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Uptake of nutrition informatics in Australia compared with the USA

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Uptake of nutrition informatics in Australia compared with the USA

Abstract

Aim To determine the method and extent of health information technology (HIT) utilisation, roles in relation to HIT in the workplace and perceived barriers and benefits of HIT by dietitians in Australia and provide a comparison with dietitians in the USA. **Methods** A survey adapted from the 2011 Academy of Nutrition and Dietetics (Academy) was utilised and circulated electronically to Dietitians Association of Australia members and advertised through a professional nutrition website in 2013. The survey encompassed 25 questions on computer access and use, data sources, experience using HIT, organisational involvement and perceived barriers and benefits to HIT. Descriptive statistics, independent t-tests, chi-square tests and z-tests were computed to investigate and compare responses from the 2013 Australian and 2011 Academy surveys. **Results** The survey completion rate represented 14.5% of Dietitians Association of Australia members (747) and 5% of Academy members (3342). The Australian and Academy respondents reported similar high levels of comfort using technology, awareness of workplace HIT benefits (such as enhanced time management and improved ability to access data) and low levels of organisational involvement. However, there were a significantly greater number of Academy organisations utilising electronic health records ($P < 0.05$), and significantly more Academy respondents (55%) reported 'no barriers' to using HIT compared with Australians (37%) ($P < 0.05$). **Conclusions** Educational programmes will be central to ensuring dietitians are equipped with technology and information management skills required to be involved in and make informed decisions about dietetic-related HIT projects as these will soon be fundamental to dietetic practice.

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Uptake of nutrition informatics in Australia compared to the United States of America

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ABSTRACT

Aim: To determine the method and extent of Health Information Technology (HIT) utilisation; roles in relation to HIT in the workplace; and perceived barriers and benefits of HIT by dietitians in Australia, and provide a comparison to dietitians in the United States of America.

Methods: A survey adapted from the 2011 Academy of Nutrition and Dietetics (Academy) was utilised and circulated electronically to Dietitians Association of Australia members and advertised through a professional nutrition website in 2013. The survey encompassed 25 questions on computer access and use, data sources, experience using HIT, organisational involvement and perceived barriers and benefits to HIT. Descriptive statistics, independent *t*-tests, chi-square tests and z-tests were computed to investigate and compare responses from the 2013 Australian and 2011 Academy surveys.

Results: The survey completion rate represented 14.5% of Dietitians Association of Australia members (747) and 5% of Academy members (3,342). The Australian and Academy respondents reported similar high levels of comfort using technology, awareness of workplace HIT benefits (such as enhanced time management and improved ability to access data) and low levels of organisational involvement. However, there were a significantly greater number of Academy organisations utilising Electronic Health Records ($p<0.05$), and significantly more Academy respondents (55%) reported 'no barriers' to using HIT compared to Australians (37%) ($p<0.05$).

Conclusions: Educational programs will be central to ensuring dietitians are equipped with technology and information management skills required to be involved in and make informed decisions about dietetic-related HIT projects as these will soon be fundamental to dietetic practice.

Key words: dietetics, electronic health record, health information technology, information management, nutrition care, nutrition informatics.

INTRODUCTION

Nutrition informatics is defined as ‘The effective retrieval, organisation, storage and optimum use of information, data and knowledge for food and nutrition-related problem solving and decision making. Informatics is supported by the use of information standards, processes and technology’.¹ The field of nutrition informatics is extensive, crossing all areas of dietetic practice, and is rapidly developing due to the demonstrated potential of health information technology (HIT) to improve efficiencies, reduce costs, support research and ultimately enhance patient care.²⁻⁷

With the digital age upon us, patients are using technology in their everyday lives, and HIT has become integral in healthcare delivery. Development of information systems (IS) which do not support nutrition standards and processes to maximise efficiencies and assist in delivery of nutrition care, may marginalise nutrition care quality and safety.²⁻⁴

The Academy of Nutrition and Dietetics (Academy) has led international efforts in defining and developing the field of nutrition informatics. The Academy Nutrition Informatics Committee was founded in 2007 and has initiated numerous projects, including: a nutrition informatics web page and blog, collaborative relationships with global organisations (such as Healthcare Information Management & Systems Society (HIMSS), International Health Terminology Standards Development Organisation and Health Level Seven International), and created nutrition informatics competencies across all areas of dietetic practice.⁸⁻¹¹ The Dietitians Association of Australia (DAA), following the Academy lead, has established a health informatics advisory committee, a

health informatics continuing professional development working party, and a nutrition informatics interest group to support resource development, continuing professional development and advocacy for nutrition informatics in Australia.

In order to prepare our profession for the changing needs of our patients, as well as adjust to the rapid transformation of organisations to electronic systems, we must first identify where we are in terms of understanding, acceptance and use of HIT. Utilising this baseline data will then enable professional development strategies to be targeted at the identified needs of dietitians, equipping them with the knowledge and skills to make informed decisions about how to utilise informatics to enhance practice.

The Academy designed and conducted a nutrition informatics member survey in 2008⁸ and 2011,¹⁰ commencing a longitudinal analysis of trends in the use of technology and information management by Academy members. The survey which was repeated in 2014, identified an increase in adoption of, and comfort with technology, as well as an improved understanding that HIT can assist with nutrition decision making and problem solving.^{8,10} These results support the continuing professional development strategies initiated by the Academy, and identify the potential for enhanced educational programs to ensure student dietitians are prepared for an electronic workplace.¹⁰

There are a limited number of small and targeted surveys on computer use by national dietetic populations^{12,13} but no comprehensive national data for any other countries (including Australia)² beyond the United States of America (USA) to our knowledge. Computer and Internet use and trends of the general population of Australia and the USA are comparable,^{14,15} and there are similarities in their dietetic practice (eg. both utilise the Nutrition Care Process Terminology), making these countries suitable for comparison. The aim of the Australian nutrition informatics survey was consistent with the Academy aims: to determine the method and extent of HIT utilisation by dietitians; to determine the roles dietitians play in relation to HIT in the workplace; and to identify perceived barriers and benefits to the use of HIT. In addition, the authors sought to compare the Australian results to the Academy 2011 published survey results.

METHODS

This present study reflects the baseline data of a longitudinal study, reported here as a cross-sectional study. In order to allow a direct comparison to the published 2011 Academy results,¹⁰ the 2011 nutrition informatics survey developed by the Academy Nutrition Informatics Committee and HIMSS Analytics was utilised to survey Australian dietitians. The Academy Nutrition Informatics Committee was contacted in 2012 and the use of their survey with some modifications was approved. Modifications to the survey aimed to make it valid for use in Australia and to provide additional targeted research data where required, namely to reflect Australian terminology and identify perceived barriers and enablers that impacted on IS implementations. Questions relating to the International Dietetic and Nutrition Terminology (IDNT), recently renamed the Nutrition Care Process Terminology (NCPT), were removed due to a comprehensive longitudinal survey study on this topic already in progress in Australia.

The modified survey was circulated to the DAA health informatics advisory committee for review and comment. The final revised survey instrument was piloted and tested for face and content validity by nine Australian dietitians. The 29-item questionnaire collected demographic information and assessed seven domains relating to HIT, computer access and use, sources of data, comfort level with using HIT, experience, organisational involvement, Electronic Health Record (EHR) implementations, perceived barriers and benefits to HIT, and educational support preferences. The survey items were presented in multiple formats, including multiple-choice (17 questions), yes/no (6 questions), Likert scale (3 questions) and open-ended (3 questions). The survey can be found at <https://www.scribd.com/doc/260071605/2013-Australian-Nutrition-Informatics-Survey-v1>.

Ethics approval was granted (HE13/274) by the University of Wollongong Human Research Ethics Committee. The DAA disseminated the survey electronically to members on two occasions, three weeks apart in mid-2013 via links from the national newsletter and also direct emails to the nutrition informatics, food service and research interest groups. The survey was also advertised through a professional nutrition website.¹⁶ A paper survey version was available for those less comfortable with

technology and utilising online tools, to prevent under-representation of this group. The invitation to participate was open for one month. SurveyMonkey® (an online survey tool) was used to collect survey responses. A prize incentive was offered to a random participant to encourage survey participation.

Statistical analysis was performed using SPSS software (version 22, 2013, SPSS Inc., Chicago, IL, USA). Descriptive statistics (mean, median, count and percentages), independent *t*-tests, chi-square tests and z-tests were computed and used to investigate the association between demographics and dietitian responses, and compare Australian and Academy responses. The level of significance was set at $p < 0.05$, and for chi-square tests with multiple testing due to the increased risk of a type 1 error, the level of significance was lowered to $p < 0.01$.

RESULTS

For the purpose of this analysis, the survey findings from the 2013 Australian survey were compared to the published 2011 Academy survey results.¹⁰ The survey completion rate represented 14.5% of DAA members (747 respondents) and 5% of Academy members (3,342 respondents). All responses were electronic for both the DAA and Academy surveys. Forty-six percent of Australian respondents were familiar with the term nutrition informatics. This question was not included in the Academy survey.

Demographic characteristics of Australian and Academy respondents are outlined in Table 1. There was a significant difference in the gender of Australian and Academy respondents ($p < 0.05$),¹⁰ however females represented the majority of both the Australian (94%) and Academy respondents (96%). There was a significant difference in the Academy respondent age distribution, with the majority (49%) greater than 50 years¹⁰ compared to only 15% of Australian respondents ($p < 0.05$) and the majority (30%) of Australian respondents being in the 25-29 years category. All DAA defined practice areas were represented, and whilst there was a significant difference to the Academy in many practice areas, the majority of respondents represented the practice area of clinical nutrition for Australia (41%) and the Academy (43%) ($p > 0.05$).¹⁰

Australian responses were received from all States and Territories and this was representative of DAA membership ($p>0.05$).

Table 1: Demographic characteristics of Australian respondents.

	Australian dietitians 2013	
	n	%
Gender		
Female	620	94%
Male	34	5%
Prefer not to answer	4	1%
Age		
Under 25 years	68	10%
25-29	197	30%
30-34	108	16%
35-39	75	11%
40-44	74	11%
45-49	40	6%
50-54	49	7%
55-59	24	4%
60-64	14	2%
65 years or older	4	1%
Prefer not to answer	7	1%
Practice Area		
Clinical nutrition	308	41%
Community and public health	130	17%
Consultation and business/private practice	92	12%
Education	20	3%
Research	44	6%
Food service	24	3%
Food industry	15	2%
Informatics	5	1%
Dietetic student	21	3%
Mixed practice (regularly undertaking 3+ areas of work)	57	8%
Retired	0	0%
Do not work in nutrition and/or dietetics	9	1%
Other	20	3%
Practice Location		
Australian Capital Territory	19	3%
New South Wales	195	30%
Northern Territory	7	1%
Queensland	148	23%
South Australia	46	7%
Tasmania	11	2%
Victoria	167	26%
Western Australia	56	9%

Ninety eight percent of Australian and 97% of Academy¹⁰ respondents reported having access to electronic data in their workplace or to support their educational pursuits.

Access was evenly reported across the practice areas. Similar responses to the Academy¹⁰ were also reported when Australian dietitians were asked how they accessed electronic data. Within the workplace, eighty three percent had access to a dedicated computer, 34% to a shared workstation, 31% to a mobile device and 5% to a smart board. For educational purposes, 97% had a dedicated computer (88% personally-owned and 8% University provided), 45% accessed a mobile device, 25% a shared workstation, and only 2% utilised a smart board.

Australian and Academy responses to electronic data accessed are outlined in Table 2. The top ten data types accessed electronically were the same for the Australian and Academy¹⁰ respondents, although in a slightly different order, with a higher level of electronic access to all of the top ten data types by Australians ($p < 0.01$). Interestingly, as well as being reported in the top 10 to be accessed electronically, continuing professional development was still highly rated by the Australian and Academy respondents for access by direct interaction (70%, 53%) respectively.

Table 2: Data accessed electronically by Australian and Academy respondents.

Area	Australia 2013		Academy 2011	
	n	%	n	%
Continuing professional education	671	95.9%	2607	78.0%
Evidence-based library	660	94.3%	2620	78.4%
Professional journals	660	94.0%	2583	77.3%
Patient educational materials	620	88.6%	2724	81.5%
Nutrient database	608	87.1%	2710	81.1%
Recipes/menus	591	84.3%	2533	75.8%
Standards of practice	562	81.0%	2232	66.8%
Drug data/information	556	79.8%	2363	70.7%
Lay literature	552	80.2%	2443	73.1%
Patient data from other professionals	531	76.5%	2232	66.8%
Schedules	527	76.0%	2029	60.7%
Data/information from patients and clients	508	73.0%	NA	NA
Work load statistics	508	72.7%	1417	42.4%
Social media (i.e. social networking sites, blogs)	460	66.2%	1965	58.8%
Standardised Terminology (i.e. IDNT)	454	65.2%	1972	59.0%
Diet manual/nutrition care manual	406	58.2%	NA	NA
Project management	393	56.5%	NA	NA
Purchasing	301	43.1%	NA	NA
Billing	245	35.1%	1053	31.5%

Budget	239	34.4%	952	28.5%
Textbooks	203	29.1%	829	24.8%
Inventory	155	22.5%	NA	NA
Sales	118	17.1%	NA	NA

* NA = not available

The ratings related to comfort levels were very similar between the Australian and Academy¹² responses, with eight of the top ten expert ratings the same, including word processing (53%, 46%), slide presentations (45%, 34%) and web/Internet (39%, 37%) respectively. Respondents rated themselves as a beginner for statistical analysis (32%), using web authoring tools (23%), creating pod casts (21%) and using graphics (21%).

Eighty one percent of Australian respondents reported a high level of experience retrieving and accessing electronic data. The greatest percentage of a high level experience rating was reported by respondents working in informatics (100%) followed by education (90%). Only 1% of respondents classified themselves as having low levels of experience with access and retrieval of electronic data. The Australian participants reported significantly higher experience retrieving and accessing electronic data than the Academy respondents¹⁰ ($p < 0.05$).

However, 77% of Australian respondents had no experience with a nutrition-related IT system implementation in their practice area. There were significant differences in the responses between practice areas, with 60% from informatics and 52% from food services reporting the highest percentage of experience, while the remainder ranged from 40% to as low as 6% ($p < 0.05$). The Academy survey did not include this question.

Reflecting the low levels of experience with nutrition-related IT system implementations, Australian respondents reported low levels of organisational involvement with HIT. Table 3 outlines the organisational roles in HIT by Australian and Academy respondents for which there was an overall significant difference ($p < 0.01$). There was no significant difference between Australian and Academy respondents for database management, hardware selection, website management and software support and maintenance ($p > 0.01$). Overall, the majority (73%) of Australian respondents reported 'no role', 19% 'provided recommendations' and 8% were a

‘decision maker’. Similarly 68% of Academy respondents reported no role’, 24% ‘provided recommendations’ and 7% were a ‘decision maker’.

Table 3: Organisational roles in HIT by Australian and Academy respondents.

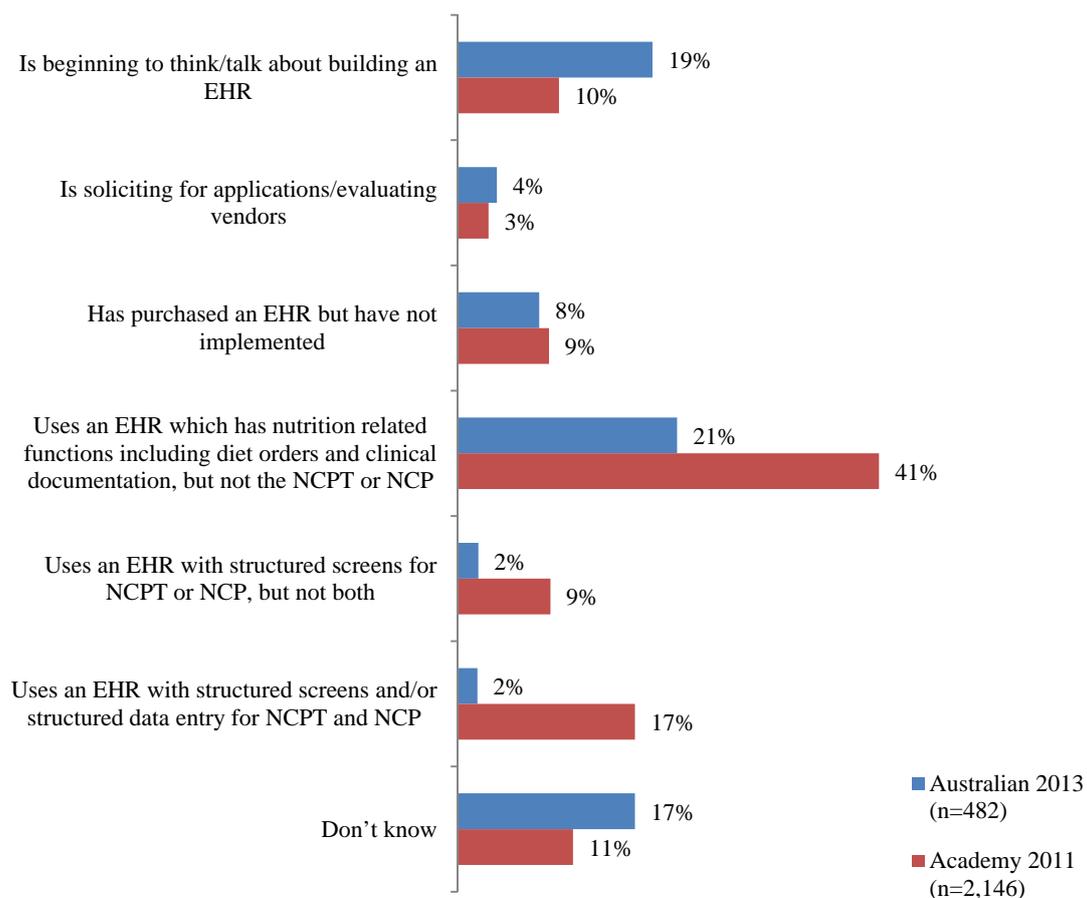
	Australian 2013 (n=669)			Academy 2011 (n=3342)		
	Decision maker	Makes recommendations	No role	Decision maker	Makes recommendations	No role
Project management	18%	35%	47%	11%	32%	56%
Change management	15%	44%	41%	11%	41%	48%
Database management	12%	27%	61%	9%	31%	61%
Mobile computing device/smart phone selection	10%	15%	75%	7%	15%	78%
Software selection	9%	25%	66%	9%	31%	60%
Social media sites monitoring	9%	10%	81%	NA	NA	NA
Software implementation	9%	18%	73%	9%	24%	67%
Social media sites managing	8%	9%	82%	NA	NA	NA
Data standards	8%	22%	69%	8%	29%	63%
Workflow design	8%	20%	71%	8%	28%	63%
Software training	8%	18%	74%	9%	24%	66%
Hardware selection	8%	19%	73%	6%	21%	73%
Web-site management	7%	14%	79%	6%	18%	75%
Developing terminology	7%	22%	72%	6%	29%	65%
Web-site development	6%	16%	78%	6%	22%	72%
Software support and maintenance	6%	12%	82%	6%	17%	76%
Interfacing systems	5%	10%	85%	4%	17%	79%
Software enhancement and/or optimisation	4%	15%	81%	5%	21%	75%
Software development	3%	9%	88%	3%	14%	83%
Other	1%	3%	97%	NA	NA	NA

* NA = not available

The Australian responses were consistent across the twenty different areas of involvement. Although there was slightly more involvement in daily activities (end-user activities) compared to scoping and developing stage activities. As may have been expected, a higher percentage (35%) of consultation and business/private practice respondents reported being a decision maker across the involvement areas, significantly higher than the average of all practice areas ($p < 0.05$).

Figure 1 outlines the level of integration of the EHR within organisations (where relevant) by Australian and Academy respondents. Significantly more (67%) Academy respondent organisations had implemented an EHR compared to 25% of Australian respondent organisations ($p < 0.05$).

Figure 1: Comparison of 2013 Australian and 2011 Academy responses to the question on the level of integration of the EHR within their organisation.

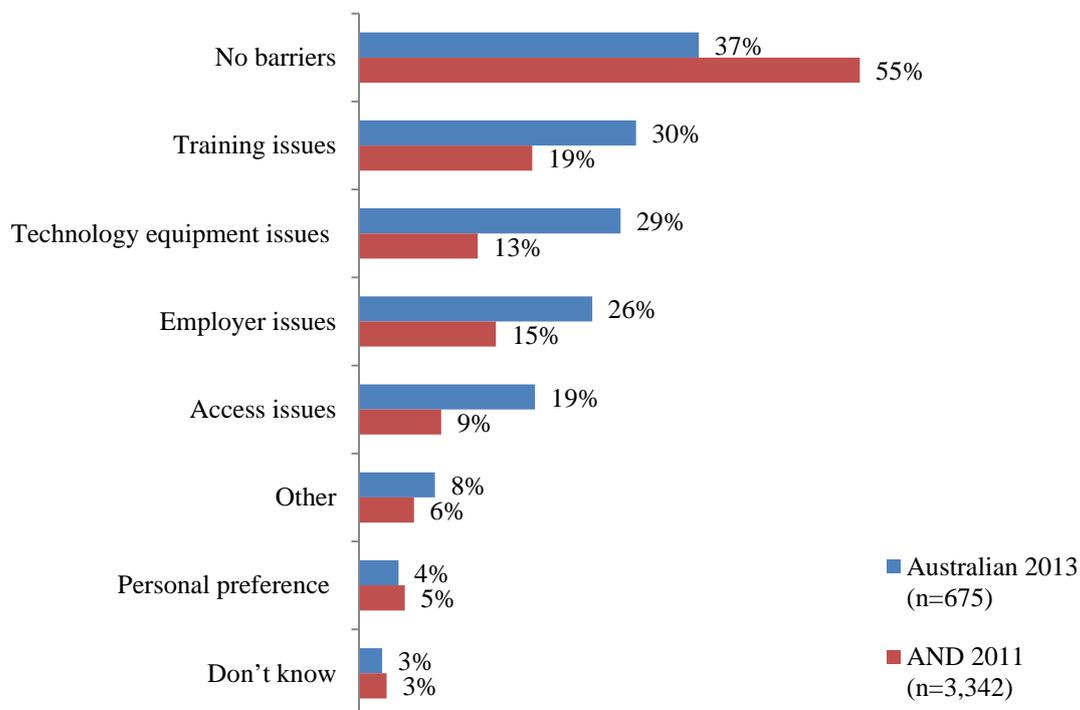


Similar Australian and Academy responses were received to 'I use data and technology available to me to problem solve' and 'I use data and technology available to me for decision making'. On a Likert scale of one to five, where one is 'strongly disagree' and five is 'strongly agree', Australian respondents recorded an average score of 4.22 related to problem solving and an average score of 4.03 related to decision making. Responses were evenly distributed across the practice areas and between questions, with the exception of dietetic students, mixed practice and consultation and business/private

practice. Within these three practice areas, respondents were significantly more likely to agree with the comment on problem solving (95%, 80% and 80% respectively) compared with the comment on decision making (79%, 69% and 63% respectively) ($p < 0.05$). Very similar results were reported by the Academy⁽¹⁰⁾ relating to using data and technology for problem solving with an average score of 4.17, and for using data and technology for decision making with an average score of 4.03.

‘No barriers’ to using technology was reported by 37% of Australian and significantly more (55%) of Academy¹² respondents ($p < 0.01$) as outlined in Figure 2. Of the Australian respondents reporting ‘no barriers’ 80% were from the practice area of informatics, 60% from the food industry and 50% from research. In addition, there were 26-30% of Australian responses reporting barriers of training, employer issues and technology equipment issues compared to less than 20% reported by the Academy.¹⁰

Figure 2: Comparison of 2013 Australian and 2011 Academy responses to the question on barriers: ‘What are the reasons/barriers (personal or work related) for not using information technology in your practice or for your education needs?’



Australian and Academy¹⁰ respondents believed that HIT can positively impact time management and improve the ability to access and analyse data (>50%), and were less likely to believe that HIT can improve patient safety, the quality of care and reduce medical errors (<44%). Of the Australian respondents, 93% reported improved access to research/education material, 71% enhanced time management and 69% improved access to patient data. These areas, along with others directly impacting on daily dietetic work activities (such as improved workflow efficiency and improved communication) were selected by greater than 50% of respondents. However, similar to the Academy,¹⁰ the areas related to higher organisational and patient outcomes had less percentage of respondents, being only 40% improved patient safety/quality of care and 22% reduction/prevention of medical errors.

Professional development (77%, 81%), training (69%, 63%) and resource materials (69%, 80%) were the top three methods selected for helping support the use of HIT for daily activities by Australian and Academy¹⁰ respondents respectively.

DISCUSSION

The survey results, whilst two years apart, demonstrate that dietitians in Australia are similar to their USA colleagues in their high level of comfort using technology, awareness of HIT workplace benefits, and low levels of organisational involvement in HIT management. Of great interest is that both respondent groups believe HIT can positively impact time management and improve the ability to access and analyse data, probably because these affect their daily work operations. However, both were less likely to believe that HIT can improve patient safety, quality of care and reduce medical errors, despite the mounting evidence.²⁻⁷ Perhaps these organisational and patient focused outcomes were poorly recognised by dietitians, as this data is collected by the organisation and are more difficult to link to specific interventions.

While similar in some areas, Academy respondents were significantly advanced in their level of integration of the EHR and involvement with HIT within their organisation. The significant differences in the implementation status of EHR, which was reported by 67% of Academy respondents compared to the 25% of Australian respondents is

reflective of the far more recent introduction of EHRs into the Australian healthcare system. The trend in this area will be interesting to monitor as EHR implementations increase in Australia.

Another significant difference was that more Academy respondents reported no barriers to using HIT. Australians reported higher levels of training, technology equipment, employer and access issues. The reported differences may be a reflection of the progressive Academy education initiatives. Along with developing nutrition informatics competencies, the Academy has developed training programs in informatics and HIT sessions at conferences. Interestingly, 19% of Australian respondents listed 'access' as a barrier to using HIT, contradicting the responses to the question specifically on access to technology where 97% of Australians had access to a computer in the workplace (83% dedicated computer). Respondents who selected access issues as a barrier may have been referring to access to suitable software or applications rather than hardware, and consequently a question to distinguish between software and hardware access would be useful in future surveys.

Although the general populations of Australia and the USA have comparable computer and Internet use and trends and similarities in their dietetic practice, the findings also highlight unique differences. Consequently, whilst the survey is generalisable to the rest of the dietetic population within each country and should be utilised to guide country specific HIT education and support, other countries might be encouraged to conduct surveys for their unique baseline data.

There is potential for participant responses to be biased towards those with an interest in the area of nutrition informatics, however, 54% were not familiar with the term nutrition informatics suggesting perhaps that a reasonable sample mix was achieved. The survey relies on self-reported use and experience of HIT, providing a relative indicator of actual use and experience and not a precise measure. This limitation is acknowledged by the authors and may account for some of the reported differences between Australian and Academy respondents.

Continued efforts to increase the awareness of nutrition informatics and HIT benefits amongst Australian dietitians are crucial, particularly at the patient and organisational level as this was not realised by the majority of respondents. The profession of dietetics in Australia is developing initiatives in this area which will need to maintain momentum and a high priority in order to continue to raise the profile and support continuing professional development. Research to contribute to the evidence of nutrition informatics benefits for patient nutrition care, and the development of best practice criteria for nutrition IS selection and use will be an important focus for the coming years.^{10,17}

As HIT and consumer-demand increases, so will the requirements for dietitians to be involved in HIT projects. Training and educational programs will be instrumental in overcoming the top three reported barriers of training, technology and employer issues, ensuring dietitians are equipped with the fundamental technology and information management skills to be involved and make informed decisions.¹¹ Initiatives to provide dietitians with the confidence and HIT skills to be proactive and pursue involvement will be the key to the future success of dietetic-related technological developments and implementations. This participation ensures that technology solutions reflect the standards and processes required by dietetic practice.¹⁰

Along with the repeat of the Academy survey in 2014, a repeat Australian survey in 2016 will provide an opportunity to monitor national progress as well as compare trends over time between the USA and Australia. In particular it will be interesting to reveal if in parallel to the increased uptake of EHR and other IS, whether dietitians are prepared and seize the opportunity to be involved within their organisations.

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Conflict of interest

KM acknowledges the non-financial support of her employer, The CBORD Group. MF, Director of Dietitian Connection, receives sponsorship from The CBORD Group.

Authorship

KM determined the key concepts for the paper, communicated with the Academy, prepared survey modifications, collected and collated survey results, conducted statistical analysis and drafted the manuscript. KW assisted in the survey modifications, statistical analysis and in the development of the manuscript. PW, MF and EB assisted in the survey modifications and in the development of the manuscript. EA and LH provided access and advice on the Academy survey and in development of the manuscript. All authors approved of the final version of the paper.

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