Focus groups were conducted by the first author between October and December 2020. Initial focus groups and interviews were conducted with another member of the research team present to facilitate consistency of approach and to provide feedback. Interviews and focus groups lasted between 60 and 90 min and were all undertaken through the online video communication platform Zoom (2021 Zoom Video Communications, Inc.). Data were audio-recorded and transcribed verbatim using an automated transcription program (Otter.ai, 2016). All transcripts were reviewed against the audio-recording to ensure the accuracy of the transcription. Each participant and focus group were given a code. All six interviewers completed contact summary sheets²⁰ for each interview and focus group. The contact summary sheet prompted interviewers to consider the main issues raised in the interview. It aimed to record salient, interesting, important, or illuminating points and take-home messages. The sheet was completed after immersion in the interview transcript and were used to support data analysis.

TABLE 1 Overview of interview and focus group discussion guides and question logic

Focus of discussion	Logic
Key food and nutrition related issues facing Australia and New Zealand	To explore if issues identified by other countries, nutrition and dietetics professions and key government and nongovernment organisations in Australia and New Zealand reflect the experience of participants
Key influences or drivers of change on nutrition and dietetics practice;	Current and emerging trends in the Australasian environment and political landscape that may influence nutrition and dietetics practice
How current health and social challenges will impact nutrition and dietetics practice	Demographic, health care and other environmental and political influences will potentially change practice and therefore what the profession may need to consider
Future roles of nutrition and dietetics professionals & opportunities and challenges for the discipline	Gather perspective on opportunities for nutrition and dietetics professions into the future and compare how these relate to opportunities that have been identified in other developed countries
Skills required of the profession into the future	Explore if current competencies and education in nutrition and dietetics need to change and considerations for the future

The analysis approach was informed by thematic framework analysis. Framework analysis is a useful approach for team based analysis to ensure consistency in coding.²¹ Initially a subset of four different interviews each were selected for analysis by one of each of three authors whereby each researcher analysed different sets of interviews. Line-by-line inductive coding of text was undertaken independently by these authors, who then came together to compare codes and their description. Codes were then compared and defined in short sentences to provide transparency to the coding framework such that it could be applied to the remainder of the data. All other transcripts were then coded by one of these three authors against this coding framework using Microsoft Excel (Microsoft Office, 2018). Where additional codes were identified as coding progressed, the coding framework was adapted to reflect the new code with regular meetings being conducted until data analysis was

complete with the three authors to compare and contrast coding and any new codes and definitions. At the completion of coding, the three authors came together to examine the data in the context of the research questions and examine frequencies and patterns across the data. These patterns were then used to identify future roles and capabilities. One author also produced a mind map which documented key concepts from the data and where ideas overlapped or connected and compared identified roles with contact summary sheets.^{22,23} The identified future roles of the profession and capabilities were then presented to all authors for consideration and review. These role descriptors and capabilities were then revised based on feedback and through a process of constant comparison with the mind-map and until agreement was reached with all authors.

3 | RESULTS

A total of 33 individual interviews and nine focus groups were conducted involving 68 participants (Table 2). A further 10 people were invited to interview but either did not respond ($n = 7$) or declined ($n = 3$) due to lack of availability. Of these, six were within the profession and

TABLE 2 Characteristics of interview and focus group participants

Area	Total participants
Thought leader—nutrition and dietetics professional ^a	25
Students/recent graduates ^b	12
Dietitians Australia members Special Interest Groups ^c	10
Thought leader—external to nutrition and dietetics ^d	8
Dietetics educators/academics	6
Fellows Dietitians Australia	4
Public Health Association of Australia, Food & Nutrition Interest Group	3

^aHealthcare, Indigenous peoples' health and nutrition, Institutional foodservices, government bureaucrats, elite sports nutrition, academia, professional standards, curriculum and assessment in nutrition and dietetics, private practice, nutrition informatics, food industry.

^bFinal year students currently enrolled in undergraduate or postgraduate nutrition and dietetics programs or nutrition science or human nutrition programs or recent graduates of these programs.

^cFood and environment, rehabilitation and aged care, food allergy and intolerance, eating disorders, public health and community nutrition, corporate, diabetes.

^dSystems scientists, International/global health, Indigenous peoples' health and nutrition, sociologies of education, health, food, government bureaucrats, food security, horticulture systems in developing countries, neuromusculoskeletal health and wellness.

four were external. Eighty-five per cent of the interviewees ($n = 29$) were from Australia and New Zealand with the remaining participants from Canada ($n = 2$), United States ($n = 1$) and Europe ($n = 1$). Attempts to recruit professionals who were permanently based in the Pacific Islands was unsuccessful. A majority (85%) identified as either working in nutrition or dietetics with 40% working in academia (Table 2). Six roles that described the future nutrition and dietetics professionals were identified and potential new areas to utilise this expertise also illuminated from the data (Table 3) and are described below.

Sixteen capabilities that were essential to perform these roles were also identified including adaptability, advocacy, courage, creativity, critical thinking, cultural safety, curiosity, empathy, leadership, and the ability to translate science, build partnerships, be entrepreneurial, disruptive and solution focused, embrace diversity and use and create technology (Table 4).

The first role was as food aficionados. Participants explained that the nutrition and dietetics workforce should be recognised as the experts on the contemporary human relationship with food and its application to health for people, communities, businesses and populations. They explained that the profession currently lacks the communication skills required. They recognised that the study of nutrients is important but will not be central to how nutrition and dietetics professionals activate optimal health and wellbeing through food in rapidly changing food, health and social environments. They explained that the nutrition and dietetics profession is unique in that it works with the materiality of food as it is converted to biological physicality, social identity and geographical place-making. Having advocacy skills and being entrepreneurial with business literacy in their practice, was suggested as critical in transferring the enthusiasm for food and nutrition to others.

"I think they [big organisations that are the face of nutrition] know ...how complex it is to eat a good diet, and have a good relationship with food, but I don't know that we have the skills to communicate that and, you know, show people that we do really understand these things on a very deep level" [INT019].

The second role was as diet optimisers in increasingly complex contexts. Participants described that nutrition and dietetics professionals will need to work simultaneously to optimise health and wellbeing as well as manage conditions with overlapping environmental, social, biological, transgenerational and comorbid drivers. It was acknowledged that this will require leading food and nutrition initiatives in settings that transcend the life course and are both inside and outside of the health system. They suggested that the future nutrition and

TABLE 3 Future new practice areas for the future nutrition and dietetics profession identified from the data

Roles	Description of role
Food aficionados	<p>Harnessing cooking as a social practice through endeavours that reduce food work and accompanying mental load.</p> <p>Working with food industry in the development of novel and functional foods with a nuanced understanding of the conflicts of interest and ethical considerations this entails.</p> <p>Building systems where food is a central pillar of circular economies within local communities.</p> <p>Food decision support workers integrating risk management, other available data including that generated by artificial intelligence.</p> <p>School food and nutrition co-ordinators.</p> <p>Driving public policy that optimises healthy food choice.</p> <p>Fusionists, bringing together creative endeavours with food to create social opportunities, solving complex food and food systems problems to improve or optimise health through the fusion of multiple skills and perspectives to advance what is possible.</p>
Diet optimisers in increasingly complex contexts	<p>Mental health and addiction specialists who can design bespoke diets to optimise memory and mental functioning, and ameliorate the impact of a diagnosed mental health issue and facilitate recovery.</p> <p>Ageing health coaches will ensure the quality of life, social connections and optimised diet of an aged population that is living in the community.</p> <p>Personalised life-course diet optimisers (from womb to tomb) using genetic and microbiome data.</p> <p>Microbiome consultants able to optimise the gut and mucosal microbiome with diet, pre- and probiotic applications and biota cultivation and transplantation.</p> <p>Gamification designer that develops games with rewards that incentivise healthy diet consumption.</p>
Knowledge translators	<p>The generation, interpretation and communication of multiple “big” data sets that link food and health.</p> <p>Development of algorithms and software that underpin wearable datafication devices, artificial intelligence and Web 2.0 and 3.0 initiatives.</p> <p>Harnessing augmented reality for better health through food</p> <p>Food and science communicators providing real-time information about food products and ethics.</p> <p>Social media influencers and personalities—interpreting the science into visual bites that can be quickly absorbed.</p>
Equity champions	<p>Tailored, personalised, person-centred dietary coaching that is broadly accessible and delivered with empathy.</p> <p>Food equity brokers, working with food insecure individuals, households and the agencies that support them to develop nutritious, stigma-free and sustainable food safety nets.</p> <p>Food sovereignty consultants—working with and learning from Indigenous communities to build food sovereignty approaches to enhance community food security.</p> <p>Local community coordinators will work with communities to bring people together fostering intercultural and intergenerational understanding using food and food production as a key strategy.</p> <p>Food entrepreneurs who will work with individuals, businesses and communities to generate social enterprises that celebrate the culture of food and generate income and are representative of the diversity in society.</p> <p>Disaster food relief co-ordinators and mobilisers (local, national and international contexts).</p>
Systems navigators and food systems activists	<p>Leaders in international development and policy predicated on partnerships linking food with health.</p> <p>Political advisors to enhance systems perspectives.</p> <p>Nutrition sensitive agricultural experts including how changes to food supply will impact diet patterns and health.</p> <p>Nutrition consultants to agri-business, urban farms and gastro-tourism.</p> <p>Sustainable food systems analysts for institutions.</p> <p>Environmental impact consultants of food production and consumption using life cycle and economic assessments.</p>
Change makers, activists and disruptors	<p>Risk assessment, ethical navigation and amelioration, for example working with implant technologies, digital systems integration, artificial intelligence which track physiological, nutritional and biochemical indices.</p>

(Continues)

TABLE 3 (Continued)

Roles	Description of role
	Industry research funding brokerage—ensuring distance between food industry and researchers. Predictive regulation analyst, conducting scans and assessments of food, health, education or other environments. Trade agreement negotiators that will ensure equitable global distribution of food that maximise human health and reduce the risk to planetary health. Minister of Food.

dietetics professional will continue to focus on person-centred care using person-generated data and in consideration of individual social eco-systems for the management of complex medical conditions. They recognised that future workforce will increasingly lead management of diet-related disease through a combination of nutrition support, pharmaceutical prescribing and behaviour change counselling. As diet is critical to health, participants suggested that the nutrition and dietetics professional will be instrumental in building systems, in food and healthcare, and in developing the tools and education for other health professionals to ensure nutritional health is a priority.

“[in the future] the majority of people are not in aged care facilities. They're at home, and ... particularly if you live alone, the motivation to cook well, is less. So I think there's ... a huge opportunity for helping, ... having community eating opportunities, engaging people, socially, so they're not isolated, assisting with all of that food preparation, so that they're able to eat well” [INT021].

“we've got to make sure that when we are caring for people, we're not just caring for them, ...we're not just coming in to do what's necessary for the bit of therapy. We're also... saying, Okay, what is the environment this person is living in,...does that in any way, influence their health, is that in any way, impeding ... the therapy goals we're trying to achieve here” [INT008].

The third role was as knowledge translators. Participants suggested that nutrition and dietetics professionals of the future will have the responsibility for generating evidence. In addition, they explained they will need to be able to interpret complex and rapidly evolving nutrition, health and social science knowledge between different groups of knowledge creators, holders and users, translated for practical use. They explained that this role requires defending scientific knowledge from distortion. It was suggested that nutrition and dietetics professionals will critically evaluate and interpret nutrition as a constantly evolving dynamic science and in a crowded information ecosystem. They suggested the workforce will have the responsibility for translating and communicating the scientific evidence in ways that are accessible, pragmatic and practical. They will have a pivotal role in

developing and harnessing technologies that increase access to and application of this evidence. The future nutrition and dietetics professional will have the credibility to effectively communicate with broad audiences, to generate meaningful dialogue and to mitigate growing channels of misinformation. They will be an independent, robust and critical voice that will hold others accountable to the defensible science, specifically countering nonscience-based food and nutrition misinformation which threatens to undermine or destabilise human health. They will practice the art of communication, balancing what people want to hear with what the science is saying. Strong science capability will support knowledge translation and communication.

“We need to see that science was taken seriously....we need to be out there often and make sure we've got good, strong messages that don't fight with each other. And telling people 'what does that mean'? ... it's not just the underlying knowledge that has to be good, but the messages about what to do about it.? And I think ... part of it is we're just not out there enough” [FG8].

The fourth role was as equity champions. The participants explained that the future nutrition and dietetics professionals will have to broker partnerships and collaborations that harness and combine their learned expertise in food, nutrition and dietetics with the lived expertise of the communities they serve. They suggested that they will need to be adept at placing the context of people's lives as central to achieving health and health equity through food. They will be able to build capacity and learn from the strengths of Indigenous cultures and other communities to optimise health through food and eating. Access to nutritious food was recognised by participants as a determinant of health and as such nutrition and dietetics professionals need to have a deep, working understanding of the implications of these determinants and how they impact on equitable access to a nutritious food supply. They will need to apply an equity, trauma-informed lens to all of the work that they do. The inequities associated with poverty and geographical isolation are urgent issues that will likely continue into the future. The future nutrition and dietetics professional will have the learned expertise to draw on a deep understanding of

TABLE 4 Critical capabilities identified from 68 participants listed in alphabetical order

Critical capability	Illustrative quote
1. Adaptable, Resilient	“Comfortable with chaos, comfortable with discomfort”
2. Advocacy, Lobbying, Activism	“Independent, robust, critical voice to hold people accountable”
3. Courageous, Confident	“We are risk averse and navel-gazing.... we need to be bold and non-judgemental”
4. Creative	“Innovation is going to be important”
5. Critical technology users & creators	“Harness the technology and keep evolving with it”
6. Critical thinking	“Is about weighing and interpreting the evidence”
7. Cultural safety	“Looking into, ‘who am I?’, which is one of the most political questions you can ask yourself, because then it orients you to yourself in relation to others and in the world”
8. Curiosity	“A growth mindset is important”
9. Disrupting expertise	“Collaborating with those with lived expertise will strengthen what we do”
10. Embrace and harness diversity	“Respect difference as a powerful resource”
11. Empathy	“Need to be able to put ourselves in other’s shoes”
12. Entrepreneurial & business skills literacy	“Building and sustaining a business without relying on public funds”
13. Lateral leaders	“..our leadership needs to come in a much more expansive way in order to be heard..” “...bold, uncompromising, courageous leadership”
14. Partnership builders	“...we are going to have to build alliances, and part of being able to do that strategically is understanding the processes involved”
15. Science translation	“We are scientists but the art is in the translation into practical everyday strategies”
16. Solutions focused, initiating projects, seeking opportunities	“.... patient [person] centric, solution driven collaboration, embracing technology”

the science and systems. They will be curious about, and continually seek to integrate the lived life experiences of individuals, communities, businesses and populations in optimising health.

The participants reported that learned expertise of future nutrition and dietetics professionals will only be validated in partnerships with those with lived experience. This includes having the ability to identify and understand how dominant paradigms and ideologies, for example heteronormativity, ableism, colonialism and capitalism, all impact the socio-cultural aspects of food consumption and health outcomes. Future workforces will need to be transdisciplinary, cross-system leaders making sense of the complex context underpinning equitable access to health for all through food. Being curious and culturally safe will be necessary to champion equity. Embracing diversity within and outside the profession and disrupting the power of their learned expertise where it is warranted is crucial.

“That’s the beautiful thing ... is that we can influence positive change at so many different levels across so many different areas. And I think, you know, being more aware of the strength based cultural determinants, not just the more deficit focused social determinants those are a bit more deficit lens as opposed to the cultural determinants” [INT017].

The fifth role was as systems navigators and food systems activists. Participants suggested that nutrition and dietetics professionals into the future will have to navigate the complexity of and interaction between food and health systems with social, education, political and economic systems. They will have a leading role in systems change and with defending and building ecologically sustainable, just and healthy food supplies. As the world and contexts become increasingly complex and uncertain, they will not only need to be systems thinkers they will need to connect and reimagine these systems. The participants recognised that diet was a modifiable risk factor, but the role of structures and systems which create and perpetuate dietary health problems was a barrier. They will be instrumental in providing leadership to enable other actors within health and food systems to work in ways that go beyond a biomedical model. They will facilitate dietary change and healthy eating through understanding social, cultural, economic and historical drivers of food choices and dietary patterns.

The participants described that future nutrition and dietetics professionals will be the food system activists leading action on generating a sustainable, equitable and healthy food supply for healthy dietary patterns at individual, community and population levels. They will create

and use the scientific evidence on climate, environment, diet and health to inform interventions and guidelines developed with scientific consensus to inform recommendations for nutrition sensitive production and consumption. They will be the leaders at the intersection of recommended food consumption patterns for human health and recommended food systems models which are ecologically sustainable and just, for restoring a safe climate for planetary health. Increasingly their work will also involve leading the preparation and response for food emergencies related to natural, climatic, biological and political disasters. They will work to mitigate threats to the vital relationship that people have with food, from within rapidly changing and fraught food systems. To do this they will need capabilities in lobbying, activism and courage.

“you cannot call yourself a health professional ... unless you advocate fiercely and frequently for the health of the planet, there are no healthy people on a ruined uninhabitable planet, ... I think that that becomes a mission and the mantra and a message that that every dietitian can embrace” [INT026].

The sixth and final role was as change makers, activists and disruptors. Participants explained that nutrition and dietetics professionals will need to drive change to protect the health of the community through food and nutrition. They will perform this work through a sophisticated understanding of the ethical, legal and political frameworks needed to ensure that appropriate positions, services and research are prioritised, financed and delivered. In the future the participants explained that the workforce will be negotiating the complex interactions between protecting human health, creating financially viable, profit-generating solutions and ensuring equitable access. They will be involved in generating and using scientific evidence in financially constrained, politically motivated environments. The future nutrition and dietetics professional will have a deep, nuanced understanding of the ethics of engagement, and the conflicts of interest that need to be managed. They will proactively disrupt systems to ensure equitable access to a healthy food supply and nutrition support. They will be the change-makers, by challenging the status quo and working in partnerships to develop solutions. To do this the participants explained that the future workforce need to be risk takers, capacity builders and will need to embrace technology and finding solutions through entrepreneurial endeavours and critical thinking. They will also need to be adaptable and resilient.

“...we need to learn how to change society. And we need to learn how to be social justice activists or advocates to do so...Can we be open to...[being] legislators, lobbyists, bureaucrats, activists?...[we]...won't be afraid to stake political opinions, won't be afraid...” [INT007].

4 | DISCUSSION

This study explored the future roles of nutrition and dietetics professionals and the capabilities needed to fulfil these roles. Potential future roles of Australian and New Zealand nutrition and dietetics professionals have been imagined, with data revealing that future professionals will be food aficionados, diet optimisers, knowledge translators, equity champions, systems navigators and food systems activists, change makers, activists and disruptors. Sixteen critical capabilities were reported. These findings provide key information to shape education and training, work practice and context into the future such that they are effectively positioned to improve nutritional health outcomes.

This study's findings concur with international research on the future of nutrition and dietetics, affirming the need for a clear professional identity, amplifying visibility and influence, embracing advances in science and technology, diversity, career advancement, knowledge translation, evidence generation and systems navigation and building its employability.^{13,14} In addition, it affirms the growing demand for nutrition and dietetics professionals in areas such as community-based chronic condition prevention and management, aged health, personalised nutrition, food and agriculture, and technology/digital health.^{13,14} The work has also highlighted the importance of nutrition and dietetics professionals generating evidence as well as translating it into practice. The importance of the professions' role in generating and translating research is stronger in this study than has been found in other work.^{13,14} In addition, a number of novel findings unique to this study were identified, these include, needing nutrition and dietetics professionals that are capable of defending and building sustainable, just and healthy food systems, opportunities to build capacity and learn from the strengths of Indigenous cultures, the key importance of the human relational connection with food, and being change agents and activists to disrupt the status quo. These novel findings reflect the suggested urgency for nutrition and dietetics to reinvent itself in a world of increasing complexity and uncertainty^{24,25} and highlight the emerging roles which must be embraced if they are to have impact and truly make a difference. Advances from the previous work in the United States¹³ and United Kingdom¹⁴ may reflect increasing urgency on climate action, and also the global pandemic, further highlighting the dynamic nature of health and health practice, and the quintessential requirements for nutrition and dietetics professionals to manage change.

As described above the emerging roles and future of nutrition and dietetics described by the participants in this study may be explained by shifts in the population's understanding of climate change and growth in technology. There has also been an enormous growth in social

media and knowledge democratisation²⁶ seen over the several years since these studies were undertaken, which has likely contributed to the study participants' perspectives. The undertones of the participants' perspectives across the data suggests that it is time for a significant cultural shift in the nutrition and dietetics profession which has been previously raised by others.²⁴ Cultural change requires a culture of learning and being comfortable with uncertainty, whereby innovations and entrepreneurial ideas are embraced and where failing is viewed as learning.²⁷ In addition, no one single approach will change professional or organisational culture and complex interventions are needed to affect cultural change.²⁸ Key nutrition and dietetics professional organisations and individuals must work alongside those tasked with educating the future professionals to consider adaptation and embracing new ways of doing, and being to be able to rise up and remain salient and relevant into the future.

The critical capabilities identified in this study are largely reflected in the recently updated 2021 National Competency Standards for Dietitians in Australia,²⁹ and the 2017 New Zealand standards.³⁰ However many of the capabilities identified in this study do not reflect current nutritionist competencies,³¹ except for those identified for public health nutritionists.³² While the professions of dietitian, nutrition scientist, nutritionist and public health nutritionist have been delineated in previous work,³³ this study highlights blurred boundaries between these professions as well as incorporating potential for professions that may currently sit outside the traditional nutrition and dietetics space. There is a need for those that currently identify with these distinct professions to work together to potentially create a collective professional identity such that they can overcome these boundaries. This includes education providers, regulators and professional associations. While this study identified future roles, the descriptors and critical capabilities did not define professional boundaries. Flexibility of roles across health care is highlighted as a key part of addressing health shortages, and work practice and context gaps.³⁴ These boundaries exist across other areas of health care and can be successfully navigated.³⁴ This data shows there is an urgent need for action in different areas of practice and context, further highlighting the current size and capability of the workforce as inadequate.⁵ It is time to define a unified nutrition and dietetics profession, which works together to develop as food aficionados, diet optimisers, knowledge translators, equity champions, systems navigators and food systems activists, change makers, activists and disruptors. Education providers may benefit from considering concept-based approaches³⁵ as they consider transformation of curricula to meet these needs.

The strengths of this study include the diverse and large qualitative data sample that drew on perspectives inside and outside nutrition and dietetics, and the team-based approach to data analysis. While this sample aimed to recruit Indigenous nutrition and non-nutrition thought leaders across Australia and New Zealand we acknowledge that this sample was small with only three participants identifying as Indigenous across the two countries. Therefore the perspectives of Indigenous peoples on the future of nutrition and dietetics are unlikely to be fully captured.

Overall this current study offers an updated and extended vision of the potential emerging future roles in nutrition and dietetics into the future. It provides specific insights for the nutrition and dietetics professionals in Australia and New Zealand and is also globally relevant. The results point to the need for future nutrition and dietetics workforce education and professional development to address the impact of climate change, growing inequities, the democratisation of knowledge, and the disruption of health and food systems. Education providers, regulators, professional associations and citizens need to work together to realise roles that will deliver on better health for all.

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CONFLICT OF INTEREST

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AUTHOR CONTRIBUTIONS

DG and RB conceptualised the study with input from all authors. All authors collected interview data, RB collected focus group data. DG, RB and CP analysed data with verification from all authors. DG, RB and CP drafted the manuscript. All authors contributed to revising and editing manuscript.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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