



# BMJ Open How do foodservice dietitians and dietetic students learn about environmental sustainability? A scoping review protocol

Joanna McCormack,<sup>1</sup> Christy Noble ,<sup>2,3</sup> Lynda Ross,<sup>1,4</sup> Denise Cruickshank,<sup>5</sup> Andrea Bialocerkowski <sup>6</sup>

**To cite:** McCormack J, Noble C, Ross L, *et al.* How do foodservice dietitians and dietetic students learn about environmental sustainability? A scoping review protocol. *BMJ Open* 2019;**9**:e032355. doi:10.1136/bmjopen-2019-032355

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2019-032355>).

Received 14 June 2019  
Revised 24 October 2019  
Accepted 28 October 2019



© Author(s) (or their employer(s)) 2019. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

For numbered affiliations see end of article.

## Correspondence to

Joanna McCormack;  
[j.mccormack@griffith.edu.au](mailto:j.mccormack@griffith.edu.au)

## ABSTRACT

**Introduction** Healthcare services are responsible for 7% of Australia's carbon emissions, or 35 772 kt per annum, with 44% of these attributed to hospitals and an unknown proportion originating from the kitchen. Carbon emissions contribute to climate change that is predicted to adversely impact health outcomes. Healthcare professionals and institutions have an opportunity to reduce their impact on the climate. Australian dietitians, however, are not required to learn about environmental sustainability during their tertiary education. This scoping review will identify pedagogical frameworks employed by educational institutions and providers of professional development, to describe how foodservice dietitians and dietetic students develop environmental sustainability capabilities.

**Methods and analysis** The scoping review methodology established by Arksey and O'Malley will be used for this review. Papers will be included if they focus on dietitians or dietetic students learning about environmental sustainability in the foodservice domain. Nine databases, Business Source Complete, CINAHL, Cochrane, Edge (via informit), EMBASE, MEDLINE, Proquest, Scopus and Web of Science, will be searched from their inception. Grey literature will also be identified by searching these databases, professional bodies databases and Google Scholar. Eligible articles will be identified by screening papers by their title and abstract, followed by a full-text review. The study selection process will be completed independently by the primary investigator and the research team. Any discrepancies will be resolved through discussion. The extracted data including citation information, information on the intervention and outcomes will be summarised using descriptive statistics. Themes describing the pedagogical underpinnings of the interventions, the measurement tools and the impact of the learning activities will be synthesised narratively.

**Ethics and dissemination** The results will inform the development of evidence-based pedagogical frameworks to enhance the capabilities of foodservice dietitians and dietetic students in environmental sustainability. Dissemination will occur through conference presentations, peer-reviewed journals and distribution through national accrediting bodies.

## Strengths and limitations of this study

- This protocol uses a rigorous methodology, based on established scoping review recommendations.
- A limitation of the scoping review is that relevant literature may be missed. However, nine library databases, databases linked to professional bodies, these databases and Google Scholar will be searched in addition to secondary searching. This will minimise missing relevant literature.
- Due to the international focus of this scoping review, unit guides of accredited courses that prepare nutrition and dietetic students to entry level are not being systematically searched.
- Searches will be conducted in the English language and thus is it likely that the majority of literature included in this review will be published in English. Papers identified which are not in English will be translated.
- The assessment of methodological quality of the included literature will not be evaluated, as all types of literature on the topic will be included.

## INTRODUCTION

The United Nations has described climate change as 'the single greatest threat to a sustainable future', with impacts on agriculture and food security, human health, water supplies and land and sea ecosystems.<sup>1</sup> Climate change is brought about by the 'greenhouse effect'. Human activities are increasing greenhouse gases (GHGs) such as carbon dioxide, methane and nitrous oxide that trap energy and heat inside the Earth's atmosphere and change the climate. The Paris Agreement on global climate change aims to limit emissions of GHGs to specified targets to restrict 'the increase in the global average temperature to well below 2°C above preindustrial levels and to pursue efforts to limit the temperature increase to 1.5°C above preindustrial levels'.<sup>2</sup> Where an increase in temperature of 1.5°C is likely to have negative effects on the



environment, achievement of the Paris Agreement has the potential to reduce the magnitude of climate change and its impact on the Earth and its population.

Extreme weather events are already part of the Australian landscape and Australia is particularly susceptible to a changing climate.<sup>3</sup> Climate change is predicted to adversely impact the health of Australians through the physical (eg, heat stroke, asthma, injury or death) and mental health consequences (eg, depression) of the increasing strength and frequency of storms, floods, heatwaves and droughts.<sup>4</sup> Climate change may also lead to changes in crop yields impacting on food availability, the distribution of infectious diseases, and will increase population displacement.<sup>4</sup> Given the significant impact climate change is likely to have on population health,<sup>5</sup> healthcare professionals and institutions have an important opportunity to lead actions to reduce their impact on the climate. The actions and interventions made today to limit climate change in the future are referred to as 'environmental sustainability'. As an example of the impact healthcare has on carbon emissions, in Australia, healthcare services alone are responsible for 7% of total carbon emissions, or 35 772 kt per annum. Of those emissions, 44% is attributed to public and private hospitals.<sup>6</sup>

Dietitians work in a range of settings to promote health and prevent and treat illness 'by optimising the nutrition of populations, communities and individuals'.<sup>7</sup> The profession, therefore, is well placed in mitigating climate change by reducing hospital carbon emissions, and the area of foodservice is likely to have the greatest impact. Foodservice dietitians work with the kitchen staff and develop menus for hospitals. Foodservice dietitians can make an impact on carbon emissions through the reduction of food waste, limiting food miles by purchasing locally produced food, reducing the frequency of 'high carbon emissions' foods on the menu such as meat, maximising the efficiency of resources in the kitchen such as refrigeration, heating, and cooking processes and reducing the need for single-use plastics.

Despite these opportunities and potential impacts, Australian dietitians are not required to learn about environmental sustainability during their tertiary education. Foodservice dietitians can learn about environmental sustainability throughout their degree, or after graduation through professional development. Carino *et al*<sup>8</sup> found that only nine Australian nutrition and or dietetics degrees (from a total of 130) contained modules on sustainable food systems. This may be explained by the removal of environmental sustainability criterion from the Dietitians Association of Australia (DAA) competency standards.<sup>9</sup> As Australian university dietetics curricula must comply with the DAA competency standards, there is currently no mandate by the accrediting authority for dietetics students, that is, dietitians of the future, to develop the capabilities required to contribute to environmental sustainability. Australian universities, however, recognise the need to improve environmental sustainability,<sup>10-12</sup> yet its inclusion into health curricula

is minimal.<sup>13</sup> The Australian and New Zealand Council of Medical Deans is an exception, having recently introduced systematic changes to medical curricula that will build a medical workforce which understands the impact of climate change on health and health services.<sup>14</sup> The preparedness of other health graduates, such as dietitians, to drive environmentally sustainable practices is therefore questionable.

Given the important contributions dietitians could make to improve environmental sustainability practices in a hospital kitchen and through advocacy, and the lack of guidance from policy and competency standards, this research team aims to ascertain the current practices which support dietitians learning about this important topic. This paper, therefore, reports a protocol for a scoping review to identify literature reporting on the pedagogical frameworks employed by educational institutions and providers of continuous professional development, to describe how foodservice dietitians and dietetic students are developing environmental sustainability capabilities.

## METHODS AND ANALYSIS

A scoping review will be used to address the aim of this study: to identify the pedagogical frameworks employed by educational institutions and providers of continuous professional development and determine how foodservice dietitians are developing environmental sustainability capabilities. Scoping reviews are used to examine the range of research activity in a particular area of interest, to identify gaps in current research<sup>15</sup> and are most appropriate to conduct in emerging areas of research. Given the rapidly emerging and changing nature of environmental sustainability, a scoping review has been chosen rather than a systematic review. It is likely that only a small body of literature exists on the topic with few, if any, randomised controlled trials.

A five-stage process, as outlined by Arksey and O'Malley<sup>16</sup> and refined by Levac *et al*,<sup>15</sup> will be used to conduct the scoping review. The stages include: (1) identifying the research question, (2) identifying relevant literature, (3) selecting literature for inclusion, (4) extracting the data and (5) summarising the data and synthesising the results. The sixth phase, consultation, was considered outside the scope of this review as it is likely that a recommendation of this review would be stakeholder consultation. This would form a stand-alone study.

### Stage 1: identify the research question

Arksey and O'Malley<sup>16</sup> and Levac *et al*<sup>15</sup> recommended developing a broad research question to summarise the breadth of evidence on a particular topic. Based on this recommendation and in consultation with the research team and library advisor, the research question 'How are foodservice dietitians and dietetic students learning about environmental sustainability' was developed. This review will seek to identify:

1. How and in what context these learning activities were implemented.
2. How they were evaluated and what frameworks were used.
3. What key factors made them successful or otherwise.
4. Any recommendations for future professional learning activities.
5. Measure the impact of the professional learning activity using the Kirkpatrick-Barr framework.

For the purpose of the scoping review, 'foodservice dietitians and dietetic students' encompass individuals who have completed a university dietetics programme and who work in the area of foodservices or are currently attending a university dietetics programme which has met the standards required by that countries' national body, for example, the DAA in Australia or the Academy of Nutrition and Dietetics in the USA. Furthermore, learning about environmental sustainability should be a primary objective of literature to be included in the review.

### Stage 2: identifying relevant literature

Scoping reviews are a comprehensive review of the literature in a particular field.<sup>15</sup> To ensure a rigorous and comprehensive review, scoping reviews include literature which have different methodological approaches and outcome measures, and will include peer-reviewed literature, summary articles, emergent literature (eg, theses), opinion pieces and grey literature.<sup>17</sup> The research team and library advisor will work together to ensure a breadth of literature will be identified by developing a comprehensive search strategy and identifying appropriate electronic databases to search. Literature to be included in the review will be (1) published and unpublished studies and literature, and (2) grey literature including relevant conference abstracts and theses. The following nine databases will be searched from their inception: Business Source Complete, CINAHL, Cochrane, Edge (via informit), EMBASE, MEDLINE, Proquest, Scopus and Web of Science. To maximise the breadth of literature to be identified for the review, no language or date restrictions will be applied.

The inclusion of grey literature will be enhanced by searching these databases and Google Scholar. While Google Scholar will be helpful, the search results can be incomplete due to limitations on search strings returning a large number of records. The research team will limit the identification of grey literature to the first 80 pages returned through Google Scholar, which has been identified as the saturation point for grey literature.<sup>18</sup> As further literature may be embedded within professional organisation bodies databases,<sup>18 19</sup> to complete the search for grey literature, we will search the databases belonging to the professional bodies which represent dietitians, including the DAA, Dietitians of Canada, the Academy of Nutrition and Dietetics, and the British Dietetic Association. In addition, the Practice-based Evidence in Nutrition database, an internationally recognised database for

### Box 1 Database search strategy

#### Search strategy

- ▶ "Food service" OR food service\* or food-service\* OR foodservice OR catering
- ▶ Dietitian\* OR dietician\* OR nutritionist\*
- ▶ Learn\* OR education OR understand OR knowledge OR curriculum OR "professional development" OR "staff development"
- ▶ Sustainab\* OR environment\*
- ▶ Student AND (university OR college OR higher education) AND (nutrition OR dietetics)

#### Search strategy—Professional Body databases

- ▶ Environmental sustainability
- ▶ Civic dietetics
- ▶ Sustainable food systems

dietetic professionals, will be searched for relevant literature. The search strategy used to identify resources within these databases is detailed in [box 1](#). To be included in the scoping review, grey literature must meet the same inclusion criteria as published literature.

Searching keywords in the title and abstract, and the subject headings will form the basis of the search strategy. Arksey and O'Malley<sup>16</sup> recommended an iterative approach to developing a search strategy. As such, [box 1](#) outlines the initial search strategy developed in the CINAHL database, as it is a comprehensive database which contains peer-reviewed journal articles and other grey literature targeted to allied health. The term 'nutritionist' has also been used as part of the search strategy as the terms 'dietitian' and 'nutritionist' are sometimes used interchangeably. This search strategy will then be customised and applied to the other databases. While scoping reviews adopt an iterative approach to developing a search strategy, it is likely that the final search strategy will be similar to that outlined but tailored to each specific database.

The search results will be downloaded into EndNote V.X9 where duplicates will be automatically removed, and then manually checked for any duplicates that were not identified. The reference lists of all included literature will then be hand-searched to identify additional literature relevant to the research question, which may have been omitted or overlooked during the database searches.

### Stage 3: selecting literature for inclusion

All papers captured during the search process will undertake two levels of screening. Initially the title and abstract will be screened, followed by a full-text review against the inclusion criteria to identify the literature to be included in this study. To add rigour to the study selection process, the study selection process will initially be completed by the primary investigator. Members of the research team will complete the selection process independently a second time. Based on the final list of included papers, inter-rater reliability will be determined using the Cohen's Kappa coefficient.<sup>20</sup> Papers identified for inclusion by



each reviewer will then be compared; any discrepancies will be identified and discussed among the research team until consensus is gained regarding inclusion. Papers will be included if they focus on environmental sustainability, include elements of learning or career development and involve dietitians that either attended or are attending a university programme recognised by the professions national body. For dietitians who have graduated and are working within foodservices, their professional development should have a focus on environmental sustainability in the foodservice domain.

#### Stage 4: extracting the data

The breadth of literature included in scoping reviews means the data extracted from the included papers is often very diverse.<sup>15</sup> Because of this, the research team will adopt an iterative approach to data extraction. Initially, the data to be extracted from each paper will include citation information (eg, title, authors, source of publication, year of publication), country, study type and methods, duration of intervention, pedagogical underpinnings, mode of delivery, measurement tools, career stage and results/recommendations, if applicable, using a standardised data extraction sheet. The impact of the professional learning activity will be classified according to the Kirkpatrick-Barr framework.<sup>21 22</sup> This framework analyses the impact of professional learning across four different levels:

- ▶ Level 1: Learners' reaction—learner evaluations with the professional activity.
- ▶ Level 2a: Change in attitude—a change in the learners' attitude towards the impact their practice will have on the environment.
- ▶ Level 2b: Change in knowledge or skills—how has the learners' knowledge of environmental sustainability changed?
- ▶ Level 3: Behavioural change—the change in knowledge has had a direct impact on workplace behaviour or a students' subsequent work or projects.
- ▶ Level 4: Overall results—the organisation has adopted changes which can be attributable to the professional learning activity, or students' career success and accomplishments are measured.

The research team will use MS Excel V.1808 to develop a spreadsheet to record the extracted data. Initially, two researchers will independently extract the data from five papers. They will review the included variables and further refine the data extraction process. Any discrepancies will be discussed with the research team until consensus has been met. Two researchers will independently review the remaining papers. An iterative process will continue to be adopted throughout the review as new themes and variables emerge. Once all papers have been reviewed, the research team will discuss any discrepancies until consensus has been met.

#### Stage 5: summarising the data and synthesising the results

The purpose of scoping reviews is to map the research area,<sup>23</sup> including all sources and types of evidence

available on a topic<sup>24</sup> and to provide a summary of the body of that research. The included papers will not undergo a quality assessment, as a scoping review 'does not seek to assess quality of evidence'.<sup>16</sup> Once the data have been extracted from the included papers, the results will be collated and summarised. First, descriptive statistics will summarise the data including the duration and frequency of interventions. Themes describing the pedagogical underpinnings of the interventions, modes of delivery, measurement tools and other relevant variables identified will be synthesised narratively. This will provide a rigorous summary of the literature, mapping how foodservice dietitians and dietetic students learn about environmental sustainability, and identify gaps in both the literature and university curricula.

#### Patient and public involvement

No patients were involved in this study.

### DISCUSSION AND DISSEMINATION

Environmental sustainability is an emerging area in the field of dietetics, and this is likely the first study to review and synthesise literature, which address sustainability capabilities in foodservice dietitians and dietetic students. As scoping reviews are used to examine the range and breadth of information in a particular area, the literature in this review will not undergo critical appraisal as this will limit the number and type of publications that could be included. Overall, the methodology outlined in this protocol will enable the scoping review to be reported using the Preferred Reporting Items for Systematic Reviews and Meta-analyses-Scoping Review guideline.<sup>25</sup>

The review will summarise the work being undertaken internationally to enhance the knowledge of foodservice dietitians and dietetic students on environmental sustainability. It is hoped the review will provide important insights into how to best develop the environmental sustainability capabilities of dietitians and dietetic students. Gaps in the literature will be identified and used to inform future research and planning. When completed, this review may be published in a peer-reviewed journal and the results disseminated at conferences and to relevant national professional bodies.

#### Author affiliations

<sup>1</sup>School of Allied Health Sciences, Griffith University, Southport, Queensland, Australia

<sup>2</sup>Allied Health, Gold Coast Hospital and Health Service, Southport, Queensland, Australia

<sup>3</sup>Griffith University School of Medicine, Gold Coast, Queensland, Australia

<sup>4</sup>Department of Nutrition and Dietetics, Queensland University of Technology, Brisbane, Queensland, Australia

<sup>5</sup>Department of Nutrition and Dietetics, Royal Brisbane and Woman's Hospital Health Service District, Herston, Queensland, Australia

<sup>6</sup>Griffith Health, Griffith University - Gold Coast Campus, Gold Coast, Queensland, Australia

**Twitter** Christy Noble @chnoble

**Contributors** All authors had a significant contribution for writing the protocol. JM is a research higher degree candidate and designed and drafted the protocol and manuscript. AB, her primary supervisor, and CN, LR and DC (her secondary supervisor) met with JM on a fortnightly basis for several months to revise the work. All authors approved this manuscript for publication and are accountable for this work.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Ethics approval** Ethical approval will not be required as this is a secondary study of data extracted from literature which has previously gained ethical approval

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iDs

Christy Noble <http://orcid.org/0000-0001-8763-234X>

Andrea Bialocerkowski <http://orcid.org/0000-0001-5946-5679>

## REFERENCES

- United Nations Secretary General. *Secretary-General's remarks at climate leaders Summit*. United Nations, 2014.
- UNFCCC. Adoption of the Paris agreement; 2015.
- Climate Council of Australia Ltd. The good, the bad and the ugly: limiting temperature rise to 1.5 degrees, 2018. Available: <https://www.climatecouncil.org.au/wp-content/uploads/2018/10/CC-IPCC-report-1.pdf>
- Watts N, Amann M, Ayeb-Karlsson S, *et al*. The Lancet countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *The Lancet* 2018;391:581–630.
- Goodman B. The need for a 'sustainability curriculum' in nurse education. *Nurse Educ Today* 2011;31:733–7.
- Malik A, Lenzen M, McAlister S, *et al*. The carbon footprint of Australian health care. *Lancet Planet Health* 2018;2:e27–35.
- Dietitians Association of Australia. DAA constitution and by-laws, 2013. Available: <https://daa.asn.au/about-daa/constitution-and-by-laws/DAA>
- Carino S, McCartan J, Barbour L. The Emerging Landscape for Sustainable Food System Education: Mapping Current Higher Education Opportunities for Australia's Future Food and Nutrition Workforce. *J Hunger Environ Nutr* 2019;1–22.
- Dietitians Association of Australia. National competency standards for dietitians in Australia, 2015. Available: <https://daa.asn.au/maintaining-professional-standards/ncs/>
- Griffith University. Sustainability hub, 2019. Available: <https://www2.griffith.edu.au/sustainability>
- University of Queensland. Sustainability action plan, 2019. Available: <https://sustainability.uq.edu.au/resources/sustainability-action-plan>
- Monash University. Sustainable Development Institute, 2019. Available: <https://www.monash.edu/sustainable-development/sustainability-institute>
- Bell EJ. Climate change: what competencies and which medical education and training approaches? *BMC Med Educ* 2010;10:31.
- Madden DL, McLean M, Horton GL. Preparing medical graduates for the health effects of climate change: an Australasian collaboration. *Med J Aust* 2018;208:291–2.
- Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5.
- Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
- Thomas A, Lubarsky S, Durning SJ, *et al*. Knowledge syntheses in medical education: Demystifying scoping reviews. *Acad Med* 2017;92:161–6.
- Haddaway NR, Collins AM, Coughlin D, *et al*. The role of Google Scholar in evidence reviews and its applicability to grey literature searching. *PLoS One* 2015;10:e0138237.
- Braithwaite J, Zurynski Y, Ludlow K, *et al*. Towards sustainable healthcare system performance in the 21st century in high-income countries: a protocol for a systematic review of the grey literature. *BMJ Open* 2019;9:e025892.
- McHugh ML. Interrater reliability: the kappa statistic. *Biochem Med* 2012;22:276–82.
- Praslova L. Adaptation of Kirkpatrick's four level model of training criteria to assessment of learning outcomes and program evaluation in Higher Education. *Educational Assessment, Evaluation and Accountability* 2010;22:215–25.
- Kirkpatrick D. *Great Ideas Revisited: Revisiting Kirkpatrick's Four-Level Model*. Training & Development; 1996.
- Munn Z, Peters MDJ, Stern C, *et al*. Systematic review or scoping review? guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol* 2018;18:143.
- Peters MDJ, Godfrey CM, Khalil H, *et al*. Guidance for conducting systematic scoping reviews. *Int J Evid Based Healthc* 2015;13:141–6.
- Tricco AC, Lillie E, Zarin W, *et al*. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.