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## INVITED POSITION PAPER

# Dietitians Australia position statement on telehealth

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## Abstract

It is the position of Dietitians Australia that clients can receive high-quality and effective dietetic services such as Medical Nutrition Therapy (MNT) delivered via telehealth. Outcomes of telehealth-delivered dietetic consultations are comparable to those delivered in-person, without requiring higher levels of additional training nor compromising quality of service provision. Dietitians Australia recommends that policy makers and healthcare funders broaden the recognition for telehealth-delivered dietetic consultations as a responsive and cost-effective alternative or complement to traditional in-person delivery of dietetic services. The successful implementation of telehealth can help to address health and service inequalities, improve access to effective nutrition services, and support people with chronic disease to optimise their diet-related health and well-being, regardless of their location, income or literacy level, thereby addressing current inequities.

## KEYWORDS

chronic disease, diet, digital health, nutrition, telehealth

## 1 | BACKGROUND

Nutrition-related chronic diseases are the leading cause of ill health in Australia.<sup>1</sup> Within the next 5 years, it is estimated that over 75% of Australian adults will be living with overweight or obesity.<sup>2</sup> One in two Australian adults have a chronic disease, with over seven million (35% of the Australian population) living with nutrition-related chronic disease, including type 2 diabetes, cardiovascular disease, obesity, diet-related cancer, chronic kidney disease and mental health conditions.<sup>1,3</sup> Australia, like many developed

countries, has an ageing population, which presents a significant challenge for the healthcare system. Together these will drive up healthcare expenditure and present a multitude of additional societal, geographical and workforce challenges for the healthcare system to manage.<sup>4</sup>

Telehealth-delivered nutrition consultations offer a flexible modality to provide effective and cost-effective medical nutrition therapy (MNT), regular monitoring and support to the large numbers of people in the community requiring dietetic services, in particular those with obesity<sup>5</sup> and nutrition-related chronic disease.<sup>6,7</sup> According to the World Health Organisation, the term “telehealth” refers to the remote delivery of health services using information and communication technologies to exchange health information, either synchronously

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(ie, two-way communication in real time; e.g. telephone and videoconference consultations) and/or asynchronously (ie, one way communication at any time; e.g. text-messaging and web-portals).<sup>8</sup> Digital health modalities (encompassing telehealth) also include the remote delivery of nutrition interventions via electronic health (eHealth) modes, such as web-based programs, software programs and a range of mobile health (mHealth) options, such as smartphone applications (apps), text messaging programs and wearable devices.

Many Australians cannot access dietetic services due to economic, geographic and sociographic barriers. There is a high concentration of dietitians located in urban, affluent areas while communities experiencing high rates of people living with overweight and obesity and type 2 diabetes mellitus are located in more disadvantaged urban suburbs and rural areas.<sup>9</sup> Furthermore, one in four people with or at risk of chronic disease fail to attend in-person consultations in community-based and outpatient clinics, contributing to substantial healthcare resource waste.<sup>10</sup> Some of the major reasons people fail to keep appointments in the community are incurring high indirect costs associated with in-clinic consultations (e.g. time away from work, travel and costs of parking), cancellations and re-bookings, and frustrations associated with lengthy waiting times.<sup>10,11</sup>

Innovative health solutions can be used to create proactive, effective and sustainable services to suit growing needs and demands on the healthcare system.<sup>12</sup> While these needs are recognised,<sup>13</sup> historically models of care have fallen short with meeting these needs. In March 2020, the Australian Government temporarily expanded access to Accredited Practising Dietitians (APD) for Medicare Benefits Schedule (MBS) items to deliver telehealth services to Australians with an eligible chronic disease management plan, including videoconference and telephone consultations, in response to the COVID-19 pandemic.<sup>14</sup> These changes have encouraged a reframe of traditional models of healthcare delivery into virtual modalities delivered remotely that can continue well after the immediate COVID-19 crisis.<sup>15</sup>

The aim of this position statement is to outline the clinical- and cost-effectiveness of telehealth-delivered dietetic consultations, and to translate this evidence to practice and policy recommendations.

## 2 | SUMMARY OF EVIDENCE

This position statement is informed by a review of the existing literature reporting the effectiveness of telephone and videoconference-delivered consultations by dietitians. The literature appraised includes recent systematic reviews where the effect of telehealth-delivered consultations by a dietitian could be defined and compared to either a control group or a face-to-face consultation<sup>5,16-18</sup>, including cost-

modelling studies.<sup>19-21</sup> Further, an updated search (to April 2020) using the search terms reported in Kelly et al<sup>6</sup> screened against additional criteria, including (a) telephone or videoconference diet intervention and (b) delivered by a dietitian. A meta-analysis was performed on selected dietary outcomes. The effect of telehealth-delivered dietetic services is arranged into five sections: (i) weight management for people who are overweight or obese; (ii) chronic disease populations; (iii) malnutrition; (iv) emerging technologies; and (v) cost-effectiveness.

## 3 | TELEPHONE-DELIVERED DIETETIC CONSULTATIONS FOR WEIGHT MANAGEMENT

There is a growing evidence base supporting the effect of telephone-delivered weight management services for people who are overweight or obese (body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup>). Two randomised controlled trials (RCTs) (2013, n = 295 participants<sup>22</sup>; and 2011, n = 415 participants<sup>23</sup>) showed that weight loss in people with overweight and obesity is similar regardless of whether the dietetic consultation is delivered by in-person mode, ad-hoc or via telehealth.

Compared to traditional care, a recent systematic review with meta-analysis (2019, n = 9 RCTs) concluded that telephone-delivered weight management interventions resulted in a significant decrease in BMI for people with overweight or obesity of  $-0.46$  kg/m<sup>2</sup> (95% CI  $-0.73, -0.19$ ).<sup>18</sup> Recent RCTs and other study designs yield additional evidence. An RCT (2016, n = 11 participants) in people with overweight or obesity, referred by their primary care physician, found that weekly telephone lifestyle counselling by dietitians for 6 months, and second weekly calls for the following 6 months, resulted in significant weight loss. At 12 months, 47.8% of patients in the treatment group had lost 5% of their body weight vs 11.6% in the control group ( $P < .01$ ). The treatment group also significantly increased their moderate to vigorous physical activity compared with the control group (+126.1 minutes vs +73.7 minutes). While weight regain was observed in the 12 months after counselling stopped, physical activity was maintained.<sup>24</sup>

## 4 | TELEPHONE-DELIVERED DIETETIC CONSULTATIONS FOR PEOPLE WITH CHRONIC DISEASE

Telephone-delivered nutrition care is effective for improving dietary behaviour of people with chronic diseases. Half of the existing telephone programs published in the literature are conducted in diabetes,<sup>25-33</sup> followed

**TABLE 1** Summary of telephone-delivered dietetic services and improved diet and clinical outcomes in people with chronic disease

Outcome reported	Number of studies and participants meta-analysed	Effect size
Fruit intake <sup>25,27,30,34,37-39</sup>	4 studies, 670 participants <sup>25,27,30,38</sup>	MD 0.33 serves/day [95% CI: 0.18-0.47; $I^2 = 0\%$ ]
Vegetable intake <sup>25,27,30,34,37-39</sup>	4 studies, 670 participants <sup>25,27,30,38</sup>	MD 0.53 serves/day [95% CI: 0.21-0.84; $I^2 = 0\%$ ]
Fibre intake <sup>27,34,36-38</sup>	4 studies, 1418 participants <sup>27,34,36,38</sup>	MD 1.82 g/day [95% CI: 1.06-2.58; $I^2 = 0\%$ ]
Fat intake <sup>27,29,30,36,37</sup>	4 studies, 1418 participants <sup>27,30,36,37</sup>	SMD 0.20% of total energy expenditure [95% CI: -0.31 to -0.09; $I^2 = 0\%$ ]
Physical activity <sup>25-30,37,39</sup>	4 studies, 708 participants <sup>25,27,37,39</sup>	SMD 2.54 minutes per day [95% CI: 0.71-4.38; $I^2 = 99\%$ ]
Body weight <sup>28,30,34-39</sup>	7 studies, 1543 participants <sup>28,34-39</sup>	MD -1.04 kg [95% CI: -1.634 to -0.45; $I^2 = 6\%$ ]
Waist circumference <sup>28,37,38</sup>	3 studies, 435 participants <sup>28,37,38</sup>	MD -2.13 cm [95% CI: -4.23 to -0.03; $I^2 = 56\%$ ]
Cardiovascular disease risk <sup>26</sup>	1 study, 199 participants <sup>26</sup>	The cardiovascular disease risk reduced in telephone group, but rose in control patients ( $d = 0.12$ )

Abbreviations: MD, mean difference; SMD, standardised mean difference.

by cardiovascular conditions,<sup>27,34-36</sup> cancer,<sup>37</sup> chronic kidney disease<sup>38</sup> and osteoarthritis.<sup>39</sup>

#### 4.1 | Telephone-delivered consultations compared to in-person delivery

Telephone-delivered consultations are as effective as in-person consultations in clinic settings.<sup>26,37</sup> A 12-month RCT (2018,  $n = 199$  participants) focused on improving type 2 diabetes mellitus self-management behaviours, which included nutrition education once a month, led to significant improvements in glycosylated haemoglobin (HbA1c), cardiovascular disease risk and overall well-being compared to in-person delivery. Of note, diet quality and reduction in BMI was significant in both the telephone coaching and traditional face-to-face rehabilitation.<sup>26</sup> Similarly, a 6-month RCT (2016,  $n = 100$  participants) in breast cancer survivors led to a significant improvement in dietary intake of fruits, vegetables, fibre and a reduction in fat intake with a corresponding increase in activity levels and weight loss. In this study, the in-person weight management program was as effective, and both the in-person and telephone coaching arm were more effective compared to traditional care.<sup>37</sup>

#### 4.2 | Telephone-delivered consultations compared to traditional care

In an updated search (April 2020,  $n = 13$  RCTs) of telephone-delivered dietetic services, a meta-analysis was performed that showed that telephone-delivered consultations by dietitians was a superior intervention compared to traditional care (including those with ad hoc

nutrition care) for improving a range of important dietary intake measures, including fruit, vegetable, fibre and fat intake per day (see Table 1). Telephone-delivered consultations also significantly improved physical activity levels, reduced body weight and waist circumference, and improved cardiovascular disease risk compared to traditional care modes (see Table 1). Table 1 summarises the results of the individual meta-analysis performed.

Combining telephone with one or more other methods of service delivery (eg, face to face; online resources, text messages, videoconferencing) produces similar outcomes to that reported in telephone-only programs.<sup>29,34,35,40,41</sup>

There is conflicting evidence reported in telephone-delivered dietetic consultations studies for some diet-related outcomes, including diet quality<sup>26,28,41-43</sup> and sodium intake,<sup>30,42,44</sup> and changes in clinical variables including HbA1c,<sup>25,26,28-30</sup> blood pressure,<sup>25,28,29,34,36,42</sup> lipid profiles<sup>25,28-30,34,36</sup> and quality of life.<sup>26,39,42</sup> Larger RCTs are needed to confirm the effect of telephone-delivered dietetic consultations for these outcomes.

### 5 | TELEPHONE-DELIVERED DIETETIC CONSULTATIONS FOR PREVENTING AND MANAGING MALNUTRITION

Telephone-delivered dietetic counselling has been shown to be an effective method to deliver malnutrition-related care to older adults. Malnutrition has been shown to affect up to 50% of the residential aged care population<sup>45</sup> and up to 70% of hospitalised older patients.<sup>46-48</sup> In a systematic review (2018,  $n = 9$  RCTs), clinical improvements following telephone-delivered consultation

compared with in-person dietetic care or no intervention included significantly increased protein intake, improved quality of life, and (nonsignificant) trends towards improvements in overall nutrition status, physical function, energy intake, reduced hospital readmission rates and mortality.<sup>49</sup>

## 6 | VIDEOCONFERENCE-DELIVERED DIETETIC SERVICES FOR CHRONIC DISEASE MANAGEMENT

Videoconference modalities to deliver nutrition care are less frequently utilised in the published literature, however, appear to be effective for managing diabetes and obesity. An Australian review (2013, n = 8 dietetic studies) of videoconference dietetic consultations concluded that these appear to be feasible and well accepted.<sup>16</sup>

### 6.1 | Videoconference-delivered consultations compared to in-person delivery

Videoconference-delivered nutrition care is as effective as similar programs conducted in-person. Two of the non-RCTs included in the review by Raven and Bywood<sup>16</sup> reported on dietary outcomes, compared in-person vs videoconference methods in people with diabetes and found clinical outcomes to be similar for a group-based program (2012, n = 39 participants),<sup>33</sup> and for a multidisciplinary (including a dietitian) individual counselling program (2011, n = 208 participants).<sup>31</sup> Both these studies reported high levels of patient satisfaction, improvements in diet adherence and enhanced self-efficacy, with improvements found in biomarkers, including HbA1c, LDL cholesterol and blood pressure.

### 6.2 | Videoconference-delivered consultations compared to traditional care

In clients with type 2 diabetes, videoconference interventions to deliver MNT have been shown to be more effective than traditional care (including ad hoc nutrition care), for improving a range of important diet and clinical variables. For example, the IdeaTel project was an RCT (2010, n = 92 participants) which provided 2 years of MNT and showed the group receiving videoconference counselling to have significant improvements in diet and exercise knowledge (+2.5 points compared to the control group).<sup>32</sup> However, while

there was significant improvement in waist circumference (by 1.2 cm over 2 years) for women, BMI and waist circumference were not significant when males were included in the overall analysis.<sup>32</sup> In the only other identified RCT (2019, n = 59 participants), people with obesity received 12 weeks of telehealth nutrition coaching (which included combined videoconference and telephone consultations), resulting in significant reductions in body weight (-6.3 kg), waist circumference (-6.8 cm), and energy intake (-2520 kJ/day) and improved diet quality (+20 points) from baseline. However, the enhanced usual care (which included brief dietitian counselling) also experienced significant improvements in these measures, albeit on a smaller magnitude.<sup>41</sup> Therefore, the only difference at follow up was body weight, where 70% of the intervention group lost 5% of their body weight, compared to 41% of the control arm.<sup>41</sup>

## 7 | EMERGING DIGITAL HEALTH MODALITIES FOR TELEHEALTH-DELIVERED CONSULTATIONS TO IMPROVE DIET AND CLINICAL OUTCOMES

Australian dietitians incorporate eHealth and mHealth technologies into their practice and patient care.<sup>50,51</sup> The potential of digital health to support dietitians in the nutrition care process and delivery of nutrition interventions for patients requiring weight and chronic disease management has been outlined previously.<sup>52</sup> In general, patients report high acceptability, feasibility and usability for mHealth interventions targeting chronic disease management, though the technologies and implementation are not without limitations.<sup>53,54</sup>

### 7.1 | Evidence for emerging telehealth-delivered dietetic consultations and improving dietary outcomes

Positive effects for food and nutrition outcomes have been observed when mHealth modalities are used for treatment and preventative service delivery. Systematic reviews report that app-based mHealth interventions can improve dietary behaviours and intake of specific nutrients and foods, such as sodium (2019, n = 11 RCTs),<sup>55</sup> vegetables, fruit, fast food or takeaway and sugar sweetened beverage intake, as well as snacking behaviours (2016, n = 27 studies).<sup>56</sup> In a meta-analysis (2016, n = 7 studies) examining e- and mHealth interventions for improving fruit and vegetable intakes, the outcome favoured the treatment group (pooled effect size [Cohen's *d*] 0.22, 95% CI 0.11 to 0.33;  $I^2 = 68.5\%$ ).<sup>57</sup> A web-based



RCT (2019,  $n = 1125$  participants) conducted in seven European countries, using personalised reports for healthy eating by dietitians or nutritionists, showed improvements in diet quality assessed by the Healthy Eating Index 2010. Improved diet quality was observed at the end of the 3-month trial and maintained at 6 months although not all food groups' intakes improved.<sup>58</sup>

## 7.2 | Evidence for emerging telehealth-delivered dietetic consultations and improving clinical outcomes

Available evidence suggests that mHealth technologies are effective in weight management. A systematic review and meta-analysis (2015,  $n = 84$  studies) of web-based interventions, mHealth interventions and other electronic communication demonstrated significantly greater weight loss in eHealth programs compared with control condition ( $-2.70$  kg and  $-1.40$  kg) albeit heterogeneity was present across studies.<sup>5</sup> Another systematic review (2019,  $n = 12$  studies) compared mHealth programs to either a nonintervention control or traditional dietary management and concluded that mobile apps and wearable devices are effective tools in facilitating clinically important weight loss of 5% over the duration of treatment, but these effects were not maintained at 12 to 24 months.<sup>59</sup> However, overall, the evidence was limited due to only three of the 12 studies reporting results compared to a true nonintervention control group. Many interventions reported in the literature are multicomponent combining health practitioner counselling with the addition of technology such as text messaging. A meta-analysis (2015,  $n = 6$  RCTs) delivered via text message demonstrated significantly greater weight loss ( $-2.71$  kg) in the intervention group compared to control.<sup>60</sup>

The evidence-base supporting the effectiveness of mHealth technologies in diabetes management is growing. A recent meta-analysis (2018,  $n = 17$  studies) showed a mean difference in HbA1c of  $-0.51\%$  (95% CI:  $-0.71\%$  to  $-0.30\%$ ;  $I^2 = 47\%$ ) in groups receiving smartphone technology consultations compared with control.<sup>61</sup> Another review (2017,  $n = 13$  RCTs) showed favourable glycaemic control regardless of whether the mobile app intervention was delivered by the health professional physically or remotely.<sup>62</sup>

In cardiovascular disease specific literature, a systematic review (2017,  $n = 27$  studies) of mHealth interventions identified three studies which included diet outcomes found improvements in nutrition knowledge and dietary choice with interventions that were delivered via apps, text messages and web-based platforms.<sup>63</sup> Another systematic review (2015,  $n = 9$  studies) examined the effects of health interventions on weight loss among patients with cardiovascular disease reporting

favourable outcomes for trials using web-based platforms ( $-1.44$  kg; 95% CI  $-2.34$  to  $-0.34$ ;  $I^2 = 98\%$ ;  $n = 10$  studies), telemedicine ( $-1.04$  kg; 95% CI  $-1.12$  to  $-0.97$ ;  $I^2 = 0\%$ ;  $n = 3$ ) and text messaging ( $-1.74$  kg; 95% CI  $-2.51$  to  $-0.98$ ;  $I^2 = 83\%$ ;  $n = 4$ ).<sup>64</sup>

## 8 | ECONOMIC EVALUATION OF TELEHEALTH-DELIVERED DIETETIC CONSULTATIONS

Telephone-delivered nutrition programs are also cost-effective. When compared to the same weight management program delivered face-to-face over 18 months, telehealth-delivered programs were more cost effective (2013,  $n = 295$  participants).<sup>22</sup> Further, an in-person group-based obesity management RCT in rural settings (2012,  $n = 215$ ) showed telephone counselling resulted in a lower cost per kilogram weight loss (AUD 52.50/kg) vs face-to-face (AUD 74.77/kg).<sup>65</sup> An RCT (2016,  $n = 111$  participants) in a Brisbane hospital outpatient setting found individual telephone counselling was more effective than a group based in-person program and the cost per healthy life year gained was AUD 33000 and AUD 85000, for the telephone and group program, respectively.<sup>66</sup>

In chronic disease studies specifically, comparing telephone-delivered nutrition consultations to usual care (including those with ad hoc nutrition care), four of five interventions were found to be cost-effective<sup>38,67-69</sup> in people with diabetes, hypertension, chronic kidney disease and people undergoing cardiac rehabilitation. However, the intervention in one of the five studies conducted in osteoarthritis patients was not cost-effective when compared with usual care.<sup>70</sup>

For cost-effectiveness of emerging telehealth interventions, a systematic review (2020,  $n = 23$  studies) in type 2 diabetes reported mHealth interventions were highly cost-effective, with cost per Quality Adjusted Life Years (QALY) gained ranging from 0.4% to 62.5% of GDP per capita. The costs varied depending on the number and type of technologies employed that ranged from one technology to three.<sup>71</sup>

## 9 | IMPLEMENTATION OF TELEHEALTH-DELIVERED DIETETIC SERVICES

An existing practice-based evidence in nutrition (PEN) knowledge pathway is available for APDs, which includes practice points for delivering telephone consultations for adults with chronic disease, non-chronic disease management telephone programs and telephone

interventions for improving nutrition outcomes in infants and new mothers.<sup>72</sup>

One of these PEN knowledge pathways highlights the lack of evidence for call centre support for public health nutrition interventions and government policy implementation, which is due to a lack of evaluation studies in the published literature.<sup>72</sup> However, there are existing telehealth programs with nutrition components in Australia, but these are not always specific to dietetic services. For example, since 2009 NSW Health has offered the community Get Healthy Coaching and Information service which provides 10 telephone-delivered coaching sessions over 6 months aiming to improve nutrition, physical activity and, if desired, weight loss. The first evaluation of the service (2014,  $n = 1440$  participants) revealed significant weight loss of 3.9 kg, increased fruit and vegetable intakes and physical activity with decreased intake of take-away meals and sugar sweetened beverages.<sup>73</sup> Since then, there have been telephone coaching services offered to different population groups that have been evaluated including Aboriginal and Torres Strait Islander people (2017,  $n = 103$  participants) showing a significant mean weight loss of 3.3 kg,<sup>74</sup> those at risk of type 2 diabetes (mean weight loss of 3.3 kg,  $P < .001$ ,  $n = 4442$ ),<sup>75</sup> and a pilot program (2019,  $n = 89$  participants) in pregnant women to avoid excessive weight gain, showing a nonsignificant difference of 42.9% in the coaching program vs 31.9% in the control meeting recommended weight gain.<sup>76</sup>

Conceptual models for effective telehealth within chronic disease management have been proposed.<sup>77</sup> Success factors in implementing a telehealth model identified by O'Cathain and colleagues include ensuring that both the human and technical aspects of telehealth operate well. These implementation considerations are summarised in Table S1. Dietitians Australia has highlighted suitable candidates for telehealth dietetic services.<sup>78</sup> These suitable candidates and practical strategies to be considered for optimising telehealth outcomes are also summarised in Table S1.

By considering factors specific to delivery of virtual nutrition care by videoconference, dietitians can use their expertise to deliver services that complement, rather than compete with existing and emerging technologies. Issues specific to using videoconference in dietetic service delivery can be addressed through use of a checklist to support them during delivery of MNT in order to facilitate effective and efficient virtual nutrition care.<sup>79</sup>

Substituting telehealth services for standard consultations covered by MBS Item 10954 would be cost neutral for the consultation. Advice from the Department of Health is that patients accessing chronic disease management MBS items claim an average 2.5 allied health (not

dietetic-specific) items per year. Expanding access to telehealth-delivered dietetic consultations will result in improved outcomes which would reduce expenditure on medications and decrease hospital costs as demonstrated by the pilot of the Diabetes Care Project.<sup>80</sup> Any increase in the number of consultations for dietitians may not require an increase in the health budget but more sophisticated analysis of the current pattern of usage of chronic disease management MBS item numbers to allow modelling of potential changes in its usage.

Appropriate and effective use of technology within practice is a key competency standard outlined in National Competency Standards for Dietitians in Australia.<sup>81</sup> Dietitians possess all the skills required to provide MNT using telehealth. Taking courses in eHealth either as part of dietetic training, or as continuing professional development for APDs, can improve the understanding of concepts essential for using telehealth and eHealth technologies.<sup>82</sup> Key components include definitions of eHealth terms and concepts related to telehealth and mHealth technologies; and knowledge and skills related to (i) use of telehealth equipment, (ii) comparison of dietetic consultation components completed in person vs remotely via video call, (iii) quality assessment of mobile apps and (iv) exploration of advantages and disadvantages, and the ethical, security and privacy issues relating to use of eHealth technologies in dietetic practice. This training and professional development in delivery of nutrition and dietetic consultations using telehealth results in improved knowledge, skills and competence in using these technologies.<sup>82,83</sup>

## 10 | FUTURE RESEARCH OPPORTUNITIES

There are a number of opportunities for further research concerning telehealth-delivered consultations. Specifically, clinical trials are needed to evaluate the implementation of telehealth consultations delivering group-based interventions in populations with chronic disease, and improving access and outcomes for vulnerable populations groups, including those in regional and remote areas through telehealth-delivered consultations. There is also a need to understand the challenges of completing some components of nutrition care via telehealth (e.g. physical measures) and evaluate alternative or modified measures to recommend as suitable proxies.

Robust economic evaluations are needed across different chronic disease populations and demographics which are most likely to benefit from wider access to dietary services under Medicare, including rural/remote areas and house-bound individuals. An economic evaluation should also consider and evaluate the societal benefits of

**TABLE 2** Evidence-based recommendations for telehealth-delivered consultations

Practice area	Recommendation
Weight management	<ul style="list-style-type: none"><li>• Telephone counselling is effective for management of overweight and obesity in primary care.</li></ul>
Chronic disease management	<ul style="list-style-type: none"><li>• Telephone and videoconference nutrition consultations improves diet, physical activity levels and reduces body weight in people with chronic conditions.</li><li>• Telephone and videoconference consultations are just as effective as in-person delivered MNT.</li></ul>
Malnutrition	<ul style="list-style-type: none"><li>• Telephone counselling is effective for the prevention and management of malnutrition in the community.</li></ul>
Digital health	<ul style="list-style-type: none"><li>• Digital health solutions (including eHealth (e.g. web platforms) and mHealth (e.g. smartphone applications)) can support traditional in-person or telephone and videoconference delivered nutrition care, but their effectiveness as a delivery modality exclusively requires further research.</li></ul>
Funding for telehealth-delivered dietetic services	<ul style="list-style-type: none"><li>• Government policy makers and healthcare funders should broaden remuneration benefits for telephone and videoconference-delivered consultations provided by APDs, as these are cost-effective and low cost for APDs to operate.</li><li>• Expanded telehealth access under Medicare and Private Health payers addresses health and service inequalities, improves access to effective nutrition services, and supports people with chronic conditions to optimise their diet-related health and well-being, regardless of their location, income or literacy level.</li><li>• MNT delivered via mHealth and eHealth should be considered eligible for Medicare or Private Health rebates when they are used alongside telephone or video conferencing modalities or in-person delivery.</li></ul>

Abbreviations: APD, accredited practising dietitian; MNT, medical nutrition therapy.

telehealth-delivered consultations that cannot always be captured by typical economic analysis using a healthcare perspective,<sup>20,21</sup> including willingness-to-pay (ie, evaluating the monetary value on the benefit associated with a service, from a societal perspective), and any unintentional consequences that new dietitian delivered telehealth consultations may potentially have (e.g. consequences which may arise from unexpected uptake, creating inequity for populations that may not have access to technology hardware or reliable phone or internet service due to financial disadvantage, which substantially increases costs, unexpected workload changes or other unforeseen factors).

Finally, it will also become important to evaluate the effectiveness of emerging technologies including mHealth and eHealth nutrition programs alone, in combination with telephone or videoconference programs, or when combined with in-person delivery to reduce the number of counselling sessions required. These evaluations, in addition to addressing the evidence gaps mentioned above, will allow decision makers to make informed, evidence-based decisions on telehealth-delivered dietetic consultations.

## 11 | RECOMMENDATIONS

The summary of results presented in this position statement support the evidence-based recommendations summarised in Table 2.

## CONFLICT OF INTEREST

This position paper was commissioned, funded and endorsed by Dietitians Australia. Funding supported the lead author to conduct the literature searches and draft the paper.

KC and TD are members of the Dietitians Australia board. Neither received any specific funding from Dietitians Australia throughout this project.

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### SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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**INVITED EDITORIAL**

## Contemporary issues in dietetics

The coronavirus disease (COVID-19) pandemic has brought the world to its knees in 2020. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus has challenged 21st century medicine and wrought havoc on sophisticated and less well-resourced economies alike, touching everyone. It will remain the contemporary issue of the decade and possibly the century.<sup>1</sup> As we brace ourselves to ride out the long road in search of a vaccine, health experts are referring back to the 1918 to 1920 Spanish flu pandemic over 100 years ago for insights on how to cope. The COVID-19 pandemic thus reminds us that in contemporary times, many lessons can be learnt from the past.

Three papers in this issue grapple with the COVID-19 epidemic directly. Chapple et al's paper on the nutrition management for critically and acutely unwell hospitalised patients with COVID-19 profiles a joint Australian and New Zealand collaboration between dietitians, nurses, intensivists, epidemiologists and researchers.<sup>2</sup> This detailed paper provides essential treatment guidelines for any dietitian managing acute respiratory failure associated with COVID-19. The authors from across four Australian states and New Zealand are all associated with the Australasian Society of Parenteral and Enteral Nutrition, a multidisciplinary body demonstrating the huge benefit of a team approach to a wicked health problem.

Also in this issue, Kelly et al<sup>3</sup> have authored the Dietitians Australia position paper on the use of telehealth. Although telehealth in the provision of dietetic services is not new, it has assumed much greater importance during the COVID-19 pandemic as the Australian Government has temporarily included telehealth both by medical practitioners and allied health under Medicare rebates. The paper provides evidence for the benefit of telehealth in delivering nutrition outcomes when compared to traditional methods. The health and economic benefits of using telehealth include its reach to those in remote locations, often unable to access dietetic services easily, if at all. The recommendations to continue the temporary rebate scheme beyond the pandemic is a call to government, providing the evidence of its benefit. Telehealth, alongside traditional methods of delivering dietetic services, is essential especially for those with chronic conditions.

The issue contains several letters that are relevant to contemporary issues in dietetics. The letter by Pelly et al<sup>4</sup> highlights how limitations placed on student placements by the pandemic led to opportunities to try an innovative student-led clinic at their university. While again this is not new, the use of telehealth provides insight on how circumstances can fast track new ways of providing student education differently, breaking old moulds. A reflection on the past is evident in two letters by Dr Beverley Wood and colleagues. In the lead up to the 100th anniversary of the nutrition and dietetics profession in Australia, Dr Wood has profiled one of our dietetic pioneers, Dr Ruth English, who was the Chief Nutritionist in the Commonwealth Department of Health from 1979 to 1993.<sup>5</sup> In the second letter, the authors have highlighted the role the early American dietitians and the Australians who followed played in the establishment of generalist dietetic training in Australia.<sup>6</sup>

Dr Ruth English, who was the subject of the 2019 Lecture of Honour at the Dietitians Australia National Conference, embodied the essential characteristics that make the dietetic profession still viable today. She was a trailblazer. Under her leadership, the Commonwealth Department of Health undertook the first national nutrition survey in 44 years, developed recommended dietary intakes and dietary guidelines and modernised and broadened the database for Australian food composition. She demonstrated advocacy and entrepreneurship in bringing many different players to the table to achieve policy outcomes.

The dietetic pioneers in the 1930s, who initiated nutrition, dietetic and food services in the large teaching hospitals of Melbourne and Sydney, also demonstrated leadership, advocacy, business management and entrepreneurship. Mabel Flanley at the Alfred Hospital in Melbourne and Edith Tilton at the Royal Prince Alfred Hospital in Sydney laid the basic tenets for the best practice methods of today. As fearless advocates for good nutrition from a social justice perspective, they set the stage for a bold profession of scientists, critical thinkers and researchers, advocating generalist training for Australian dietitians. Profiling this history remind us that leadership, advocacy, business management and entrepreneurship, complementing the four essential competencies of dietetics—communicating for better care,


scientific enquiry, critical thinking and professionalism—remain the focus of today's dietetic education and are still relevant.<sup>7</sup>

A strong focus on social justice is evident in the research priorities paper by Porter et al,<sup>8</sup> where healthy ageing, vulnerable populations and food systems remain important areas of focus. The rise of informatics is a new focus for the 21st century. Using evidence-based practice remains a core tenet of dietetic research and practice and the remaining papers in the issue reflect the importance of using validated tools to screen for and assess malnutrition, and to measure food intake.

Malnutrition continues to be a key challenge. Nishioka et al's retrospective cohort study<sup>9</sup> reviewed 113 patients recovering from stroke to investigate the correlation between malnutrition, muscle mass and oral status. Another collaborative study, this time between dietitians, speech therapists, physical therapists and dental hygienists, the study found that reduced muscle mass and poor oral hygiene were independently correlated with oral intake, suggesting a poorer outcome. A cross-sectional study by Lee et al<sup>10</sup> of malnourished cardiac patients found 39% of these patients were on restrictive diets, 80% of which were deemed to not be clinically indicated. The study brings into focus past dietary patterns affecting malnourished patients on admission. Botero et al<sup>11</sup> undertook an exploratory study of 74 oncology patients to identify if adding malnutrition risk and body mass index (BMI) could predict 12-month mortality. A secondary aim of this study was to evaluate if malnutrition risk and BMI were associated with chemotherapy outcomes. Malnutrition risk was a potential indicator of 12 month mortality for those where chemotherapy was not feasible, although not as an independent risk factor.

Measurement of nutritional intake, an essential tenet of dietetic practice, has embraced newer technologies. Computer applications on smartphones and tablets have resulted in less participant burden in collecting nutrition information; however, nutrition expertise is still required in determining random and systematic error. Lancaster et al<sup>12</sup> compared self-reported and dietitian-adjusted dietary intake records among older adults using the Research Food Diary app. Significant errors of up to 8% occurred in some nutrients and food groups between the self-reported and dietitian-assisted records; however, none between the dietitian-assisted and carefully applied dietetic assumptions used independently to adjust the self-reported records. Finally, Hall et al<sup>13</sup> reported on a pilot study of the impact of television on nutritional intake of patients with acquired brain injury eating in a communal dining area. Assessment of dietary intake was facilitated by electronic menu analysis via standard portion sizes at meals.

There will be ongoing challenges in managing the health and wellbeing impacts of the COVID-19 pandemic. Critical care will remain an essential part of our practice for those needing nutrition support who are acutely ill. Increasingly though we will witness the economic and mental health impact of the pandemic. It is essential that the focus on social justice and equality of access to services remains a core tenet of dietetic practice and research.

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## ORIGINAL RESEARCH

# Using the Delphi process to identify priorities for Dietetic research in Australia 2020-2030

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**Abstract**

**Aim:** This research aimed to use a consensus process to develop a framework and definition for nutrition and dietetic research, and to identify dietetic research priorities for Australia for the period 2020 to 2030.

**Methods:** A three-round Delphi process was selected to enable dietitians with demonstrated research expertise to contribute to the national priority development. All Fellows of the Dietitians Association of Australia, Advanced Accredited Practising Dietitians and research leaders were invited to participate (n = 84). The questionnaire was distributed electronically using a 7-point Likert scale. Rounds 1 and 2 asked participants to comment on the proposed research framework, definition of dietetic research and to rate a set of priorities categorised within seven themes. Fields were available for comments for revisions to each section. Approval was considered when  $\geq 70\%$  of participants ranked priorities as *Agree* or *Strongly agree*. In Round 3, participants were asked to rank the resultant priorities within themes.

**Results:** Through this Delphi process, Australian dietitians with demonstrated expertise contributed to and confirmed a framework and definition for dietetic Research. A ranked list of 15 priorities within five themes for dietetic Research in Australia for the period 2020-2030 was developed: *Healthy ageing; Vulnerable populations; Food systems and health/nutrition promotion; Informatics and evidence based practice* and *Achieving a balance between prevention and treatment approaches*.

**Conclusions:** It is anticipated that results will lead to the development of a research strategy to focus future dietetic research efforts, including the development of professional position papers as well as informing research competencies for dietetic education.

## 1 | INTRODUCTION

The United Nations (UN) Decade of Action on Nutrition 2016-2025 drew attention to worldwide issues relating to malnutrition and the double burden of chronic disease.<sup>1</sup> In Australia, the National Academy of Science's

production of a Decadal Plan for the Science of Nutrition has highlighted the need for greater investment in research as well as system wide changes to enhance the nutritional health of the population.<sup>2</sup>

Dietetics, or the practical application of a scientific understanding of nutrition, requires a strong evidence

base. Within the dietetic profession, research supports practice across public health, food service and clinical settings. The conduct of high-quality research requires research funding, infrastructure and training in research capability in order to ensure advances in knowledge, while minimising duplication and waste.<sup>3</sup> Continuation of research on topics where sufficient evidence already exists is redundant and could be considered to represent misaligned research investment. Prioritising research in specific settings is one approach to ensure that limited funding and resources are targeted at areas where further evidence is required.<sup>4</sup>

Future visioning for dietetics in terms of research and practice has been undertaken in the United States<sup>5</sup> and in the United Kingdom.<sup>6</sup> While the dietetic profession's future areas of priority action has been outlined in those countries, a similar priority setting has not been undertaken in Australia. That said, there has been a considerable expansion of the dietetic profession in Australia in recent years,<sup>7</sup> and a corresponding rise in research capacity,<sup>8-10</sup> associated with the increase in academic positions. The increase in research output may also be due to the inclusion of research into National Competency Standards for Dietitians (eg, Competency 3.2 Conducts research, evaluation and quality improvement processes using appropriate methods).<sup>11</sup> Hence the development of research priorities for dietetics in Australia is needed to direct future research efforts.

Presently there is no recognised definition or framework for dietetic research. Such frameworks have been developed on a broader scope within international and national medical research institutes<sup>12</sup> and funding organisations,<sup>13</sup> and can provide a useful starting point for research priority setting exercises. As such, the development of national dietetic research priorities is an opportunity to concurrently develop a definition and a framework specifically for the dietetic profession.

Many clinical specialties (eg, emergency<sup>14</sup> and cancer nursing<sup>15</sup>), professional groups (radiographers<sup>16</sup> and health education researchers<sup>17</sup>), and research funding organisations (eg, National Health and Medical Research Council<sup>18</sup>) have defined their future research priorities in an effort to focus research efforts within sectors of health care. The approach frequently used to develop research priorities is the Delphi method, where a panel of experts are specifically recruited to reach a consensus. This research aimed to use a consensus process to develop a framework and definition for dietetic research, and to define dietetic research priorities for Australia for the period 2020 to 2030.

## 2 | METHODS

The multi-round Delphi process was selected to enable dietitians with demonstrated research expertise to contribute to the development of national priorities. The Delphi method is a multi-round approach, with each round building on the results from the previous round, in order to ultimately reach consensus opinion.<sup>19</sup> Several rounds of questionnaires are distributed to the expert group, with anonymous responses aggregated and shared after each round.<sup>19</sup> Ethical approval was obtained from Monash University HREC, Project ID 14376.

Dietitians who were considered to be leaders in research and/or in the profession were invited directly. Inclusion criteria were: Fellows of Dietitians Association of Australia (FDAA); Associate Professors and Professors from accredited dietetic programs in Australia; National Health and Medical Research Council (NHMRC), Australian Research Council and Heart Foundation fellowship recipients (including recipients of NHMRC Translating Research into Practice and Early Career Fellowships during the period 2014-2018) and senior dietetic researchers at the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Advanced Accredited Practising Dietitians (AdvAPDs) were invited through distribution of an invitation from the Dietitians Australia National Office. Participants were invited only once in the case of fulfilling more than one of the eligibility criteria. The authors of this paper did not participate in the Delphi process.

Round 1 was open in June-July 2019, Round 2 in November 2019 - January 2020 and Round 3 in February 2020. Participants who completed the previous round were again invited to take part in successive rounds. Participants were invited by email with one reminder email sent each round. The questionnaire asked participants to comment on the proposed research framework and definition of dietetic research. They were then asked to rate a set of priorities listed under seven themes.

The proposed research framework emerged after analysis of open text comments obtained in Round 1. The "Blue Highways" model from the US National Institute of Health<sup>12</sup> was adapted for comment in Round 2 as it aligned with the open text comments. Adaptations were made to the model to expand the scope of practice beyond the clinical and translational setting.

In the absence of a pre-existing definition for dietetic research, the definition distributed to participants in Round 1 was developed by the research team from existing research definitions. This was revised for Round 2 based on extensive feedback from Round 1 respondents, and was further refined using the research definition



used by the Australian Research Council<sup>13</sup> and tested in Round 2, when agreement was reached.

The time period for the research priorities was defined from the outset by the research team as 2020-2030. As a starting point, research priorities considered in Round 1 were developed by the research team based on the established United States<sup>5</sup> and United Kingdom<sup>6</sup> dietetic leadership documents. Initially seven themes with associated research priority statements were extracted from these documents by the research team to form a framework for the first round. The themes were *Healthy ageing, Vulnerable populations, "Food systems and health/nutrition promotion," Personalised nutrition, Digital technology and evidence based practice, Achieving balance between prevention and treatment approaches* and *Nutrition communications*. Research priorities were also extracted from the United States<sup>5</sup> and United Kingdom<sup>6</sup> for inclusion within each theme in Round 1. Each research priority was rated by participants using a 7 point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Acceptance of priorities was agreed by the research team *a priori* where  $\geq 70\%$  of participants rated a priority statement highly (either 6 or 7). Where this occurred in Rounds 1 and 2, these items were accepted as Agreed Priorities. At the completion of Round 2, all priorities that did not achieve  $\geq 70\%$  support by participants were removed.

Open text comments from participants regarding potential additional themes and research priorities were sought in Round 1. These underwent synthesis by the research team to reduce duplication and were added into Round 2. New potential priority areas were also added into Round 2 in order to align with the publication of the Australian National Academy of Science Decadal Plan for the Science of Nutrition.<sup>2</sup> Further refinement and synthesis of research priorities occurred prior to Round 3 to reduce repetition through clustering of similar statements. Open text comments were not sought in Rounds 2 or 3.

Round 3 was a ranking round, with participants asked to rank the order of agreed priorities within themes. At the close of Round 3, scores within each theme were summed, and the order of priorities was determined as those with a cumulative total from lowest to highest.

### 3 | RESULTS

Eighty-four participants (11 males, 73 females) were invited to participate in Round 1. Participants invited directly were: 14 FDAA, 14 national Fellowship recipients, 31 senior academics (Associate Professor or

Professor level) and 25 AdvAPDs who responded to the invitation to all AdvAPDs. Based on response, 50 participants (7 males, 43 females) were then invited in Round 2, and likewise 38 participants in Round 3. Final data were contributed by 35 participants (4 males, 31 females) in Round 3 (Figure 1). The sample included dietitians from across all scopes of practice covering hospital, industry and academic settings. Participants contributed from most Australian states, although the majority were based on the east coast of mainland Australia. The questionnaires from each round are included in Supplementary files 1-3.

The Dietetic Research Framework developed through this Delphi study is shown in Figure 2. The framework illustrates that dietitians practise across many settings, whilst recognising the role that dietitians play in leading or contributing to inter-professional research. This framework received high levels of agreement of ranking 6 (n = 14, 36.8%) or 7 (n = 17, 44.7%) by participants in Round 2.

The definition proposed for dietetic research in Round 1 of the Delphi survey (Figure 2) received a high level of support. The median value for the level of agreement with the Round 1 definition was 6 (Strongly agree score of 7: n = 4; score 6: n = 21; score 5: n = 14; scores 1-4: n = 9). Feedback indicated the definition needed to be extended to consider discovery research, including human clinical research (n = 12 comments), and be more inclusive across a range of settings (n = 6 comments). Other recommendations from experts (n = 3 comments) were to acknowledge the inter-professional nature of research, where research is "done on, by or with dietitians."

Nine priority statements received  $\geq 70\%$  support in Round 1. A further 13 priorities received  $\geq 70\%$  support in Round 2. These 22 priorities were further synthesised

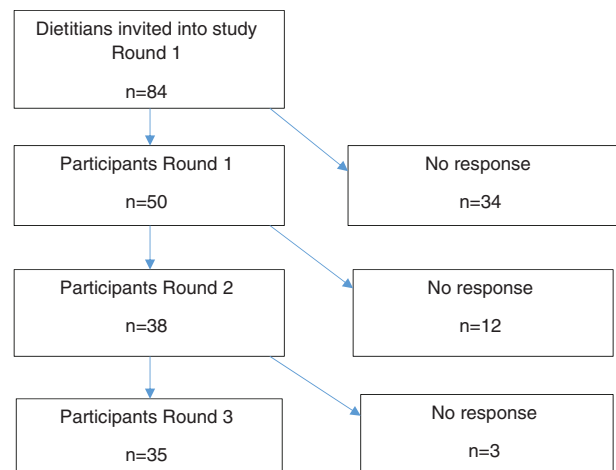
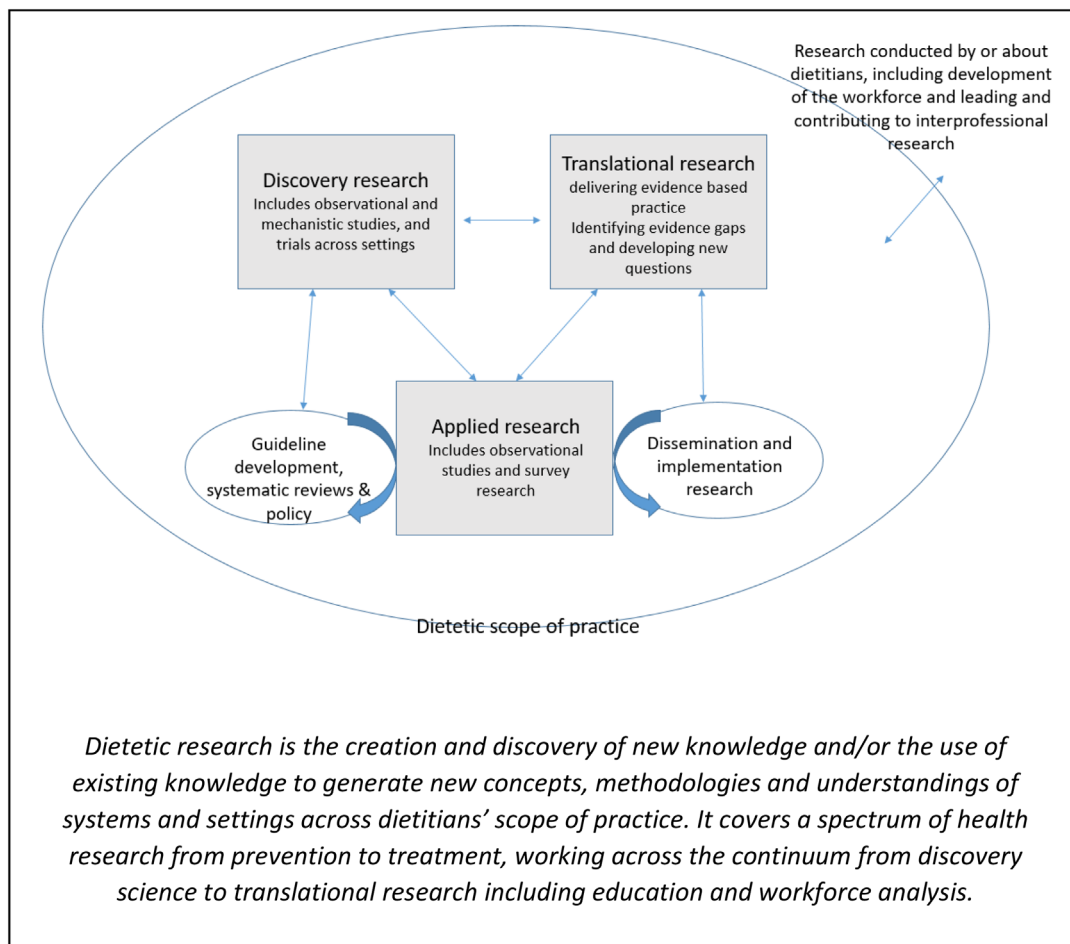


FIGURE 1 Participant flow through the Delphi process



**FIGURE 2** Dietetic research framework and definition

into 15 priorities for the ranking process undertaken in Round 3. The dietetic research priorities by themes for Australia for the period 2020-2030 are shown in Figure 3. Priorities within two of the initial themes did not receive adequate support from the Delphi scores. These were *Personalised medicine* and *Nutrition communications*. The *Personalised medicine* theme included priorities for research at an individual and health system level (eg, application of nutrigenomics and targeting the health care system based on the genetic predisposition for diet/disease prevention model). The theme *Nutrition communications* listed some broad priorities including capacity building of the nutrition workforce and development and evaluation of strategies to enhance nutrition literacy. Scores for these stated priorities did not reach the cut off points for inclusion.

#### 4 | DISCUSSION

Through this Delphi process, Australian dietitians with demonstrated research expertise contributed and

confirmed a definition and framework for dietetic research, and identified the 15 top research priorities for dietitians in Australia across the period 2020 to 2030.

Some notable omissions emerged amongst the preferred research priorities. The absence of priority statements relating to the theme of *Personalised medicine* appears at odds with the Decadal Plan for the Science of Nutrition<sup>2</sup> where one pillar is nominated for "Precision and Personalised Nutrition." This may indicate a lack of Delphi participants with experience of working in that area, and/or suggest this is an area of emerging research practice, which may attain greater prominence in the coming years.<sup>20</sup> Certainly there appears to be a strong emphasis in areas relating to population health, health promotion/disease prevention and policy development which may reflect existing strengths in epidemiology and program evaluation. The other omitted priority, *Nutrition communications*, could be considered across several of the included research priorities, for example the use of telehealth dietetic models.<sup>21</sup>

<p><b>Theme:</b> <i>Healthy ageing</i></p> <ol style="list-style-type: none"> <li>1. Research on the cost effectiveness of evidence-based nutrition care in the prevention, treatment, and management of malnutrition and chronic disease in older populations</li> <li>2. Research that develops and evaluates nutrition related strategies that support healthy ageing and longevity</li> <li>3. Research in nutrition and specialties of older adults to support optimal health and improve health outcomes for a diverse aging population</li> </ol> <p><b>Theme:</b> <i>Vulnerable populations</i></p> <ol style="list-style-type: none"> <li>1. Research into interventions and processes that address the nutrition and health inequalities of Indigenous populations</li> <li>2. Research into interventions and processes that address the nutrition and health inequalities of people with mental health issues, people with disabilities, and people who are homeless</li> <li>3. Research into interventions and processes that address the nutrition and health inequalities of maternal and child food and nutrition issues including the first 1000 days of life</li> </ol> <p><b>Theme:</b> <i>Food systems and health/nutrition promotion</i></p> <ol style="list-style-type: none"> <li>1. Research on the effects of food choice and dietary patterns on health, well-being, planetary health and sustainability</li> <li>2. Research that addresses the development, implementation and evaluation of a National Nutrition Policy</li> <li>3. Implementation and evaluation research on initiatives that lead to more sustainable food systems</li> <li>4. Research on frameworks for the food system that support equitable access to healthy foods and effective population nutrition interventions</li> <li>5. Research on the relationship between the food and nutrient intake and health status of Australians, to inform development of dietary interventions and health promotions strategies/policies</li> </ol> <p><b>Theme:</b> <i>Informatics and evidence based practice</i></p> <ol style="list-style-type: none"> <li>1. Research that examines the use of tele-dietetics models and nutrition apps and their effect on clinical outcomes</li> </ol> <p><b>Theme:</b> <i>Achieving a balance between prevention and treatment approaches</i></p> <ol style="list-style-type: none"> <li>1. Translational research on the effectiveness of nutrition-related approaches to prevention of disease and ill health that leads to policy formulation and implementation</li> <li>2. Research into the effectiveness of preventive aspects of health care</li> <li>3. Research on lifestyle risk-factor modification and weight management as essential components of health promotion and disease prevention programs</li> </ol>
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**FIGURE 3** A thematic understanding of Australian Dietetic Research Priorities for the period 2020-2030

Despite original reference to overseas documents, there was both similarities and differences in priorities that emerged in this Delphi study. In the case of the visioning statement from the Academy of Nutrition & Dietetics,<sup>5</sup> similarities include “food as medicine in the continuum of health,” “the impacts of an ageing population” and the priority for “population health/health promotion.” Notable differences were the omission of those

ranked in the bottom tier of the US visioning statement, namely “tailored health care to fit genetic profiles,” “the use of simulation as an instructional method” and “the development of collaborative ready health professionals.” Again, this may reflect differences in choice of words, and could be considered in the broader light of statements that emerged from the current study. Direct comparisons with the UK Future Dietitian 2025 vision

statement were more challenging as this document aimed to inform a workforce strategy for dietetics in the United Kingdom.<sup>6</sup>

There are several limitations to this study. First, while the contribution from participants who were FDAA, AdvAPDs, senior academics and recipients of national fellowships represented a broad range of settings, including dietitians practising in health care, industry and academic settings, there was a predominance of dietitians employed in academia. Although they likely comprise the largest group of research active dietitians, the priorities may reflect individuals' current research interests. Second, a larger response rate may have allowed greater confidence in the interpretation of findings. A further limitation is the predetermined content of the survey. Rather than an open set of questions, key professional documents from the United Kingdom and the United States formed a basis for Round 1. Although the Delphi process allowed for open ended comments, and there were multiple rounds, the closed system of scoring for statements still delimits responses and may not capture the full extent of opinions relating to research priorities. Further research that examines the outputs (publications, doctoral theses, successful competitive grants) and impacts (policy uptake, new products and services) of dietitian-led research would provide a useful comparative source of information to cross reference with these results. This would also align dietetic research with mainstream research infrastructure and funding bodies (eg, National Health and Medical Research Council, Australian Research Council) which sustains and recognises research expertise.

Strengths of this study are that it attempted to engage members across the dietetic profession regardless of their membership status of Dietitians Australia and included contemporary researchers, early career researchers with nationally competitive fellowships and emerging leaders in research. There was less engagement than anticipated from AdvAPDs, possibly attributed to the competencies for AdvAPDs that relate to practice based skills/roles rather than research expertise *per se*.

This process has highlighted the broad range of research that dietitians are involved in and the extensive range of settings and systems to which dietitians are contributing. There is no doubt that there is a need for leaders who have the capability to both drive and perform research with in multi-disciplinary teams,<sup>22</sup> and supporting research leaders will be crucial if dietetics is going to expand its influence in the next decade. We anticipate that the findings from this Delphi process will contribute to a research strategy that focuses future dietetic research efforts, including the development of professional position papers as well as informing research

competencies for dietetic education. It also indicates which of the Decadal Plan goals that dietitians may be most likely to contribute to in the short term. This, in turn, will help to maximise research investment into the future in dietetic research.

It is important to note that this is an initial consensus process and should be re-visited periodically and, as such, can be viewed as a contemporary way in which dietitians can have greater influence into the Australian research agenda. Importantly, it can help to ensure that research investment, including research capacity building and leadership, remains focused across a period in which research investment may be limited.

### CONFLICT OF INTEREST

Authors have no conflicts of interest to declare.

### AUTHOR CONTRIBUTION

All authors conceived this research, contributed to interpretation of results, manuscript development and review and approved the manuscript for submission. JP facilitated all stages of data collection.

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### SUPPORTING INFORMATION


Additional supporting information may be found online in the Supporting Information section at the end of this article.

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## ORIGINAL RESEARCH

## Nutrition risk and mortality in older oncology patients: An exploratory study

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**Abstract**

**Aim:** The primary aim of this analysis was to identify if two standard measures incorporated into the comprehensive geriatric assessment; specifically, malnutrition risk and body mass index (BMI), could predict 12-month mortality in older patients with solid tumours. The secondary aim was to evaluate if malnutrition risk and BMI were associated with chemotherapy outcomes (discontinuation/modification of treatment) in older patients with solid tumours.

**Methods:** Older patients (aged  $\geq 70$  years) with solid cancers were recruited from the outpatient oncology clinic of a tertiary hospital in Brisbane, Australia. Participants' nutritional parameters, BMI, and malnutrition risk (determined using the Malnutrition Screening Tool (MST)) were recorded at baseline. Mortality data and chemotherapy outcomes were recorded for 12 months.

**Results:** Seventy-four participants (67% males, median age 77 ( $\pm 4.4$ ) years) were recruited. Nearly half the cohort was at-risk of malnutrition at baseline ( $n = 39$ , 46%). Chemotherapy was prescribed to 39% ( $n = 29$ ) of the cohort. For patients receiving chemotherapy neither being underweight nor having a low or medium risk of malnutrition was associated with adverse chemotherapy outcomes or 12-month mortality. At a bivariate level, malnutrition risk was significantly associated with 12-month mortality in patients who did not receive chemotherapy ( $P = 0.018$ ), but not BMI.

**Conclusions:** This analysis indicates that malnutrition risk was a potential indicator of 12-month mortality in cases where chemotherapy was considered unfeasible. However, this was not an independent risk factor. Further investigation using a larger sample is required to determine the association between malnutrition risk, quality of life and mortality in patients who are not considered to be fit for chemotherapy.

**Key words:** aged, body mass index, chemotherapy, geriatric assessment, malnutrition, neoplasms.

**Introduction**

In developed countries people are living longer than in previous generations.<sup>1</sup> It is projected that by 2030 the number of people over the age of 60 years will grow by 56%, more than double than in 2015.<sup>1</sup> This growth will be even greater for persons aged over 80 years, which is projected to triple by 2050.<sup>1</sup> It is predicted that an ageing population will

likely result in a higher cancer incidence as cancer is generally a disease of older age.<sup>2</sup> For example, in Australia cancer incidence is expected to rise to 40% by 2020, primarily due to the ageing population.<sup>3</sup>

Many older patients diagnosed with cancer are eligible for chemotherapy, either with palliative or curative intent.<sup>4</sup> However, chemotherapy decision-making is difficult in this context, given that evidence-based decisions regarding treatment are usually based on studies conducted in younger cohorts.<sup>5</sup> The prevailing perception is that older adults are vulnerable to the detrimental physiological changes often associated with ageing, which can be exacerbated by exposure to chemotherapy.<sup>6</sup> For example, some (but not all) older adults can have diminished organ function,<sup>7</sup> an increased risk of comorbidities<sup>7</sup> and a higher risk of malnutrition,<sup>8</sup> all of which make treatment decision-making complex. These factors negatively affect cancer outcomes and treatment tolerance if they are not adequately supported during therapy.<sup>6–8</sup>

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Due to the complexity entailed in chemotherapy decision-making in this cohort, the International Society of Geriatric Oncology (SIOG) recommends a screen and/or a comprehensive geriatric assessment (CGA) for older cancer patients.<sup>9</sup> CGA is a holistic assessment of all the domains of health that are known to affect the outcomes of the disease and its treatments. As nutritional status is critical to patient outcomes, CGA usually includes either a screen of malnutrition risk and/or a full assessment of nutritional status to inform treatment decision-making.<sup>9</sup>

Malnutrition is common in older adults with cancer.<sup>10,11</sup> Extensive literature indicates that malnutrition in older adults with cancer is an independent risk factor for poorer health outcomes, such as decreased survival rates, increased risk of treatment-induced toxicities and reduced quality of life.<sup>8,10,12</sup> Although several studies have focussed on identifying the prognostic association of malnutrition assessment methods with survival<sup>13–15</sup> and chemotherapy toxicity<sup>4,16</sup> in older adults with cancer, it is not known if malnutrition risk screening can predict cancer outcomes. Therefore, the primary aim of this analysis was to investigate if two baseline nutritional parameters, namely malnutrition risk (as assessed by the Malnutrition Screening Tool (MST))<sup>17</sup> and body mass index (BMI), could predict 12-month mortality in older patients with solid tumours. The secondary aim of the analysis was to evaluate if malnutrition risk and BMI are associated with alterations to treatment in older patients with cancer undergoing chemotherapy for solid tumours.

## Methods

This was a single-centre prospective exploratory study conducted in the outpatient oncology clinic at a tertiary hospital in Brisbane, Australia. Ethical approval was obtained from the Human Research Ethics Committee (HREC)—Metro South Health Service District (HREC/09/QPAH/269) prior to undertaking the study, and approval from the relevant statutory authority to obtain death registry data (where this was not recorded in the medical record).

Inclusion criteria comprised patients aged 70 years and over, diagnosed with a primary or a recurrence of solid tumours at any stage, referred for potential chemotherapy, and able to understand conversational English. Oral chemotherapy and patients undergoing combined immunotherapy were also included. Patients with blood cancers, those who were unable to give consent as deemed by their oncologists were excluded from this exploratory study. Recruitment occurred in two steps. First, potential participants were identified by the hospital's geriatric oncology clinical nurse consultant, who then also assessed them for suitability to participate in the study and obtained informed consent. All participants then underwent screening and/or CGA between April 2014 and February 2015, prior to the oncologist's decision as to whether treatment was (or was not) indicated.

The purpose of screening within the CGA process is to flag the potential vulnerability of the cancer patient, and to

determine whether a full CGA is needed. The instruments used to screen and comprehensively assess patients in the study facility, and the rationale for the choice of these instruments, have been published previously.<sup>18</sup> In brief, the screening tools used include the Vulnerable Elders Survey-13 (an indicator of potential vulnerability), a scale indicating patients' perceptions of their quality of life, and the MST. Height and weight to determine BMI were also collected from the medical record at baseline, as part of the Participant Record Form. These procedures were conducted by one nurse before the decision was made about chemotherapy, and results were reported to treating oncologists.

The MST has a relative validity of 100% sensitivity and 92% specificity as a predictor of malnutrition risk in outpatients (over and under 65 years) receiving chemotherapy.<sup>19</sup> The MST contains two questions: recent unintentional weight loss and recent poor dietary intake.<sup>17</sup> Patients can receive a score between 0 and 5.<sup>17</sup> A score of 0 or 1 indicates no/low malnutrition risk; scores of 2 or 3 indicate a medium risk, while a score 4 or 5 denotes a high risk of malnutrition.<sup>17</sup> Across Queensland Health, there has been a consolidated effort to utilise dietetic resources carefully. Consequently, for patients who received an MST score of 2 or 3 are provided with written information on nutrition support strategies. Participants with an MST score  $\geq 4$  are referred to a dietitian for comprehensive nutritional assessment. Therefore, in the present study, participants with MST score  $\geq 4$  were referred to a dietitian.

BMI was evaluated by dividing weight (in kg) by height (in m<sup>2</sup>). Recommended geriatric ranges for BMI were used to categorise patients into three groups, as follows: underweight (<22 kg/m<sup>2</sup>), normal weight (22–27 kg/m<sup>2</sup>) and overweight (>27 kg/m<sup>2</sup>).<sup>20</sup> If oedema was present, this was identified by either assessing pitting or non-pitting oedema.

For this study, where participants received chemotherapy after baseline assessment, alterations to chemotherapy were defined as: discontinuation of planned chemotherapy drug/s, and/or reduction in dose by >15% and/or treatment cessation after Cycle 2. Data regarding alterations to chemotherapy and mortality were collected from medical databases and chart audits for 12 months following the CGA assessment.

Data were analysed using IBM SPSS Statistics for Windows Version 22.0, 2013 (IBM Corp., Armonk, NY) In univariate descriptive analyses, frequencies and proportions describe all categorical variables. The mean (SD) or the median (interquartile range, IQR) (depending on distribution of data) represents numerical variables. Chi-square tests determined the association between categorical independent variables (BMI and MST) and dependent variables (alterations to chemotherapy after Cycle 2 and incidence of mortality at 12 months).

Statistical significance was evaluated with chi-square tests of independence. Fisher's exact test determined the significance between two binary categorical variables, and the likelihood ratio test with their corresponding degrees of freedom was used between two nominal variables due to the small sample sizes in both chemotherapy and non-

chemotherapy patient groups. Statistical significance was indicated at the *P*-value of <0.05. The exact *P*-value was used for nominal categorical variables which did not meet the assumptions of the Pearson chi-square test of independence. The present study complies with the STROBE (Strengthening the Reporting of Observational studies in Epidemiology) guidelines.

## Results

A total of 75 participants with solid tumours were recruited. One non-chemotherapy patient was excluded due to incomplete CGA assessment, resulting in 74 participants included in the data analysis. The median age of the cohort was 77 years (IQR = 7) with most participants being males (67%) (Table 1). The most common cancer types were generic cancers (*n* = 33, 45%), followed by colorectal (*n* = 21, 28%) and lung (*n* = 9, 12%). Generic cancers included upper gastrointestinal tumours, hepatobiliary, urology, bone and soft tissue, skull base tumours and other less frequently encountered tumours. One in three participants (*n* = 29, 39%) underwent chemotherapy after baseline assessment. The demographic characteristics of participants who underwent chemotherapy were not

significantly different to those who did not receive chemotherapy (Table 1).

Overall, 12% of the participants (*n* = 9) were underweight at baseline as per BMI (Table 1). One participant's BMI could not be determined due to the presence of oedema. Over half of the cohort (*n* = 39, 52%) were found to be at-risk of malnutrition as per MST (Table 1).

Twelve-month mortality was observed in 5 (17%) of the 29 patients who received chemotherapy (Table 1). Two of these participants were at-risk of malnutrition (Table 2). Significant association was not identified between 12-month mortality and patients at or not at-risk of malnutrition (*P* = 1.0) (Table 2) in patients who had received chemotherapy. Similarly, there was no association between BMI and 12-month mortality in the chemotherapy patient group (*P* = 0.52) (Table 2).

Chemotherapy ranged from 2 to 12 cycles within 12 months. Nineteen (65%) participants had alterations to treatment. Of these patients, nine (31%) had been assessed at-risk of malnutrition according to the MST. However, only one of the nine patients at-risk of malnutrition was found to be underweight as per BMI assessment (Table 3). The most common reasons for alterations to chemotherapy included poor tolerance (*n* = 10, 34%) and disease

**Table 1** Participant characteristics

CGA assessment variables	Complete cohort (N = 74)	Chemotherapy patients (n = 29)	Non-chemotherapy patients (n = 45)	P-value
Gender				
Male	n = 50 (67%)	n = 21 (72%)	n = 29 (64%)	0.475
Female	n = 24 (33%)	n = 8 (28%)	n = 16 (36%)	
Age (years)				
Median (min and max)	77 (70–87)	75 (70–87)	77 (70–87)	0.215
Mean (SD)	77 (±4.4)	76 (±4.0)	77 (±4.7)	
Body mass index				
Underweight (<22 kg/m <sup>2</sup> )	n = 9 (12%)	n = 2 (7%)	n = 7 (16%)	0.105
Normal weight (22–27 kg/m <sup>2</sup> )	n = 32 (43%)	n = 17 (59%)	n = 15 (33%)	
Overweight (>27 kg/m <sup>2</sup> )	n = 32 (43%)	n = 10 (34%)	n = 22 (49%)	
Unable to determine (oedema)	n = 1 (2%)	n = 0 (0%)	n = 1 (2%)	
Malnutrition risk score				
No or low risk (0–1)	n = 35 (47%)	n = 16 (55%)	n = 19 (42%)	0.145
Medium risk (2–3)	n = 34 (46%)	n = 13 (45%)	n = 21 (47%)	
High risk (4–5)	n = 5 (7%)	n = 0 (0%)	n = 5 (11%)	
Deceased one 1 year from CGA assessment				
No	n = 52 (70%)	n = 24 (83%)	n = 28 (62%)	0.059
Yes	n = 22 (30%)	n = 5 (17%)	n = 17 (38%)	
Type of cancer				
Generic <sup>(a)</sup>	n = 33 (45%)	n = 17 (59%)	n = 16 (36%)	
Colorectal	n = 21 (28%)	n = 6 (21%)	n = 15 (33%)	
Lung	n = 9 (12%)	n = 3 (10%)	n = 6 (13%)	
Melanoma	n = 4 (5%)	n = 1 (3%)	n = 3 (7%)	
Breast	n = 7 (10%)	n = 2 (7%)	n = 5 (11%)	

<sup>(a)</sup> Generic cancers include upper gastrointestinal tumours, hepatobiliary, urology, bone and soft tissue, skull base tumours and other less frequently encountered cancers.

CCI, Charlson comorbidity index; CES-D, the centre for epidemiologic studies depression scale; CGA, comprehensive geriatric assessment; MBI, modified Barthel index; MOSS, medical outcome social support survey; n, sample size within each group; N, total sample size; SMMSE, the standard mini-mental examination; TUG, the timed 'up and go' test. *P*-value was significant at a level of <0.05.

progression (n = 3, 10%). Neither nutritional parameter demonstrated a significant association with alterations to chemotherapy (MST:  $P = 1.0$ ; BMI:  $P = 0.72$ ) (Table 3).

A significant association was observed between malnutrition risk and 12-month mortality ( $P = 0.018$ ; Table 2) in patients who did not receive chemotherapy. Of those patients who died within 12 months, 15 (33%) were at medium or high risk of malnutrition (Table 2). Of the non-chemotherapy patients, 16% were underweight, 33% were within the normal weight and 49% were overweight. BMI was not significantly associated with mortality within 12 months ( $P = 0.58$ ) in this group (Table 2).

One-third of the non-chemotherapy cohort died within 12 months of CGA assessment (Table 1). Although not statistically significant, greater 12-month mortality was observed in participants not undergoing chemotherapy (38%, n = 17/45) versus those undergoing chemotherapy (17%, n = 5/29) ( $P = 0.059$ ) (Table 1). The percentage of deaths within 1 year did not differ by BMI category for the entire cohort ( $P = 0.61$ ) (Table 2). Medium risk of malnutrition was significantly associated with mortality in all 74 patients ( $P = 0.011$ ) (Table 2).

## Discussion

The aim of this analysis was to identify if malnutrition risk and BMI prior to assessment for chemotherapy were associated with 12-month mortality in a sample of older adults with solid tumours. We also aimed to evaluate if the nutritional parameters of BMI and nutritional risk collected during baseline screening were associated with chemotherapy outcomes and 12-month mortality in older cancer patients referred for potential chemotherapy. Although no association was observed between malnutrition risk and 12-month mortality in chemotherapy patients, this association was significant for patients who did not receive chemotherapy. Nevertheless, due to the small sample size, statistical

**Table 3** Associations between nutrition parameters and alterations to chemotherapy

Nutritional parameters	Chemotherapy patient group (N = 29)		P-value
	No. of patients (%), n (%)	Alterations to chemotherapy, n (%)	
BMI			
Underweight	2 (7%)	1 (3%)	0.72
Normal weight	17 (59%)	10 (34%)	
Overweight	10 (34%)	8 (28%)	
MST			
No or low risk	16 (55%)	10 (34%)	1.0
Medium risk	13 (45%)	9 (31%)	
High risk	0 (0%)	0 (0%)	

BMI, body mass index with geriatric ranges; MST, malnutrition screening tool; n, sample size within each group; N, total sample size.

P-value was significant at a level of  $<0.05$ .

analysis could not be adjusted for confounding variables, therefore, further research is needed to investigate if malnutrition risk is an independent risk factor for mortality in this population group.

BMI was not significantly associated with 12-month mortality in the cohort, regardless of chemotherapy status. This highlights the limitation of BMI alone as an indicator of malnutrition risk, as it can often underdiagnose malnutrition risk in those patients who fall within the healthy or overweight ranges, but who have experienced significant weight loss.<sup>21</sup> Both malignant tumours and chemotherapy can cause a loss in appetite, problems in swallowing and inadequate nutrient intake, which can lead to further detrimental weight loss and alterations in body composition.<sup>22</sup> The latest endorsed recommendation from the European Society for Clinical Nutrition and Metabolism has

**Table 2** Association between nutritional parameters and 12-month mortality

Nutritional parameters	Entire cohort <sup>(a)</sup> (N = 74)			Non-chemotherapy patient group <sup>(a)</sup> (n = 45)			Chemotherapy patient group (n = 29)		
	No. of patients n (%)	12-Month mortality n (%)	P-value	No. of patients n (%)	12-Month mortality n (%)	P-value	No. of patients (%)	12-Month mortality n (%)	P-value
BMI									
Underweight	9 (12%)	4 (5%)	0.61	7 (16%)	4 (9%)	0.58	2 (7%)	0 (0%)	0.52
Normal weight	32 (44%)	9 (12%)		15 (34%)	5 (11%)		17 (59%)	4 (14%)	
Overweight	32 (44%)	9 (12%)		22 (50%)	8 (18%)		10 (34%)	1 (3%)	
MST									
No or low risk	35 (47%)	6 (8%)	<b>0.011</b>	19 (42%)	3 (7%)	<b>0.018</b>	16 (55%)	3 (10%)	1.0
Medium risk	34 (46%)	12 (16%)		21 (47%)	10 (22%)		13 (45%)	2 (7%)	
High risk	5 (7%)	4 (4%)		5 (11%)	4 (9%)		0 (0%)	0 (0%)	

<sup>(a)</sup> One patient's BMI could not be determined due to oedema.

BMI, body mass index with geriatric ranges; CGA, comprehensive geriatric assessment; MST, malnutrition screening tool; n, sample size within each group; N, total sample size.

P-value was significant at a level of  $<0.05$ .

recommended new BMI ranges to help clinicians diagnose severity of malnutrition; in older adults the recommendations are: moderate malnutrition if BMI is <22 for patients aged 70 years, and severe malnutrition if BMI is <20 for patients aged ≥70 years (when used in conjunction with other parameters: percent weight loss and muscle wastage).<sup>23</sup>

In those patients who received chemotherapy, no significant associations were found between nutritional parameters and alterations to chemotherapy. However, this analysis provides preliminary evidence that older patients with cancer who do not undergo chemotherapy require vigilant monitoring of their nutritional status to improve their outcome. The positive association between malnutrition risk and mortality in this group coincides with oncologists' clinical judgements, who in not prescribing chemotherapy indicated that potentially vulnerable patients might not be able to tolerate treatment or could die sooner. Supportive care should not be ruled out even when active treatment is not viable, however, and larger studies could help to determine if the MST is a reliable tool to rapidly identify patients' need for nutritional and other support when they are not suitable for chemotherapy.

Depending on cancer type and stage, as many as >80% of patients with cancer can experience weight loss.<sup>24,25</sup> Both pre-treatment weight loss and anorexia (loss of appetite resulting in inadequate nutritional intake to meet protein and energy needs) are known to affect treatment tolerance, quality of life and survival in adult patients with cancer irrespective of weight range.<sup>14,26</sup> While the number of studies investigating the consequences of weight loss and health outcomes in older patients with cancer is limited, Fiorelli *et al.* indicated that weight loss of >5% prior to lung cancer resection was an independent risk factor for 1-year mortality in older patients.<sup>27</sup>

It is important to consider that weight loss in older adults with cancer can be a symptom of various syndromes.<sup>28</sup> Weight loss in cancer patients can be a consequence of deprived oral intake alone or in combination with tumour-related metabolic alterations, such as increased resting metabolic rate, insulin resistance, lipolysis and protein catabolism; as seen in cancer cachexia.<sup>29</sup> Cachexia, a cancer-associated metabolic syndrome, is characterised by severe weight loss as a consequence of muscle wastage with or without loss of fat mass, anorexia, early satiety, fatigue, and systemic inflammation, all of which lead to disease-associated malnutrition in the patient.<sup>28</sup> It is estimated that approximately 80% of cancer patients experience cachexia.<sup>30</sup> Refractory cachexia is often identified at the late stages when the patient has sustained severe weight loss and muscle tissue wastage, which, at this point is rarely amenable to nutritional support.<sup>31</sup>

Cachexia, as measured by skeletal muscle mass depletion in patients with cancer, is correlated with decreased overall survival.<sup>32,33</sup> Shifts in muscle mass can affect the volume available for the distribution of drugs,<sup>34</sup> which has been shown to be predictive of chemotherapy toxicity.<sup>35</sup> Hence the problems linked to malnutrition are

often a result of depletion in muscle tissue rather than fat mass.<sup>36</sup>

Even though malnutrition is observed in approximately 40–80% of patients with cancer,<sup>37</sup> malnutrition is often underdiagnosed in older adults with cancer.<sup>11</sup> Malnutrition at baseline is associated in some studies with adverse health outcomes in both older and younger cancer patients, including higher risk of mortality during (or soon after) chemotherapy,<sup>13,15,16</sup> increased risk of non-haematological toxicities from chemotherapy,<sup>4</sup> and less likelihood of completing chemotherapy.<sup>16,38</sup>

The development of weight loss and malnutrition can be multifactorial in older patients with cancer; hence risk assessment should not be confined to baseline. Routine nutritional screening is probably essential throughout the process of cancer care, which would enable early identification of problems before severe changes of body composition occur. Following screening, prompt referral to a dietitian for comprehensive nutritional assessment is likely to result in nutrition intervention strategies that are tailored to the individual and the aetiology of their malnutrition.<sup>30</sup> Nutrition support in patients with cancer has been associated with improved nutritional status, preservation of muscle mass, improved self-reported quality of life, and enhanced treatment outcomes.<sup>36,39</sup> The relationship between components of the CGA and mortality have been well-established in the literature.<sup>38,40</sup> Completion of the CGA and comprehensive nutritional assessments require skilled staff who have been trained specifically. Additionally, these are both time-consuming processes. The methods used in our exploratory study demonstrate that oncologists could use the MST, which is quick, non-invasive, and cost-effective to determine malnutrition risk and potentially (with further research, which allow for multivariate analysis) help oncologist predict outcomes in older patients using a simple process without the reliance on specifically trained staff.

Future research including a larger sample size is required to demonstrate the independent association between malnutrition risk, weight loss and outcomes in older oncology patients receiving active treatment. Weight loss will provide further insight into the effect of alteration in body composition in older cancer patients.

Finally, the development of malnutrition in older oncology patients is multifaceted, and its early manifestations, such as weight loss and decreased appetite, can have profound effects on cancer outcomes with or without chemotherapy.<sup>14,40,41</sup> Consequently, performing routine malnutrition screening in all patients, even when they are not suitable for chemotherapy is recommended to identify patients who could benefit from dietetic interventions to help enhance their cancer-related outcomes.<sup>40</sup>

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## Conflict of interest

The authors have no conflicts of interest to declare.

## Authorship

This project was conceptualised by ALM and RB. Data were collected by RB, KG and LB. LB and EA analysed the data, interpreted and compiled the results and discussion. LB authored the first draft of the manuscript. All authors reviewed the final draft and are in agreement with the manuscript. All authors declare that the content has not been published elsewhere.

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**LETTER TO THE EDITOR**

# Appointment of the first dietitians in Australia: The 90th anniversary

To the Editor:

In this celebration, we reflect on the significant contribution of the first dietitians in Australia. Their committed pioneering work established the tenets for the current knowledge, skills and activities, which we now continue to apply for the common good. They laid the foundations of our best practice methods.

Around the world, the new profession was shaped by the health and food issues of World War I, significant discoveries in the food and nutrition sciences and increased awareness of the importance of food and nutrition in public health and medical care. Increasing international connections were facilitating the distribution of knowledge, strategies and skills in many areas of health, wellbeing and the environment. Table 1 outlines how Australia was in the forefront of the emergence and establishment of the dietetic profession in developed countries.

Doctor MacEachern (American College of Surgeons) visited Australia in 1924 and 1925 and was widely quoted.<sup>1</sup> His invited report to the Victorian Government included "...that as far as possible qualified dietitians be placed in each of the metropolitan public hospitals; and ... that provision be made in Melbourne for specialised training of hospital dietitians..."<sup>2</sup>

The boards of several hospitals responded and sent home economists and trained nurses overseas to be trained in Canada, United States and the United Kingdom. Sister Nesta Miller (Royal Melbourne Hospital) was the first dietitian to return in June 1929,<sup>3</sup> where she set up the diet kitchen to open in November 1929.<sup>4,5</sup> She was succeeded by Sister Clare Lelean.<sup>6</sup> Two Sydney nurses, Sister Sally Ann Eisenberg<sup>7</sup> (Royal Alexandra Children's Hospital) and Eneid Davies<sup>8</sup> (St George Hospital) also completed dietetic training overseas and returned in 1936 and 1937, respectively.

The Charities Board of Victoria and the Hospitals Commission of New South Wales committed policy and financial support to two major metropolitan hospitals to employ their first dietitians (Alfred Hospital, Melbourne; Royal Prince Alfred Hospital, Sydney). The American Dietetic Association assisted in the employment of two experienced graduate dietitians (Mabel Flanley, Alfred Hospital, 1930; Edith Tilton, Royal Prince Alfred Hospital, 1936). Both Americans followed MacEachern's

recommendations. Within the first 18 months of their tenure, they had established models for the generalist training and development of the profession of dietetics which could be expanded as dietitian numbers increased.

By the end of the 1930s, the Australian trained dietitians held positions in administration, teaching and scientific research and were engaged in food service, clinical practice and public health nutrition. As educated generalists, their training provided them with a global network of advisors which was not limited by distance. The pioneering dietitians were lively voluntary advocates for food nutrition and health through the media and professional publications, contributing to public and community health activities and initiating research and development. They also acted as external consultants to other professions who sought their assistance (hospital architects, hospital administrators, medical officers and educators).

Australia had joined the League of Nations (1936) and the Federal Government had appointed the Australian National Advisory Committee in Nutrition (1936-1938), with its public health nutrition activities.<sup>9</sup> Joan Woodhill was the first graduate dietitian to train at the Royal Prince Alfred Hospital in Sydney (1936-1937) and became the Chief Dietitian there in 1938. In 1942 she was invited to join the National Advisory Committee in Nutrition,<sup>9</sup> representing the National Council of Women.

From the very beginning in Victoria, and also in Sydney, differing opinions were held about dietitian training by the pioneer Australian dietitians, and by government officers, tertiary teachers, academics, medical officers and trained nurses. A national approach to professionalisation was needed and the Australian Dietetic Council formed (1950).<sup>10</sup> A uniform standard of graduate training was achieved with the formation of the Australian Association of Dietitians in 1976.<sup>11</sup> The early work was complex and difficult and the dietitians met their need for professional organisation and continuing education by forming the Dietetic Associations of Victoria (1935) and NSW (1939). Key supporters were enlisted to achieve professional recognition in Victoria (1935) (Dietitians Registration Act, 1943),<sup>12</sup> and in New South Wales (Institute of Dietitians, 1943).<sup>13</sup>

**TABLE 1** Chronology for the early development of the dietetic profession in Australia

1914 to 1918	World War I
1918	American Dietetic Association
1929	First dietitian (Melbourne Hospital)
1930	First dietitian (Alfred Hospital, Melbourne) First training of dietitians in Victoria
1935	Dietetic Association of Victoria
1936	British Dietetic Association First dietitian (Royal Prince Alfred Hospital, Sydney) First training of dietitians in New South Wales
1939	World War II Dietetic Association of New South Wales
1943	New Zealand Dietetic Association Dietitians Registration Act of Victoria NSW Institute of Dietitian
1945	End of World War II
1950	Australian Dietetic Council


World War II (1939-1945) brought new imperatives for the evolution of the profession. Dietitians were well placed as highly educated commissioned officers to contribute to the war effort at home in food service administration and clinical practice, as scientists assisting governments (population health, nutrition science and health education, food control and rationing), in Australian Military Hospitals and in post-war reconstruction settings. The early dietitians understood that “Discovery, growth and evolution” had to be a fundamental tenet in the development of the unique profession of dietetics, and they set out with serious intent and good external support to achieve it. We recognise, honour and thank them for their earnest and creative endeavours and the heritage that they have afforded us.

### CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

### AUTHOR CONTRIBUTIONS

Both authors have contributed, written and reviewed the letter to the editor, and the content has not been published elsewhere.

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LETTER TO THE EDITOR

# An important legacy in public health nutrition: Ruth English AO PhD (1929-2015)

To the Editor:

Dr Ruth English AO (1929-2015) was a Public Health Nutritionist and Dietitian whose work on the development of public health nutrition (PHN) policies and strategies in Australia, Asia and Oceania was recognised internationally. She was first employed as a Nutritionist in the Commonwealth Department of Health (DoH) in 1957, and in 1979 appointed as Chief Nutritionist for Australia. It was a time when there was increasing knowledge of and political support for the importance of food and nutrition in population health.

During this period, English and her DoH colleagues (particularly Margaret Corden, Karen Cashel, Maureen Cornish, Nancy Hitchcock (née Kirk), Ian Lester, Janine Lewis and Nancy Palmer) were committed to public health and very productive. The Standing Nutrition Committee of the National Health and Medical Research Council (1974-1990)<sup>1</sup> consisted of eminent nutritionists and dietitians in Australia, and supported and contributed to the work of DoH.

Professor Colin Binns assisted by overseeing the development of the first Commonwealth Dietary Guidelines.<sup>2</sup> Professor Stewart Truswell led a major revision of the recommended nutrient intakes.<sup>3</sup> The first Australian dietary survey for 44 years was conducted with the support of the National Heart Foundation.<sup>4,5</sup> The persistent work of Karen Cashel, Ruth English and Janine Lewis resulted in the first comprehensive national food composition data based on the direct analysis of a wide range of Australian foods—"Composition of foods, Australia".<sup>6</sup> Ruth English with professional working groups initiated many of the PHN policies and strategies and information bases which we now take too much for granted.

Part of Australia's Chief Nutritionist's work was to represent the Australian Government on food and nutrition issues to many international organisations. Following such a lengthy period as a public servant, English progressed her professional activities as a nutrition consultant both within Australia and with the Food and Agriculture Organisation and World Health Organisation in the development of food, nutrition and agriculture plans of action and policies in many countries in Oceania and Far East Asia.

A comprehensive outline of the work of Ruth English in PHN has now been published<sup>7</sup> and includes an extensive bibliography of DoH publications for the period. This publication is recommended to colleagues as a source of information on the dedicated work of the Commonwealth DoH from 1957 to 1993. It was a period of unparalleled activity in the setting of PHN in Australia which has not been repeated since. Most of the cited publications are being deposited in the State Library of Victoria<sup>8</sup> and some may be found in Trove.<sup>9</sup> It is impossible to understand why the highly developed country of Australia has not updated our 1992 National Nutrition Policy.<sup>10</sup>

## CONFLICT OF INTEREST

The author declares no conflicts of interest.

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**LETTER TO THE EDITOR**

# Student placement adaptability during COVID-19: Lessons learnt in 2020

To the Editor

The advent of COVID-19 has placed undue pressure on universities with accredited dietetic programs having to consider alternative models of placement due to social distancing, risk mitigation and isolation measures identified by placement partners. University programs have the added concern of maintaining professional accreditation standards<sup>1</sup> by ensuring that students are able to demonstrate that they meet competence.<sup>2</sup> We wish to outline the changes that have led to new opportunities to develop student competence at the University of the Sunshine Coast (USC) between February to April 2020 as a result of this unprecedented situation.

The novel coronavirus COVID-19 was first identified in Queensland on 29 January 2020.<sup>3</sup> With the unfolding situation, travel across the state became more tenuous and sending students away from support networks and possibly into isolation was less than ideal. Also, students' anxiety about the risk associated with COVID-19 and site constraints with implementing social distancing highlighted issues with the existing placement model. Thus, consideration was needed to modify public health nutrition, foodservice and medical nutrition therapy placements.

At USC, a nutrition and dietetics clinic was already in operation fortnightly as an additional experience as part of the medical nutrition therapy placement program. In response to the cancellation of some placements due to COVID-19 and increasing anxiety of some students, a decision was made to expand the operation of the clinic using telehealth. Strategies to market the service were a necessity and included a media release and social media posts that resulted in an ABC radio interview across Queensland. What resulted was a demand for the clinic services that required a quick response, and adaptability of staff and students. The attendance in the 2 weeks that the clinic was operational prior to this time (23rd-27th March and 6th-9th April 2020) was declining due to cancellations, and only one new (14%) and six review (86%) clients had attended. This increased by 300% over 9 days of operation (14th-24th April 2020) to 19 new (90%) and two review consultations (10%), and another 16 clients still to be seen. For a snapshot of consultations, see Table 1.

For the public health nutrition and foodservice placements, remote projects were collaboratively established with sites with joint supervision that involved weekly Zoom meetings with sites, students and university supervisors.

The initial challenge for staff was to introduce flexibility across areas of practice to ensure that students continued to develop skills that allowed them to be assessed against the competency standards<sup>2</sup> while still complying with university policies on assessment and satisfying the requests of placement partners. Several challenges have arisen with the use of online supervision and telehealth (Table 2).

We believe there are reasons for the successful implementation of online placements at USC. This includes acting quickly and adapting to a new situation, raising awareness of the telehealth service and creating demand specific to COVID-19, removing barriers of cost and travel for clients, focusing on the "can do" and triaging clients if required. Transitioning to telehealth provided students with the opportunity to develop e-health skills that are also essential employability traits for healthcare.<sup>4</sup> The limited access to dietetic services for those in rural and remote areas<sup>5</sup> and the lower recurring costs of telehealth for dietetic service providers and clients,<sup>6</sup> provides an opportunity for USC to engage more easily with the local community and broaden reach beyond the Sunshine Coast. In regard to remote project supervision, establishing clear parameters for students, upskilling on various modes of technology and ensuring adequate engagement with stakeholders has been integral to success.

The knowledge and skills developed through this change are relevant to future work opportunities for graduates and are representative of the future thinking for dietetic education and training which include use of technology, digital literacy and communication skills.<sup>7-9</sup> Concurrent workforce data collected via a survey of USC nutrition and dietetic graduates (2009-2018) demonstrates that of 91 individuals, only 38 (42%) of the sample were currently working in clinical dietetics within a hospital, with 43 (45%) self-employed or working for a small business. Students were asked which skills were of most value in their dietetics degree and what they would have liked to have obtained but felt they did not get during

**TABLE 1** Snapshot of telehealth consultations by students (14th–24th April 2020)<sup>a</sup>

	Number
Contacts made	37
Consultations to date	21
New clients	19
Review clients	2
Age (years)	
Mean/median	35/30
Range	10–67 <sup>b</sup>
Gender (n = 33)	
Males	12
Females	21
Location (n = 23)	
Local: Sunshine Coast	11
Regional remote: Far North Qld = 3, Cairns = 1, Townsville = 1, Brisbane = 2, Bundaberg = 1, Mt Isa = 1, Gympie = 1, Gold Coast = 1	11
International: USA	1
Occupation (n = 24)	
Professional: Manager = 2, allied health = 2, nurse = 1, teacher = 2, media = 1	10
University student and staff	8
Blue collar: Truck driver = 1, labourer = 1	2
Not working: Unemployed = 1, Home carer = 1	2
Self-employed/business owner	2
Reason for consultation (n = 32)	
Healthy eating	12
Weight reduction	11
Gastrointestinal issues	2
Sports nutrition	2
Other: Cardiovascular disease, acne, thyroid, weight gain, food intolerance	5
Method of consultation (n = 21)	
Video conference via Zoom	16
Mobile conference call	6

<sup>a</sup>Includes available data provided by consent from telehealth clients.

<sup>b</sup>Consultation with those less than 18 years occurred in the presence of an adult/ guardian.

their course of study. Clinical, research and communication skills (aligning with key learning concepts for dietetics<sup>10</sup>) were valued, while business and private practice were highlighted as areas that could be better incorporated into the degree, which supports recent results from focus group discussions with dietetic graduates.<sup>11</sup> This data suggests a need for change to exposure to different placement settings. As this was collected prior to the

**TABLE 2** Challenges of online supervision and telehealth based on reflections of academic placement staff (n = 4)

Issues related to placement operation by staff	<ul style="list-style-type: none"> <li>• Increased communication with sites regarding their individual capacity to take students</li> <li>• Creating remote placements that allow students to demonstrate competencies and meet learning outcomes</li> <li>• Development of processes for students for working at home or dealing with anxiety about COVID-19, and establishing when to remove students from placement site</li> <li>• Need to increase telehealth client base by marketing of service to ensure adequate case-load experience for students</li> <li>• Capacity to supervise four students at one time with the telehealth clinic model</li> </ul>
Issues related to student placement experience	<ul style="list-style-type: none"> <li>• Finding suitable and time-efficient ways to work as a team with other students on placement</li> <li>• Assisting students to collaborate and upskill each other and key stakeholders using different technologies</li> <li>• Challenges for students engaging with stakeholders at a time when organisations are adapting to new modes of operation and communication</li> <li>• Students missing out on experiencing the workplace, that is, not being physically “in” the organisation makes it hard for students to conceptualise/ understand the nature of the environment that may impact on their project and their proposed recommendations</li> <li>• Students and staff managing work with children needing home schooling</li> </ul>
Issues related to technology	<ul style="list-style-type: none"> <li>• Establishing processes and protocols for telehealth using Zoom and mobile conference calls, including privacy and consent</li> <li>• Loss of internet access or poor connection</li> </ul>

current situation with COVID-19, it will be beneficial to track graduate outcomes and reflection of placement experience from the 2020 cohort.

The impact of these changes on students' competence and future employability will not be known for some time, however, we are confident that the use of telehealth and online placements through this unprecedented situation has resulted in beneficial outcomes that will remain in place beyond COVID-19. We have observed that students have risen to the challenge and have demonstrated flexibility, adaptability and resilience that they may not have experienced through standard placement models.

As of the current date (11 May 2020), the number of new cases of COVID-19 has declined in Queensland and thus sites are looking at how they can re-accommodate students. The big question is whether universities should return to standard placement models or consider this as a time to change.

### AUTHOR CONTRIBUTIONS

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