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Janine Castle is a Naturopath with 20 years of clinical practice experience in the area of family healthcare and uses nutraceuticals, homeopathy and herbal medicines with HTMA and Functional Pathology testing.

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Editorial: Give a man a fish – an innovative and sustainable new herbal medicine programme in Ethiopia

Jane Frawley
Editor, Australian Journal of Herbal Medicine
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“Give a man a fish and you feed him for a day; show him how to catch fish and you feed him for a life-time.”

I remember attending a particularly inspirational talk by Dr Gerry Bodeker, a leading academic in the field of traditional medicine, senior lecturer in public health at the University of Oxford Medical School and adjunct Professor of Epidemiology at Columbia University; at the 3rd International Congress on Complementary Medicine Research in Sydney in March 2008. He discussed the intimate relationship between plant biodiversity and human health and described a project in India where the government had given local people in a rural community a small patch of ground and 10 plants each to grow for personal use. The project was very simple but the health outcomes for the people involved were profound. Elizabeth d’Avigdor has conceived of a similar aid and development project in Ethiopia where she has pioneered the development of an indigenous medicinal herb garden in Fiche, a town North of Addis Ababa (capital city of Ethiopia). The ‘Living Pharmacy’ project is delivered in partnership with Global Development Group, an Australian non-government organisation that helps to develop and implement humanitarian ventures with the goal of providing long term solutions to poverty. The ‘Living Pharmacy’ project is partly funded by Blackmores®, an Australian health care company and delivered in conjunction with local partners and working groups from the Fiche community.

Whilst the use of modern medicine is becoming more popular in Ethiopia¹, recent research has shown that 80% of Ethiopian people still utilise traditional health care methods such as herbal medicine² as their primary source of medicine.³ In addition to this, about 90% of livestock are also dependent on traditional medicine.⁴ This form of health care is still popular in Ethiopia, as well as many countries in the developing world, due to poor access and the costs associated with modern health care. A recent study found the most common reasons for visiting a traditional healer in Addis Ababa were effectiveness of treatment (57.2%) and dissatisfaction with orthodox medicine (35.6%).⁵ It is vital and empowering then that communities can plant, grow and harvest their own plants for both their own use and to sell at market. Ms d’Avigdor details the development, challenges and successes of the ‘Living Pharmacy’ project in this edition of AJHM.⁶

Also in this edition Mathew Leach et al present the findings from a recent complementary and alternative medicine workforce survey.⁷ All current members of the National Herbalists Association of Australia were invited to participate in this study in 2013. Participants were asked a range of questions relating to their practice including demographic details (age, gender, area of residence and highest level of education) and practice details (primary occupation, clinic location, hours in practice/week, cost of consultations, income from practice, length of consultations and years in practice). The results and ensuing discussion are presented in this edition of AJHM. Dr Amie Steel made all editorial decisions regarding this manuscript in the place of Jane Frawley who was a contributing author.

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Botanica Ethiopia; a herbal experience

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"Ras metat allesh? (Do you have a headache?) Are you hot? Does your tummy hurt? Eshi, I will make up something for you, and you can go to sleep and when you wake up you will feel better. Gule, please fetch some Demakese and I will make it up for this poor girl for her fever!"

We were in Fiche, Ethiopia, and my daughter May, the journalist on the team, was unwell with fever and headache. Shikerke roasted some green coffee beans on a small brazier then threw some frankincense crystals onto the coals and while the smoky fragrance filled the room she pounded the roasted coffee beans into a powder. When the coffee was brewed and poured into a small cup from the clay pot, she added the leaves of the Demakese (Ocimum lamifolium) to infuse in the cup. When it was cool enough to drink May obediently took the brew. The patient then slept for several hours and awoke without fever, whereupon another woman fetched some leaves of Nech bahirzaf (Eucalyptus globulus), demonstrated rubbing them in her hands to get the juice and fragrance, and proffered the bruised leaves to May to inhale the strong scent. After a further long sleep, May awoke free of illness and able to continue her work reporting on the progress of the “Botanica Ethiopia: A Living Pharmacy”; a project to support this community in saving their herbs and their knowledge for future generations.

I was in Ethiopia to conduct research into the use of herbal medicine in Fiche, which is a rural town 115 km north of Addis Ababa at an elevation of 2700 metres above sea level. The research was conducted under the supervision of Dr. Hans Wohlmuth at Southern Cross University as part of a Masters in Clinical Science (Comp.Med.) degree, with the support of Addis Ababa University and the Ethiopian Institute of Biodiversity. Over a period of two months I visited the community to conduct focus group interviews, individual interviews, “walkabout/talkabout” sessions and a market survey. It was a family team affair with my son doing the film camerawork and my daughter recording events for future website and blog reporting. Hooray for volunteers!

My time spent with the community taught me much more than the useful results of this study, and the Botanica Ethiopia project developed alongside and as a result of this research. The Botanica Ethiopia: A Living Pharmacy (J655N) project is delivered in partnership with Global Development Group, an Australian NGO that carries out humanitarian projects and provides long-term solutions to poverty. Partnering with Global Development Group means that all activities are conducted and monitored according to aid and development guidelines.

Before I embarked on this activity I looked at what has been done elsewhere in the world to investigate indigenous use of herbs as medicine. I came across some inspiring work preserving traditions in India, Brazil and South Africa,1,2,3 as well as elsewhere in Ethiopia. Gerard Bodeker’s Global Atlas of Traditional, Complementary and Alternative Medicine4 was an eye-opener, showing a global picture of the status of herbal medicine traditions. Throughout the world the use of plants to treat sickness has been the basis of medicinal practice for thousands of years and in Ethiopia this tradition continues as a fundamental practice of significance to the health of the family in daily life.

Most Ethiopians rely on traditional medicine for their primary health care using knowledge passed down through the family or by seeking help from professional herbalists in the various religious traditions.5,6 As with many other places in the world there are warnings in the literature that this knowledge is likely to be lost to future generations if the learned information is not documented and if the plants are not protected from threats of land degradation, over-harvesting in the wild and lack of documentation. Given the importance of maintaining access to their herbal medicine as well as access to modern medicine, the Ethiopian Government encourages programmes which support ethnobotanical surveys and research which may lead to integration of traditional herbal medicine with allopathic medicine in community outreach facilities.7

Conducting research in a country where I don’t speak the language, where I am learning about plants yet I am not a botanist, where I am studying people in their environment yet I am not an anthropologist, may seem a somewhat arrogant proposition for this humble herbalist. And in hindsight it probably was, but with support and encouragement from people who recognised a good idea in the making I was able to recruit experts to guide me through the difficulties.

One of the most important things I did was to engage the help of Dr. Zemede Asfaw, Associate Professor of Ethnobotany in the College of Natural Sciences at Addis Ababa University (AAU). I wrote introducing myself and
describing what I wanted to do in terms of research and thus started a correspondence. When I arrived in Ethiopia Dr. Zemede facilitated collaboration between myself and the University, and introduced me to Dr. Tesfaye Awas of the Ethiopian Institute of Biodiversity (EIB) in Addis Ababa. Dr. Tesfaye organised official collaboration with the EIB, conducted the vital ethnobotanical survey which collected the plants identified by the community at Fiche as important to their herbal medicine and provided translation of interviews. The plants were collected, dried and deposited as voucher specimens at the EIB Herbarium. To our knowledge this is the first ethnobotanical survey of the area and contributes to the existing data of Ethiopian plants. A postgraduate ethnobotany student at AAU, Abiyu Enew, subsequently conducted further research of the area and surrounds under the supervision of Dr. Zemede. Throughout, Hans, Zemede and Tesfaye kept me on track with protocols and advice and became co-authors on the journal article detailing our research findings.

I learnt, in the nicest way, the truth of the saying: it is not what you know but whom you know. Another essential contribution came from Lakew Gebeeyehu. Lakew lives in Addis Ababa but comes from Fiche, has qualifications in agronomy and has worked with government and overseas NGOs all his working life. I have known him for 20 years and I learnt only four years ago that he has a passion for preserving herbal plants and had many great ideas for developing household herb gardens in communities. Lakew was able to connect me with community in Fiche and facilitated the initial recruitment of informants. Fortunately I was not entirely new to all things Ethiopian and my connection with the country spanned some 12 years to this date. I could manage a basic conversation in Amharic, the official language (and one of many languages) of Ethiopia and I had visited the country three times previously.

I have just described the ingredients I consider the most important in being able to conduct research and implement a programme in a very different environment. I will mildly gloss over the hoops that had to be jumped through because I want this article to encourage, not deter, anyone who wants to do something similar, but suffice to say that in addition to my learning at University I learnt:

- NGO-language (goals, aims, objectives, outcomes, outputs, risk management, monitoring, stakeholders etc.).
- How to write a funding proposal (using NGO-language).
- How to write a funding budget.
- How to be accountable every step of the way.
- How to communicate the activities and progress of the project.
- Some conversational Amharic (and quite a number of local plant names in Amharic).

All of these tasks involved asking many generous people to share their skills with me, to teach me what is required to do it properly from outset. This stringent learning process has at times been frustrating and challenging but ultimately very rewarding.

The results of the research showed that herbal medicine is alive in this community, but they face significant challenges in maintaining their access to herbs and knowledge due to land degradation, over-harvesting in the wild, encroaching industry and acculturation. Both women and men are significant holders of knowledge which is passed on in the oral tradition. All are aware of the threats to their plants, and the professional herbalist neatly summed it up when he was advised of the reason for research and project activities:

“Teruneew (it is good). This has to happen. I used to find herbs everywhere, now I have to walk for two days to find some herbs. Even in the forest areas, some don’t exist any more at all…now everyone is looking for herbs, but no-one plants and looks after them. We are losing the knowledge.”

For a walkabout/talkabout session and collection of plant voucher specimens I was guided out to the escarpment above the River Jemma, a river that is a tributary of the Blue Nile. Some of the true beauty of Ethiopia could be seen in this deep and dramatic gorge, and the ancient landscape that stretched out as far as the eye could see. From deep below in the valley, a woman carrying a huge bundle of recently cut branches for firewood trudged up the steep hillside. A young boy was herding goats and he showed us how he cuts off a branch of an acacia, strips it and uses it as a toothbrush, chewing on it throughout the day. He also showed us plants used as herbs and described their uses. Dr. Tesfaye asked a group of boys to find a sample of *Aloe pulcherrima*, known to be in the area but described as becoming inaccessible, and within half an hour they returned with a beautiful sample for cataloguing. They then proceeded to carefully replant unused roots.

Women were identified as holding significant knowledge of how to apply herbs to treat family sicknesses, but I noticed they were so busy with their daily

Figure 1: Garden flourishing
chores that they were not able to spend more than an hour at a time at interviews. Many of our interview sessions were conducted to the background swoosh-swoosh of a butter churn, or the crackle of coffee beans roasting and of course with children joining in on the fun. Most of the literature discusses how knowledge is usually passed on in the oral tradition through the male line, from father to son or in the religious teachings, but all informants at Fiche agreed that ‘the women hold more knowledge on how to treat the family’. I would recommend that future researchers consider how to enable women to attend interviews so that they may equally share their knowledge.

At the completion of research activities, I asked the community whether they wanted to take further steps to look after their knowledge and their herbs, and how Botanica Ethiopia could support them to do this. Perhaps they would like to form an association?

“Of course. How can you carry a bundle of sticks without a tie?” said Ato Abi, the professional herbalist.

Ato Abi has 29 children and six wives. Age is sometimes hard to discern amongst rural Ethiopians who may not have birth records, but I was told he was in his seventies, a very healthy-looking man. The group debated the issues and decided that they would like to form an association and work co-operatively, supporting each other by sharing their household herb gardens, and the professional herbalist said he would supply plants to those who needed them. We somewhat fortuitously discovered that local government has to be apprised of collective agreements such as this, so we engaged with local Council and City Council, which sent representatives.

And so at one memorable meeting Council members advised the group on how to form an official association, and there and then voting took place. All of a sudden, the Etse-Fewus (Healing Herbs) Association was formed and office bearers appointed. Since then the group has provided Articles of Association and an official seal for paperwork, and has opened up a bank account to manage and distribute funds as required. And we have the wonderful Tessema Bekele as our Project Liaison Officer to visit, advise and report to Botanica Ethiopia on progress. Tessema is Director of the Emmanuel Development Foundation, an Ethiopian NGO, and the value of his input and guidance is immeasurable.

And the outcome? There is a strong, resourceful, knowledgeable and skilled group which started with 20 people in Fiche (lay community members and one professional herbalist) who showed their commitment...
by co-operatively revitalising their home gardens. The group is growing and women and men are equally involved. Those who had gardens shared with those who did not and decisions are made with democratic contributions by all.

As a result of this demonstration City Council donated to them a large block of community land for developing as a community herbal garden. In a country where land is becoming a premium for industry and development this is a major success. The aim is that this garden may be a display for other interested communities and now the ideas are flooding in as to future plans. Initially the group would like to implement beekeeping and this may be a potential source of income. I have learnt the importance of taking small steps and keeping some ideas ‘on the shelf’ until we are ready for them; in this way we have measurable outcomes and minimise risk. The group have shown they are by no means helpless and that a small degree of support will go a long way. They are directing activities and democratically discussing their future plans.

As Tessema puts it: “They have the knowledge and experience. Development starts with their own thinking, not from ours – from their own society, culture, norms and values. And in the end, they are the ones to see success and say: ‘This is my project, I have done this, this is my own brand.’ Fiche is one of the model self-helps groups in my eyes. They have done it for themselves.”

If you were to visit today you would see the fenced garden filled with herbal plants, with a line on one side of the beautiful Kosso (Hagenia abyssinica) trees (the leaves are used as a tapeworm infection remedy). Also on the perimeter are herbs that have been planted to keep away the evil spirits – like Gizawa (Withania somnifera). There is a newly-built dam and a small guardhouse.

I will be returning to Ethiopia in December 2014 to conduct a workshop with all the key stakeholders to document the process that has contributed to the success of the project so far. This will be used to write a codification manual, a written “how-to” account of how it was done, and will form the template that other communities or groups may use to support their own programs, therefore providing what is arguably the most important aspect of any community aid development project: a measure of sustainability.

We are proudly moving on to Stage 2 of the project, which will involve increasing the capacity of the group via permaculture training, promoting their activities and achievements to the wider community and exploring some livelihood options for income-earning potential. Later this year this resourceful group will attend a five-day permaculture training skills workshop. Strawberry Fields, an Eco-Lodge and Permaculture Farm (http://www.permalodge.org/) in Southern Ethiopia, provides

Figure 3: Local women at the garden
Commentary

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Susan Dean passed away peacefully on Sunday March 9, 2014. Sue was an esteemed Fellow and past President (2001-2005) of the National Herbalists Association of Australia (NHAA). I served on the board as an examiner during this time and remember Sue as both a dynamic, intelligent and determined president and a wholehearted, inclusive and kind mentor. Below is a vale collated from many of Sue’s colleagues and friends honouring and celebrating her wit and humour, sharp intelligence and passion for the profession she loved.

**Jane Frawley, past Director NHAA, Editor AJHM**

I had the pleasure of working with Susan Dean on the NHAA Board from 1999 to 2005. Sue Dean joined the NHAA Board in 1999 as an executive officer, having graduated from the Southern School of Natural Therapies as a naturopath in 1998. She took up the role of president in 2001. She hit the ground running as president. Sue Dean and Ruth Trickey embarked on a national tour called “Promoting our future” by running consultative meetings on a national registration scheme for practitioners. Sue understood complex issues and was able to articulate these clearly to herbalists, naturopaths, government departments, media and the public alike. She was a grass roots naturopath and an icon in her local community of Ballarat, often running local events to promote herbal medicine.

Susan Dean was warm, dynamic, vibrant, enthusiastic, passionate, wise, intelligent, playful, inclusive, and leaves not only a great legacy to the NHAA but to her daughter Nellie who she loved dearly and in whom she was enormously proud.

**Ses Salmond, past Vice-President NHAA**

It was with great sadness that I heard of Sue’s illness and passing. I have fond memories of our working together for the NHAA. Sue was a wonderful soul with a joyful and caring nature who worked tirelessly for the profession, representing Australian herbalists on the national stage as president of NHAA. We all owe a debt of gratitude for Sue’s work in furthering the cause of professional herbalists. Our love and condolences to her family, Sue will be missed by us all.

**David McLeod, past President NHAA**

Sue Dean was a mate.

I first met Sue when we were elected as directors of the NHAA board in 1998. The sheer volume of information and the size of the job for which we had volunteered overwhelmed us both. Sue, in her imitable fashion, took a deep breath, created a list of things to achieve and got on with the job. Sue was known for her lists. Everything she did she did with a list to ensure she did not miss an important detail. This was a habit I soon adopted.

Sue’s abilities as an organiser soon stood out and she was elected to the presidency of the NHAA at a very crucial time for the profession. The work on the Lin report was in full swing and Sue was invited to participate in the compilation of the report. This work was added to her life where she was already juggling a clinic, the presidency and probably the most important work in her life, Nell her daughter.

When Sue stepped down from the president’s role her work for the association continued in a support role. She unstintingly supported me as I grew into the position and organised meetings with the Department of Human Services legislative officers that were held in her house in Ballarat.

Her passion for herbal medicine and the work of the NHAA never wavered, ever.

Personally, it is hard to put into words how Sue affected my life. She was always open, friendly, opinionated and passionate. We spoke often on the phone and whenever business took me to Ballarat we found time to have a chin wag over coffee or a meal, which more often than not included her beloved Nell.

Sue was a friend whose passing leaves a gap in my life and I will miss her.

**John Baxter, past President NHAA**

I was a colleague and friend of Sue Dean during the 1990s when we both served in various capacities on the NHAA Board of Directors. Subsequently we stayed in touch for several years and I supplied her clinic with the Hypericum infused oil which she loved so much. I remember her as gentle but most forthright when it came to the business and politics of the NHAA. She took on the reigns of presidency at a difficult time when it came to the business and politics of the NHAA. She was a friend whose passing leaves a gap in my life and I will miss her.

**Andrew Pengelly, past Director NHAA**

I remember Sue as an engaged and questioning student, someone who brought her critical mind and lively sense of humour to class. She matured into a warm and thoughtful practitioner with great skills and attention...
In memoriam

to detail. I would see her at conferences and seminars, her curly hair nodding, deep in earnest conversation with herbalists; making her point, laughing and enjoying the company of like-minded people. As president of the NHAA she was forthright, communicative and efficient. She pushed along a national agenda for the profession at meetings and seminars across the county and in numerous committees. She worked hard in meetings with government, manufacturers and practitioners to move the profession to a better place and to articulate our position to a wider society. She was a force to be reckoned with.

Sue we shall miss you greatly as a peer, a practitioner and a person. It is a loss for our profession to be without such a learned, practical and warm woman.

Assunta Hunter

I was so sad when I heard that Susan Dean had developed a terminal form of breast cancer that left her with very little time. But as I’d seen from her time on the NHAA Board and as president, she was an amazing woman, strong yet gentle and caring. She, like many others in her place, took on the role of President under some duress, and did an exceptional job for four years from 2001-2005, during which time she was influential in the development of course accreditation guidelines and competency standards for the profession, a more targeted direction for the association and of course the ongoing registration issues, to mention just a few. Sue brought up a lovely daughter on her own, had her own clinic in Ballarat and still managed to hold a full role with the association, not just as leader, but doing presentations throughout the country, being mentor to students and developing friendships with so many of her colleagues. Sue’s attitude to her death in her last few months was inspiring and humbling. She had no regrets or bitterness, just a profound love and compassion for others – an attitude that has left its mark on myself and I’m sure on many others.

Anne Cowper, past secretary NHAA

I worked closely with Susan Dean on the board of the NHAA in the early 2000s, firstly as one of the examiners on her team, then when I took over her role of coordinating examiner and she became president. Our passion for high standards in education made us a great pair, and during this period Sue and I worked tirelessly to revamp the NHAA course accreditation system into a modern, rigorous system. I got to know Sue personally, travelling around with her for weeks at a time as we visited, consulted with and assisted 21 different training institutions across the country. She was a great travelling companion, always professional whilst also being a caring and gentle soul. We shared many personal and professional stories, laughed over a few glasses of wine, and made a fantastic team in our efforts to raise the bar in herbal and naturopathic education.

I firmly believe that the profession of herbal medicine in Australia is stronger because of her efforts, and I feel richer for having known Sue during those years. My best wishes go to her daughter Nell, and the rest of Sue’s family. I will miss Sue’s face at conferences, yet at the same time I am glad her battle is over and she can get the rest she deserves.

Ian Breakspear, past Vice-President NHAA

Susan worked with us since the early days of the postgraduate Wellness program, teaching a subject called ‘Herbs and Natural Supplements’ which is an online elective in the Master of Wellness program. Susan developed the learning package for the subject to a much higher standard, drawing on her own knowledge and experience as a Master’s graduate in herbal medicine. We appreciated very much her excellent level of knowledge in this area and her skills with online teaching and supporting her students. Students who complete the elective gain not only knowledge of selected herbs and supplements, but the ability to locate and assess published research in those fields.

We didn’t see Susan as often as we would have liked because she lived in Ballarat and taught online from home. But she was usually able to come when we had a staff retreat and it was always a joy to see her and catch up with her life. We didn’t realise that Susan was unwell until early this year when our program leader, Professor Marc Cohen, told us that she had breast cancer and would not be able to teach this semester. The next news we had, just a few weeks later, was that she had passed away which was a great shock to us all.

Susan was a beautiful soul, a dedicated educator, a wonderful colleague and one of Australia’s passionate pioneers in the field of herbal medicine. May her legacy live on as a loving reminder of the memorable personality that was Susan Dean.

Rest in peace Susan, and blessings for the new journey you have begun.

From the Wellness staff, Royal Melbourne Institute of Technology, (RMIT), School of Health Sciences
Characteristics of the Australian complementary and alternative medicine (CAM) workforce

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Abstract
Background/aim: The complementary and alternative medicine (CAM) workforce is the third largest occupational group in the Australian health sector. Yet the profile of this workforce is not well understood. This study aims to provide new insight into the Australian CAM workforce by exploring the demographic and practice characteristics of this occupational group.

Methodology: Members of the National Herbalists Association of Australia (NHAA) were invited to participate in a descriptive, online survey. The NHAA, comprising of 1,125 members, is a professional association representing both Western herbalists and naturopaths, although nearly half of members primarily practice in another CAM discipline. The 82-item survey consisted of demographic questions (e.g. gender, age, highest qualification, place of residence, location of business), questions related to CAM practice (e.g. main occupation practiced, years in practice, employment type, number of clients consulted per week, fees charged and annual taxable income for practice), and questions relating to NHAA membership.

Results: A response rate of 35.4% (n=399) was obtained. Participants were primarily female (86.7%), aged between 41-60 years (56.1%) and resided in a major city (61.7%). The majority of respondents (37.1%) held an undergraduate degree as their highest qualification, with 34.6% holding a postgraduate qualification and 27.6% holding an advanced diploma or lower-level qualification. Respondents most commonly practiced naturopathy (61.6%), herbal medicine (51.9%), nutrition (15.2%), massage therapy (14.4%) or another discipline (20.2%), with the majority of participants being in practice in their main modality for less than 10 years (47.6%). The number of years in practice, initial consultation fee and employment type were found to be statistically significantly associated with a higher income from clinical practice (p<0.001).

Conclusion: The CAM workforce is a significant part of the healthcare landscape in Australia. Findings from this study suggest that the profile of this occupational group is changing, with signs of a shift toward a more female-dominant, part-time and highly qualified workforce. A more comprehensive investigation of the CAM workforce is now needed to corroborate these findings and to explore the implications of these results on CAM practice and policy.

Keywords: Complementary and alternative medicine, herbal medicine, occupation, profession, naturopathy, workforce, survey

Introduction
The Australian health care system is serviced at the grassroots level by a myriad of health care providers who span across multiple disciplines and various public and private settings. Nurses represent the largest segment of the Australian health workforce (n=169,734 workers), followed by medical practitioners (n=33,169).1 Complementary and alternative medicine (CAM) therapists, with approximately 19,401 workers, represents the third most prevalent occupational group in the Australian health sector, exceeding that of any single allied health profession.2 In the context of this study, CAM is defined as a group of diverse health care practices that are generally considered to be outside of conventional medical practice, such as naturopathy, herbal medicine, massage therapy, osteopathy, traditional
Chinese medicine and clinical nutrition.3

While there is a large body of literature describing the nursing, medicine and allied health labour force, there has been very little work exploring the CAM workforce. This is concerning because, although CAM represents approximately seven percent of the total health workforce,1,2 there is a high level of consumer demand for these services. In fact, the expressed demand for CAM services in Australia is similar to the expressed demand for conventional medical care2 with Australian adults in 2005 making approximately 69.2 million visits to CAM providers, compared with 68.9 million consults with conventional medical practitioners.4

There are a number of reasons why the provision of data on the CAM workforce is important. First, it improves our understanding of the size and composition of the workforce. Second, it allows us to better meet the training and continuing education needs of the profession. Third, it ensures the provision of a competent workforce to service the needs of consumers.2 As well as supporting consumers and the CAM profession, this data is valuable to researchers and key stakeholders involved in future health workforce and health services planning.

To date, few studies have described the CAM workforce. Four Australian surveys that have examined the characteristics of members of professional CAM associations5,6 or health insurance agencies,7,8 are now more than a decade old. As well as being dated, these surveys are limited in scope to herbalists, naturopaths and/or acupuncturists/TCM practitioners, who represent only a portion of the CAM profession. These limitations hinder our current understanding of the Australian CAM workforce.

A more recent study, published in 2013, used national census data to assess CAM workforce supply across five countries.2 While this study presented findings that were more representative of the Australian CAM workforce, there were some notable limitations with the data used. For instance, some occupations (e.g. herbalists) were not reported in the census, and further, some disciplines were inappropriately reported in aggregate form with non-CAM professions. One of the recommendations arising from this work was the need for a more recent and comprehensive survey of the CAM workforce.

Aims and objectives

The aim of this research was to describe the Australian CAM workforce through the membership of a professional CAM association, the National Herbalists Association of Australia (NHAA). The objectives of this study were to:

1. Identify the demographic characteristics of a segment of the Australian CAM workforce.
2. Describe the professional and practice characteristics of a segment of the Australian CAM workforce.
3. Examine the relationship between demographic and practice characteristics and gross taxable income and employment type.

Sample

The study sample comprised of members of the NHAA. The NHAA, formed in 1920, is a not-for-profit professional association that represents Western herbalists and naturopaths, although almost one-half of members identify another CAM modality as their primary occupation. At the time of the survey, the NHAA had a total of 1,126 members, of which 867 were full members (i.e. practitioners who have completed a recognised qualification in naturopathy or Western herbal medicine), 122 were student members (i.e. students of naturopathy or Western herbal medicine), and 137 were companion members (i.e. practitioners who have joined the NHAA as a second association or anyone with an interest in herbal medicine). All current financial members of the NHAA were invited by email to participate in the survey. Two reminder emails were sent to members at one and two weeks after the survey opened in order to increase participation. The survey was conducted between April and June 2013.

Survey

The survey was developed by the NHAA executive officer in conjunction with the association’s board of directors. The 82-item survey was delivered online using the SurveyMonkey® platform, and comprised of three sections. The first section captured the demographic characteristics of participants, including gender, age, highest qualification, place of residence, location of business and remoteness area. The second section asked questions relating to CAM practice, such as main occupation practiced, years in practice, employment type, number of clients consulted per week, fees charged and annual taxable income for practice. The final section solicited responses relating to NHAA membership. All sections contained a combination of Likert-type scales, closed-ended questions and open-ended questions.

Statistical analysis

SPSS (Version 22) was used to calculate descriptive and inferential statistics. The data were assessed for skewness and screened for missing values. As most variables were skewed, and data were categorical and
ordinal, a nonparametric method of analysis was used. Frequency distributions and percentages were used to describe the data. Pearson chi-square test of contingency (\( \alpha = 0.05 \)) was used to assess the strength of the relationship between: gross income and practitioner age, highest qualification, area of residence, years in practice, employment type and employment status; and between age, gender and type of employment. Cramer’s V was used to determine the effect size of all relationships between variables.

**Ethics**

The survey was initially undertaken by the NHAA for internal purposes. The research team (authors) approached the NHAA seeking permission to analyse the de-identified data, with permission granted by the NHAA board of directors.

**Results**

A total of 399 NHAA members completed the survey, providing a response rate of 35.4%.

<table>
<thead>
<tr>
<th>Table 1: Demographic characteristics of participants ( (n=399) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td><strong>Age [years]</strong></td>
</tr>
<tr>
<td>21 – 30</td>
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<tr>
<td>31-40</td>
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<tr>
<td>41-50</td>
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<tr>
<td>51-60</td>
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<tr>
<td>&gt; 60</td>
</tr>
<tr>
<td><strong>State/Territory of Australia</strong></td>
</tr>
<tr>
<td>NSW</td>
</tr>
<tr>
<td>VIC</td>
</tr>
<tr>
<td>QLD</td>
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<tr>
<td>WA</td>
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<td>TAS</td>
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<td>Overseas</td>
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<tr>
<td>ACT</td>
</tr>
<tr>
<td>NT</td>
</tr>
<tr>
<td><strong>RA Class [residential location]</strong></td>
</tr>
<tr>
<td>Major City</td>
</tr>
<tr>
<td>Inner Regional</td>
</tr>
<tr>
<td>Outer Regional/Remote</td>
</tr>
</tbody>
</table>

RA = Remoteness Area, according to the Department of Health (2014)

<table>
<thead>
<tr>
<th>Table 2: Professional characteristics of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Qualification ( (n = 399) )</td>
</tr>
<tr>
<td>No Qualification</td>
</tr>
<tr>
<td>Certificate, diploma, advanced diploma</td>
</tr>
<tr>
<td>Undergraduate Degree</td>
</tr>
<tr>
<td>Postgraduate qualification</td>
</tr>
<tr>
<td>**Primary occupation ( (n = 362) )</td>
</tr>
<tr>
<td>Naturopath</td>
</tr>
<tr>
<td>Herbalist</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Nutritionist</td>
</tr>
<tr>
<td>Massage therapist</td>
</tr>
<tr>
<td>Homoeopath</td>
</tr>
<tr>
<td>Nurse</td>
</tr>
<tr>
<td>Researcher</td>
</tr>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>Traditional Chinese medicine</td>
</tr>
<tr>
<td>General practitioner</td>
</tr>
<tr>
<td>Pharmacist</td>
</tr>
<tr>
<td>Chiropractor</td>
</tr>
<tr>
<td>Osteopath</td>
</tr>
</tbody>
</table>

| **Years working in primary occupation \( (n = 362) \) | \( n(\%) \) |
| < 1 year | 30 (8.3) |
| 1 to 5 years | 85 (23.5) |
| 6 to 10 years | 75 (20.7) |
| 11 to 15 years | 53 (14.6) |
| 16 to 20 years | 29 (8.0) |
| > 20 years | 52 (14.4) |
| Not in clinical practice | 38 (10.5) |

*Multiple responses, with percentages listed as the percentage of cases.

**Demographic characteristics**

The majority of participants were female (86.7%), and most (61.7%) lived in a major city. New South Wales had the highest number of respondents (38.1%), with the least residing in the Northern Territory (0.5%). Participants were most commonly aged between 51-60 years (28.3%), although a similar proportion were aged between 41-50 years (27.8%) and 31-40 years (24.6%) (Table 1).

**Professional characteristics**

Most respondents (37.1%) held an undergraduate degree as their highest qualification, with a total of 34.6% holding a postgraduate qualification. Less than one-third of participants (27.6%) possessed a qualification at or
below the level of advanced diploma. The most frequently reported practice disciplines were naturopathy (61.6%), herbalism (51.9%), nutrition (15.2), massage therapy (14.4%) and other (20.2%); noting that participants could select more than one main occupation for this question. More than half (55.4%) of all respondents identified as having multiple professions. The majority of participants were in practice in their primary profession for 1-10 years (44.2%) (Table 2).

**Practice characteristics**

More than half of participants had a clinical practice in a major city (63.3%), worked part-time (51.1%) and were self-employed (87.7%). Most practitioners who worked part-time or casually (42.1%) spent less than 10 hours in clinical practice per week (Table 3). The majority of respondents in clinical practice (55.4%) earned less than $25,000 of gross taxable income per annum.

The majority of practitioners (78.3%) conducted less than five consultations per week on average. Consultations were primarily delivered face-to-face (99.7%), with few practitioners (14.2%) also delivering consultations by email or online. Most practitioners (56.9%) charged less than $100 for an initial consultation, and spent between 46 and 60 minutes completing the initial consult (41.7%). Likewise, most practitioners (89.9%) charged less than $100 for a follow-up appointment, spending between 31 and 45 minutes for this consult (37.9%). However, almost as many practitioners (33.8%) spent between 16 and 30 minutes in a follow-up consultation (Table 3).

**Relationship with gross taxable income**

Years in primary occupation ($\chi^2 = 76.59, p<0.001$, Cramer’s $V = 0.293$, n=298), initial consultation fee ($\chi^2 = 58.08, p<0.001$, Cramer’s $V = 0.261$, n=285) and employment type ($\chi^2 = 120.76, p<0.001$, Cramer’s $V = 0.450$, n=298) all had a moderate and statistically significant relationship with gross taxable income. Level of qualification, clinic location and employment status

<table>
<thead>
<tr>
<th>Clinic location [RA class] (n=297)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major City</td>
<td>188 (63.3)</td>
</tr>
<tr>
<td>Inner Regional</td>
<td>53 (17.8)</td>
</tr>
<tr>
<td>Outer Regional/Remote</td>
<td>56 (18.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GTI from clinical practice [AUS] (n=298)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 25,000</td>
<td>165 (55.4)</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>67 (22.5)</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>34 (11.4)</td>
</tr>
<tr>
<td>&gt; 75,000</td>
<td>32 (10.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment type (n=362)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td>99 (27.3)</td>
</tr>
<tr>
<td>Part-time</td>
<td>185 (51.1)</td>
</tr>
<tr>
<td>Casual</td>
<td>78 (21.5)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Employment status (n=332)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-employed</td>
<td>291 (87.7)</td>
</tr>
<tr>
<td>Employed (paid wage)</td>
<td>33 (9.9)</td>
</tr>
<tr>
<td>Retired</td>
<td>8 (2.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of consultations per week (n=290)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>227 (78.3)</td>
</tr>
<tr>
<td>6 - 10</td>
<td>42 (14.5)</td>
</tr>
<tr>
<td>11 - 15</td>
<td>10 (3.4)</td>
</tr>
<tr>
<td>&gt; 15</td>
<td>11 (3.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hours worked per week [part-time/casual only] (n=261)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10</td>
<td>110 (42.1)</td>
</tr>
<tr>
<td>11 - 20</td>
<td>87 (33.3)</td>
</tr>
<tr>
<td>21-30</td>
<td>47 (18)</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>17 (6.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial consultation fee [AUS] (n=288)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100</td>
<td>164 (56.9)</td>
</tr>
<tr>
<td>101 - 150</td>
<td>106 (36.8)</td>
</tr>
<tr>
<td>151 - 200</td>
<td>12 (4.2)</td>
</tr>
<tr>
<td>&gt; 200</td>
<td>6 (2.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Follow-up consultation fee [AUS] (n=288)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100</td>
<td>259 (89.9)</td>
</tr>
<tr>
<td>101 - 150</td>
<td>27 (9.4)</td>
</tr>
<tr>
<td>151 - 250</td>
<td>2 (0.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of initial consultation [minutes] (n=290)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 15</td>
<td>15 (5.2)</td>
</tr>
<tr>
<td>46 - 60</td>
<td>121 (41.7)</td>
</tr>
<tr>
<td>61 - 75</td>
<td>93 (32.1)</td>
</tr>
<tr>
<td>76 - 90</td>
<td>46 (15.9)</td>
</tr>
<tr>
<td>&gt; 90</td>
<td>15 (5.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of follow-up consultation [minutes] (n=290)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 15</td>
<td>4 (1.4)</td>
</tr>
<tr>
<td>16 - 30</td>
<td>98 (33.8)</td>
</tr>
<tr>
<td>31 - 45</td>
<td>110 (37.9)</td>
</tr>
<tr>
<td>46 - 60</td>
<td>69 (23.8)</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>9 (3.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of consultations (n=295)*</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-to-face</td>
<td>294 (99.7)*</td>
</tr>
<tr>
<td>Skype/Phone</td>
<td>70 (23.7)*</td>
</tr>
<tr>
<td>Email/online</td>
<td>42 (14.2)*</td>
</tr>
</tbody>
</table>

GTI = Gross Taxable Income. RA = Remoteness Area, according to the Department of Health (2014).

*Participants not in clinical practice were excluded.

*Multiple responses, with percentages listed as the percentage of cases.
were not significantly related to gross taxable income (Table 4).

Relationship with employment type
A statistically significant relationship was found between employment type and gender ($\chi^2 = 9.49, p<0.05$, Cramer’s $V = 0.162, n=362$), although the strength of the association was small. There was no statistically significant relationship found between age and employment type (Table 5).

<table>
<thead>
<tr>
<th>Gross taxable income [AUS]</th>
<th>&lt; 25,000</th>
<th>25,001–50,000</th>
<th>51,000 –75,000</th>
<th>&gt; 75,000</th>
<th>Total</th>
<th>Chi square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adv Dip or lower</td>
<td>29.1 (48)</td>
<td>16.4 (11)</td>
<td>29.4 (10)</td>
<td>31.3 (10)</td>
<td>26.5 (79)</td>
<td></td>
</tr>
<tr>
<td>Bachelor degree</td>
<td>37.6 (61)</td>
<td>40.3 (27)</td>
<td>35.3 (12)</td>
<td>25.8 (8)</td>
<td>36.2 (108)</td>
<td></td>
</tr>
<tr>
<td>Post graduate</td>
<td>33.9 (56)</td>
<td>43.3 (29)</td>
<td>35.3 (12)</td>
<td>43.8 (14)</td>
<td>37.2 (111)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55.4 (165)</td>
<td>22.5 (67)</td>
<td>11.4 (34)</td>
<td>10.7 (32)</td>
<td>100 (298)</td>
<td>6.36</td>
</tr>
<tr>
<td>Clinic location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major city</td>
<td>66 (103)</td>
<td>62.7 (42)</td>
<td>56.3 (18)</td>
<td>62.5 (20)</td>
<td>63.8 (183)</td>
<td></td>
</tr>
<tr>
<td>Inner regional</td>
<td>17.9 (28)</td>
<td>17.9 (12)</td>
<td>18.8 (6)</td>
<td>9.4 (3)</td>
<td>17.1 (49)</td>
<td></td>
</tr>
<tr>
<td>Outer regional/rural</td>
<td>16 (25)</td>
<td>19.4 (13)</td>
<td>25.8 (8)</td>
<td>28.1 (9)</td>
<td>19.2 (55)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>54.4 (156)</td>
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<td>11.1 (32)</td>
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<td>9.7 (29)</td>
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<td>1 to 5</td>
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<td>14.9 (10)</td>
<td>11.8 (4)</td>
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<td>24.8 (74)</td>
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<td>6 to 10</td>
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<td>32.8 (22)</td>
<td>20.6 (7)</td>
<td>9.4 (3)</td>
<td>23.2 (69)</td>
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<td>11 to 15</td>
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<td>17.6 (6)</td>
<td>21.9 (7)</td>
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<td>16 to 20</td>
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<td>9.4 (3)</td>
<td>9.1 (27)</td>
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<tr>
<td>&lt; 20</td>
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<td>16.4 (11)</td>
<td>35.3 (12)</td>
<td>46.9 (15)</td>
<td>17.1 (51)</td>
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<tr>
<td>Total</td>
<td>55.4 (165)</td>
<td>22.5 (67)</td>
<td>11.4 (34)</td>
<td>10.7 (32)</td>
<td>100 (298)</td>
<td>76.59**</td>
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<td>Employment type</td>
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<td>Part time</td>
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<td>25 (8)</td>
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<td>18.1 (54)</td>
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<td>Total</td>
<td>55.4 (165)</td>
<td>22.5 (67)</td>
<td>11.4 (34)</td>
<td>10.7 (32)</td>
<td>100 (298)</td>
<td>120.76**</td>
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<td>Self employed</td>
<td>95.7 (155)</td>
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<td>88.2 (30)</td>
<td>87.5 (28)</td>
<td>92.9 (274)</td>
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<td>Employed (paid wage)</td>
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<td>11.8 (4)</td>
<td>12.5 (4)</td>
<td>6.1 (18)</td>
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<td>Retired</td>
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<td>0 (0)</td>
<td>0 (0)</td>
<td>100 (3)</td>
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<td>Initial consultation fee</td>
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<td></td>
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<tr>
<td>&lt; 100</td>
<td>68.4 (106)</td>
<td>54.5 (36)</td>
<td>39.4 (13)</td>
<td>19.4 (6)</td>
<td>56.5 (161)</td>
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</tr>
<tr>
<td>101–150</td>
<td>30.3 (47)</td>
<td>40.9 (27)</td>
<td>48.5 (16)</td>
<td>51.6 (16)</td>
<td>37.2 (106)</td>
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</tr>
<tr>
<td>151–200</td>
<td>0.6 (1)</td>
<td>3 (2)</td>
<td>12.1 (4)</td>
<td>16.1 (5)</td>
<td>4.2 (12)</td>
<td></td>
</tr>
<tr>
<td>&gt; 200</td>
<td>0.6 (1)</td>
<td>1.5 (1)</td>
<td>0 (0)</td>
<td>12.9 (4)</td>
<td>2.1 (6)</td>
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<tr>
<td>Total</td>
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<td>23.2 (66)</td>
<td>11.6 (33)</td>
<td>10.9 (31)</td>
<td>100 (285)</td>
<td>58.08**</td>
</tr>
</tbody>
</table>

**< p 0.001
Adv Dip = Advanced diploma.
Discussion

There have been few studies to date investigating the CAM workforce. The findings outlined above represent the most recent description of a segment of the CAM workforce in Australia. This study has shown that the majority of CAM providers in the target population were naturopaths and herbalists, female, aged between 41-60 years, had an undergraduate degree or higher as their highest qualification, earned less than $1,000 gross per week, worked in their primary area of practice for 10 years or less, and worked part-time as a self-employed sole trader. Apart from qualification and part-time status (which are discussed below), these findings are consistent with the results of a recent analysis of 2006 Australian population census data on the CAM workforce.² The findings also closely approximate the profile of Australian CAM providers described in 2002⁶ and 2004,⁵, 8 as well the demographic profile (i.e. age, sex, state/territory of residence, membership type) of the total NHAA membership. This suggests that the respondents of the current survey are likely to be representative of the national population of CAM providers.

In terms of qualifications, more than one-third (37%) of CAM providers in this study held a bachelor degree as their highest qualification, with a similar proportion (35%) holding a post-graduate award. This contrasts significantly to earlier workforce studies, where in 2006, 29% of CAM providers had a bachelor degree, with 14% possessing a post-graduate qualification;⁵ in 2004, 24% had a bachelor degree;⁶ and in 2002, only 10% and 0.7% of CAM providers held a bachelor and post-graduate qualification, respectively.⁶ While some of this variation may be attributed to differences in the survey populations (i.e. different occupational mix), it is likely that the increasing proportion of CAM providers with higher-level qualifications over time simply reflects the changing landscape of CAM education in Australia.⁹ To illustrate, bachelor degrees for many CAM disciplines only emerged in Australia in the late 1990’s, with postgraduate programs emerging in early 2000.¹⁰, ¹¹ By 2003, bachelor and postgraduate awards made up 40% of all naturopathy and Western herbal medicine programs in Australia.¹²

A total of 51% of CAM providers in this study were working part-time at the time of the survey, with almost half (42%) working less than 10 hours a week. When comparing data over time, the proportion of CAM providers working full-time appears to have declined, decreasing from 34% in 2006 ² to 27% in 2013; this finding closely approximates the trend observed across the broader health workforce.¹³ Nevertheless, CAM workforce studies conducted prior to 2006 do not report the number of hours worked; thus, it is difficult to determine if this pattern is a product of time or just the result of sample variation. This trend therefore warrants further investigation.

There is also a need to understand why the majority of CAM providers in this study worked part-time. The older age profile and high proportion of female practitioners in the CAM workforce are likely explanations, with both factors shown to be closely related to part-time employment status in other health workforce studies.¹³ Notwithstanding, of these two factors, only gender was found to be significantly associated with working hours in the current study. In fact, the majority (53.4%) of female respondents working in clinical practice were employed part-time, compared with only 37.3% of male practitioners. Consistent with this trend, substantially fewer female practitioners (24.4%) were employed full-time relative to male practitioners (45.1%). One reason for this may be that many female health providers make a

Table 5: Contingency table of the relationship between age, gender and employment type

<table>
<thead>
<tr>
<th>Employment type</th>
<th>Full time</th>
<th>Part time</th>
<th>Casual</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>6.1 (6)</td>
<td>6.5 (12)</td>
<td>9 (7)</td>
<td>6.9 (25)</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>23.2 (23)</td>
<td>25.9 (48)</td>
<td>21.8 (17)</td>
<td>24.3 (88)</td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>30.3 (30)</td>
<td>26.5 (49)</td>
<td>30.8 (24)</td>
<td>28.5 (103)</td>
<td></td>
</tr>
<tr>
<td>51-60</td>
<td>29.3 (29)</td>
<td>29.7 (55)</td>
<td>24.4 (19)</td>
<td>28.5 (103)</td>
<td></td>
</tr>
<tr>
<td>&gt; 60</td>
<td>11.1 (11)</td>
<td>11.4 (21)</td>
<td>14.1 (11)</td>
<td>11.9 (43)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>27.3 (99)</td>
<td>51.1 (185)</td>
<td>21.5 (78)</td>
<td>100 (362)</td>
<td>2.61</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>76.8 (76)</td>
<td>89.7 (166)</td>
<td>88.5 (69)</td>
<td>85.9 (311)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23.2 (23)</td>
<td>10.3 (19)</td>
<td>11.5 (9)</td>
<td>14.1 (51)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>27.3 (89)</td>
<td>51.1 (185)</td>
<td>21.5 (78)</td>
<td>100 (362)</td>
<td>9.49*</td>
</tr>
</tbody>
</table>

*< p 0.05
decision to work part-time to care for younger children; while this could be a likely explanation given that the majority of female CAM providers were of childbearing age, this has yet to be confirmed and requires further examination.

Another factor likely to be contributing to the rising percentage of CAM providers working part-time is increasing female participation in the CAM workforce. While this study has only evaluated a segment of the CAM workforce, it appears that the percentage of female CAM providers in Australia has increased over the past eleven years, from 75% in 2002 to 76% in 2004, 79% in 2006 (naturopaths only) and 87% in 2013. However, gender is not likely to be the only factor driving part-time employment in the CAM workforce. Another potential driver of working hours is consumer demand which might explain why providers in rural/remote settings—with relatively fewer competing services and increased health care need—worked more hours than their metropolitan colleagues. Further research is required to unpack these drivers, and to ascertain if other factors (e.g. personal preference) might also be responsible for the increasing number of part-time CAM providers.

Consumer demand may also explicate the relationship between practitioner income and consultation fees, experience and hours worked. An increase in consumer demand, for instance, can lead to a rise in service costs (or consultation fees), as well as the frequency of consultations and total hours worked. Collectively, these sequelae of events are likely to steer a growth in both practitioner experience and practice income. Even though the current study adds to our understanding of the Australian CAM workforce, there are some limitations that warrant consideration. First, the participants were a sample of convenience from a single professional association in Australia, and it is possible that the profile of these providers could differ from that of other associations. Notwithstanding, almost half of respondents were members of other CAM associations (data not reported), and further, the profile of respondents was similar to that reported in other studies involving members of other agencies. Second, some disciplines were not well represented in the current study (e.g. massage therapy, chiropractic, osteopathy, Chinese medicine). As pointed out in a recent analysis of CAM workforce data these occupations differ in several ways (e.g. income, highest qualification, hours worked) and as such, increased representation of these disciplines in the survey could potentially alter the profile of the CAM workforce. However, when the analysis looked at all CAM disciplines collectively, the findings were not too dissimilar to the current study. As a final point, the low response rate in this study makes it difficult to generalise findings to the broader CAM population; although, low response rates are not uncommon in studies of CAM providers.

Conclusion

This study represents the most recent investigation of the Australian CAM workforce to date. Findings suggest that a segment of the Australian CAM workforce may be transitioning from a vocational occupation to a more highly qualified professional workforce. At the same time, the composition of the profession may be changing to a more female-dominant, part-time workforce; however, research that has adequate representation from all disciplines is needed to confirm this. Some of these changes may be indicative of the changing landscape of CAM education, variations in consumer demand and increasing female participation in the CAM profession, although, a comprehensive investigation of the factors driving these changes in the Australian CAM workforce has yet to be conducted and remains an important area for future research.

Acknowledgements

The authors would like to thank Andrew Hamilton for the survey design and construction, the NHAA for administering the survey, and the NHAA members for their participation in the study.

Conflict of interest

Erica McIntyre is a Vice President of the NHAA Board of Directors. Matthew Leach and Jane Frawley have no conflict of interest to declare.

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Sue Dean in conversation with Sue Evans
December 2013 in Ballarat, Victoria

Sue Evans
Southern Cross University
Email: susannahjevans@scu.edu.au

Sue Dean is a fighter. Over the best part of the last two decades she has fought for an increased standard of professionalism within herbal medicine, as well as establishing her own successful practice in regional Victoria. Today, she has a different fight on her hands – she is battling a form of breast cancer that is showing itself resistant to treatment. As she says, with characteristic wry humour, ‘Mine would be an absolutely fascinating case if only it wasn’t me’.

I was one of Sue’s teachers, and we have kept in touch over the years. For me, one of the great joys of teaching is to see students graduate and then to observe where they take their herbal knowledge and skill. So I sat with Sue one afternoon recently to find out more about her herbal journey.

She describes her professional life in two parts – the six years on the NHAA Board, with clinic fitting around that, and her subsequent clinical focus.

‘That change, from being nationally and internationally focussed with NHAA to coming back to being so locally focussed, with Ballarat as my base, has made for a really interesting life,’ she says.

Sue joined the NHAA Board in 1999, a couple of years after graduating from the Southern School of Natural Therapies, and following a previous life as a librarian for the Melbourne City Council. At that time the Goods and Services Tax (GST) was being introduced, and the board’s focus was to ensure GST-free status for herbal medicines. This was not straightforward.

‘Initially our consultations were going to attract GST, so there was a fight on to get them to be GST-free. The NHAA and other professional associations lobbied the government hard and long, and eventually they recognised that we had a case.’

However, there were conditions to that exemption. Members of five associations, the NHAA, the Federation of Natural and Traditional Therapists (FNTT), Australian Natural Therapists Association (ANTA), the Australian Traditional Medicine Society (ATMS) and the Australian Chinese Medical Association (ACMA) would be able...
to claim this status as long as they developed national standards relating to education, continuing professional education (CPE) requirements, a code of ethics, and a complaints procedure. It was expected that the associations would work together and develop a single set of standards, but Sue says this soon became impossible.

‘We had meetings with the four other associations, but they weren’t always friendly, in fact they were terrible sometimes. The antagonism was awful. A big point of disagreement was that we wanted to make the education standard at advanced diploma and degree level, but ATMS and ANTA were against that. We could not come to agreement, so we ended up going our own way with FNTT.’

To this end, the NHAA revised its educational requirements and Sue as president and Ian Breakspear as coordinating examiner visited all 23 then NHAA-accredited colleges to explain the changes and assist in the transition to the new scheme. In addition, the code of ethics was revised and the complaints procedure and CPE requirements were formalised.

But the NHAA and FNTT went one, very big, step further. Rather than limiting themselves to issues associated with the GST, they put the issue of statutory regulation (SR) of herbalists and naturopaths on the agenda.

‘We took the ball and ran with it, and we produced our own discussion paper – Promoting our Future, a proposal for the establishment of an Australian Council of Complementary Medicine. This was our suggestion for a basis for SR. Then we held meetings in all states to explain the proposal to our members.’

The Board also worked with a team of researchers led by Dr Alan Bensoussan at the University of Western Sydney to undertake a comprehensive national survey of herbal and naturopathic practitioners, the ‘workforce survey’. This became part of the influential Latrobe Report that followed in 2005, a report commissioned by the Victorian Department of Human Services and which recommended SR.

The recommendations for SR were not taken up by the Victorian Government, partly because Australia moved from a state system of regulation of health professionals to a national one, but Sue is philosophical.

‘SR seemed a possibility then, politically there were encouraging signs, but unfortunately it did not occur. But it was always going to be a long term thing.’

For Sue, there are a couple of compelling reasons why SR is important.

‘We need a mechanism to restrict some herbs. I strongly believe that St Johns wort (SJW) should not be available over-the-counter and it should be restricted to appropriately qualified practitioners. And if Schedule 1 [of the Schedule for the Uniform Scheduling of Medicines and Poisons] were utilised for registered herbalists and naturopaths, not only could it be used to restrict SJW, but it would also open the opportunity to re-introduce herbs practitioners have lost access to, like lobelia and coltsfoot and comfrey.’

However Sue is concerned about the maintenance of the knowledge of how to use these herbs.

‘If we got these herbs back, the ones we lost, we would need to take responsibility for educating ourselves about them. My concern is that if we leave it too long the generation that has actually used them, your generation, will be retiring and we will lose access to practitioners who can pass on the practical skills of using them, the difference between a theoretical knowledge and a practical knowledge.’

Her other major motivation for SR is to enable a closer relationship between us and the medical profession.

‘I don’t think this can happen until we are registered, but I think it would allow the patient to be the centre of concern and focus. I would love to see that. For many people the general practitioner (GP) is where they start for health care, but for many others it is us, herbalists and naturopaths. There are some conditions, such as for example chronic ear infections in children, where herbal interventions can work particularly well. And there are others where it is more appropriate that patients see a GP. I think it would be easier for us to cross refer if we had the official recognition of SR. I don’t think is too hard and it would be of such benefit to the patient.’

I ask her about the challenges she has faced in practice.

‘There is the challenge of keeping up to date with what is going on, not just in our own profession with developments in herbal medicine and nutrition, but also medically. And our patients are so well informed! And of course the financial challenges are always there, though for me it really worked when I moved the clinic home.’

‘Home’ is a spacious, airy house in a tree lined street in Ballarat. Sue closed the clinic late in 2013 due the severity of her illness, and when I visit soon after Christmas every surface in the living room is covered with Christmas cards, most of them notes of gratitude and good wishes from patients. Reflecting on the messages, Sue says

‘There is a theme that comes through these messages. What the patients appreciate isn’t just a place to talk about their health issues, it is all the other stuff that comes with it – the other things we do. And that’s it, isn’t it? All the other stuff. You might look at the health implications of, say, relationships or what is going on at work. Seemingly random conversations can be actually quite relevant. It is the insights that those discussions bring that are often what helps people change, and that is the best part about practice – seeing people change. When that happens it’s just so gorgeous.’

Sue would like to see more research undertaken in this area.

‘It is all very well, researching individual herbs, and that is useful. But I think now what needs to be done is research on how we practice. This complicates things because double blind trials are held up as gold standard, but there
was one study done a few years ago in the UK looking at menopause treatment, using individual combinations of herbs. It was really interesting that individual combinations were so effective. And that’s the point. We don’t often use a single herb, we use individual combinations.’

I remember the article and how enthusiastic I was about it when it came out. Julia Green, Alison Denham and their colleagues did a great job demonstrating the effectiveness of individual treatment for symptoms of menopause in their 2007 article in the journal, *Family Practice.*

Sue is also concerned that herbalists should not be naive with regard to products and manufacturers.

‘We have to be critical of what is happening in our own profession. We are a small profession but we are also a small industry, we have two or three good liquid herb companies, one of whom is dominant but it is no longer as practitioner oriented as it used to be since Kerry (Bone) is no longer involved in the same way. It is so much more of a business now. Being responsible practitioners means that we need to identify the best of multiple products for our patients, not just depend on one company…. and also that we really know when we are being marketed to, when companies are trying to push a product.’

Before I leave, I want to know Sue’s dispensary favourites. She can’t choose between four herbs – slippery elm, Echinacea, Astragalus and St Mary’s thistle. She has found slippery elm and St Mary’s thistle particularly helpful for herself recently, ‘Ulmus has an incredible ability to regulate bowel function despite enormous challenges like coping with the effects of IV antibiotics three times a day. That was what I was doing and I used it in tablet form and it was amazing how quickly it helped me recover. And I love the way St Mary’s helps the liver regenerate, gently, without high doses. And if you’re going into surgery, it helps you recover from that as well.’

Echinacea and Astragalus are other favourites.

‘Echinacea for any infection - for prevention at low dose and at high doses for acute infections. Astragalus is for when someone really needs a broad tonic to improve their immune function. It also affects the adrenals. I use it to break a pattern of illness. For example, I got great results with a fireman who had young kids and was working shifts and he was getting recurrent pneumonia. Hello, recurrent pneumonia? We used this to break the cycle. I kept him on it for a couple of winters, just to be sure. He was fine.’

On my last phone call to Sue, she had spent the previous day oiling the deck. ‘I need to keep reminding myself that I have a terminal illness’ she says. It is clear to me that Sue Dean is still a fighter.

Editor’s note: Sue Dean passed away on 9 March 2014. This interview was conducted whilst Sue was very much alive, and still ‘oiling the deck’.

---

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Did you know that unregistered health professions do not have their title protected?

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- safe practices to protect the public
- protection of professional title

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- Hervey Bay Saturday 28th June
- Rockhampton Monday 30th June
- Toowoomba Tuesday 1st July
- Mackay Wednesday 2nd July
- Townsville Friday 4th July
- Cairns Saturday 5th July
- Gold Coast Friday 11th July
- Brisbane Sunday 13th July

NSW & ACT
- Ballina Saturday 28th June
- Coffs Harbour Sunday 29th June
- Port Macquarie Tuesday 1st July
- Kingscliff Thursday 3rd July
- Parramatta Saturday 5th July
- Manly Sunday 6th July
- Newcastle Monday 7th July
- Forster Beach Wednesday 9th July
- Leura Thursday 10th July
- Batemans Bay Friday 11th July
- Canberra Saturday 12th July
- Wollongong Sunday 13th July
- Cronulla Monday 14th July
- Sydney Sunday 20th July
- Albury Friday 25th July

VIC
- St Kilda Saturday 19th July
- Glen Waverley Monday 21st July
- Geelong Tuesday 22nd July
- Albury Friday 25th July
- Melbourne Sunday 27th July

TAS
- Hobart Thursday 3rd July
- Launceston Friday 4th July

SA
- Barossa Friday 25th July
- Adelaide Saturday 26th July

WA
- Perth Sunday 13th June
- Bunbury Monday 14th July
- Albany Tuesday 15th July

NT
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Reviews of articles on medicinal herbs

Jodie Tester

These abstracts are brief summaries of articles which have appeared in recent issues of herbal medicine journals, some of which may be held in the NHAA library.

Tea tree oil in wound healing


Antibiotic resistance continues to be problematic in the management of infectious diseases and as such, alternative treatments need to be considered and investigated for potential use in this area. The potential use of essential oil of Melaleuca alternifolia (tea tree) as an alternative treatment is supported by in vitro data demonstrating antimicrobial and anti-inflammatory properties. Tea tree oil vapour has been demonstrated to produce zones of inhibition against one strain of Oxford Staphylococcus, and has demonstrated bacteriostatic and bactericidal activity against a number of strains of methicillin-resistance Staphylococcus aureus and vancomycin-resistant Enterococcus.

The present study was designed to investigate whether healing rates differ between conventionally treated wounds and those that are also treated with tea tree oil vapours, and to identify whether there is a correlation between in vitro and in vivo results. The study used a quasi-experimental design with experimental and control participants. In total, 10 patients who were being treated for abscessed wounds diagnosed with S. aureus were included in the study. Four participants were matched to compare conventional treatment with conventional plus tea tree treatment. The remaining participants were treated with tea tree essential oil in addition to their conventional treatment and results reported.

The study treatment protocol involved placing six pipette drops (approximately 2 drops from a full-sized dropper) of full strength tea tree oil at the centre of the bottom of the dressing. Dressings were changed every three days and oil was reapplied for experimental participants with each dressing. Wounds were assessed by visual tracking of wound size, and by presence of redness and induration.

Of the two matched-participant sets, the authors found improved healing rates when treatment included tea tree essential oil compared with control. Of the additional participants treated with tea tree oil, all except one demonstrated accelerated healing times. The authors concluded that the use of tea tree essential oil appeared to assist with accelerated healing of abscessed wounds and cellulitis and that it was a safe modality in the treatment of common infections.

Herbal medicine use in pregnancy


Herbal and complementary medicine use has grown considerably worldwide over the past two decades. The estimated prevalence of herbal use during pregnancy varies greatly from country to country with reported rates varying from 6-9% in Canada and the USA to 52-58% in Australia and the United Kingdom. With such differences in reported usage, a study was undertaken to characterise the prevalence of herbal medicine use in pregnancy and the characteristics of herbal medicine users during pregnancy from a multinational perspective, as well as investigating the reasons for herbal medicine use and the sources of recommendation of use.

The study was a multinational, cross-sectional, Internet-based study with invitations to participate extended to participants across Europe, Australia, Canada, United Kingdom and USA via national websites and/or social networks commonly visited and consulted by pregnant women and/or new mothers. Participants were invited to complete an online self-administered questionnaire that captured data on maternal health, socio-demographic, and lifestyle characteristics as well as use of herbal and conventional medicines in pregnancy. Participants were eligible to participate if they were pregnant or had at least one child less than one year of age.

Herbal medicine use was assessed through several
questions regarding use during pregnancy. Additionally, herbal medicine use could be reported under specific questions about disease and pregnancy-related health ailments. The form of herbal medicine used was not specifically requested nor was dose or duration. Information was also sought regarding recommendation sources and reasons for use of herbal medicines.

In total, 9459 women responded to the survey from six different regions and 23 countries, including 217 participants from Australia. Importantly, the study found the use of herbal medicine in pregnancy varied significantly between different countries despite similarities in the herbs used. Herbal medicine use throughout pregnancy was reported by 28.9% of responders, with Australia, Poland and Russia having the highest country rates of 43.8%, 49.8% and 69% respectively.

The herbal medicines commonly used included ginger, cranberry, raspberry, chamomile, valerian and echinacea and were predominantly for ailments related to pregnancy such as nausea, urinary tract infections and preparation for labour, rather than to assist with chronic diseases.

Of potential concern was the finding that in most countries women relied on informal sources of information, such as one’s own initiative, friends/family, Internet, magazines and media in their decision to use herbal medicine throughout pregnancy. Only in Eastern Europe, potentially due to wider acceptance of herbal medicine by physicians, was herbal medicine initiated on advice of a physician as the most common source of recommendation.

Whilst this interesting study provides good, multinational insight into the use of herbal medicine throughout pregnancy and information regarding who influences this use, there are several limitations with the study and thus how the information can be interpreted. Despite the large participation rate permitted by the Internet-based survey, this may have contributed to bias in the results due to limitations in people’s accessibility to the internet. Additionally, those frequenting the social media sites and websites through which the survey could be accessed may not be representative of the entire pregnancy population. The potential for recall bias and underreporting cannot be excluded and additionally the prompting of certain herbal medicines by having some examples attached to some survey questions may have influenced results.

The study provides insight into the use of herbal medicine at a multinational level, and importantly includes data from Australia, which demonstrated a high prevalence of use throughout pregnancy, largely initiated by the individual. The high quantity of informal information sources highlights the need for herbal medicine practitioners and industry to promote the need for women to discuss herbal medicine use with appropriately trained professionals. As significant differences were observed in herbal medicine usage during pregnancy between different countries, an Australian focused study would be ideal to provide greater understanding into the use at a more localised level.

**Ginkgo biloba and reproductive effects**


In recent years, several studies have been published reporting adverse effects of Ginkgo biloba (ginkgo) extracts on reproductive functions in mice. Increasing demand of ginkgo products has led to variability in the quality and composition of such products with a recent investigation finding 8 of 18 ginkgo supplements to be adulterated. The addition of inexpensive flavone glycosides or aglycones and increased concentration of potentially allergenic and genotoxic ginkgolic acids are reported forms of such adulteration. The authors undertook research to investigate the influence of a specific type of ginkgo extract, EGB761® on embryofetal development in mice during the critical period of organogenesis (6th to 15th day of pregnancy) by oral administration to the dams. EGB761® is manufactured by the German company Dr. Willmar Schwabe GmbH & Co, and is specified to contain 22.0-27.0% ginkgo flavone glycosides and 5.0-7.0% terpene lactones, consisting of 2.8-3.4% ginkgolides A-C and 2.6-3.2% bilobalide, and less than 5ppm ginkgolic acids. A noted conflict of interest arises from the authors being employed by the company that manufactures the extract EGB761® being evaluated.

One hundred virgin female CD-1 mice were randomly paired with sexually mature male mice of the same breed in separate cages for monogamous mating. Conception was ascertained by establishing the presence of a copulatory plug and/or sperm and the day when found was considered the day of conception (day 0 of pregnancy). Ginkgo extract EGB761® was given to groups of 25 mice at doses of 100, 350 and 1225mg/kg/day with an additional control group receiving the vehicle only. The extract was administered daily from day 6 to 15 of pregnancy. The study animals were individually observed daily for clinical signs, food and water consumption and daily body weight before being sacrificed on day 17 of gestation for further examination.

The authors reported no changes in behaviour or external appearance in mice treated with the EGB761® extract with no premature deaths to report. No test item-related influence in food or water consumption, or faeces consistency was noted. The food intake of the high dose dams, however, was significantly reduced compared to the control group on gestation days 7, 11 and 12, though the authors suggested this was within normal range of variation.
No test item-related influence on prenatal foetal development including number of corpora lutea, implantation sites, resorptions and live foetuses, were detected at any of the EGb761® doses. The post-implantation loss was significantly increased for 100, 350 and 1225 mg EGb761®/kg/day (7.5%, 8.7% and 8.6%) compared to the control (2.9%). Mean foetal weights were not influenced by administration of the 100 or 350mg/kg/day doses as compared to the control group, however statistically significant decreased body weights were observed for male mice and viable foetuses at 1225mg/kg/day dose. There was one dead foetus observed in the high dose group, with none noted in the control and other doses. A statistically significant incidence was noted for retarded ossification of metacarpalia at 100mg/kg/day EGb761® compared to control, but the authors suggested this difference was spontaneous rather than associated with the extract.

The authors suggested the post-implantation loss, the decreased body weights and the incident of dead foetuses are well within the historical control data range and as such the no-observed-effect-level (NOEL) was above 1225mg/kg/day for the dams and the foetuses, however these findings should not be discounted. Despite small numbers in the groups, statistically significant observations were made and the study may not have been adequately powered to find differences outside of the reported normal control ranges. No test item-related external malformations were noted in all treatment groups.

This study highlights the importance of quality control in herbal medicine and how increasing demand for herbs can influence quality and adulteration of products. Additionally, it raises the question of the appropriateness of extrapolating findings from herbal medicine research to other preparations of the same plant species given differences and deviations in the raw material and/or extraction processes will likely lead to differences in the composition of the extract.

Based on the current and previous studies, additional research with appropriate powering and larger numbers of subjects are required to further understand the effect of EGb761® on reproductive health and pregnancy outcomes.

**Synergistic effects of Rhodiola rosea with B vitamins**


Many mechanisms are involved in pain and it is has been suggested that using a combination of antinociceptive drugs that have different mechanisms of actions may be beneficial in treatment, by working in a synergistic manner and potentially requiring lower doses of the therapeutic agents, thus minimising potential for unwanted side effects. This trial was designed to investigate the pharmacological interactions between *Rhodiola rosea* (rhodiola) ethanol extracts and individual or a mixture of B-vitamins in nociception induced by the formalin test in mice.

Female mice (body weight range 25-30g) were used in the study. Groups of at least six mice received increasing doses of either *Rhodiola rosea* extract (10-77mg/kg), vitamins B1 (30-707mg/kg), B2 (1-100mg/kg), B6 (30-707mg/kg), B12 (1-177mg/kg), a mixture of B1+B6+B12 (30-562mg/kg) or the rhodiola extract combined with each B-vitamin or the mixture. Isobolographic analysis was used to evaluate the pharmacological interactions between rhodiola and each B vitamin individually and the B vitamin mix by using the doses that produced 30% of the maximum antinociceptive effect and a fixed 1:1 combination. The rhodiola extract was standardised containing 2.7% of rosavin and 2.5% of salidroside. All substances and extracts were administered orally 15 minutes before formalin administration into the right hind paw of the mouse. The time of licking of the injected paw was defined as a nociceptive response. A control group received the vehicle only without rhodiola or any B vitamin.

The possible antinociceptive mechanism of action of rhodiola was also investigated by administering rhodiola (81mg/kg) 15 minutes before flumazenil (a GABA/BDZ receptor antagonist), WAY100635 (a 5-HT1a serotonin receptor antagonist) or naltrexone (an opioid receptor antagonist). Additionally, the involvement of the nitric oxide pathway was also investigated by pretreating the mice with a nitric oxide synthase inhibitor, a nitric oxide donor, a soluble guanylyl cyclase enzyme inhibitor or an ATP-sensitive K channel blocker 15 minutes prior to rhodiola administration. A formalin administration was then given to register a nociceptive behaviour.

*Rhodiola rosea* extract inhibited the licking time after formalin administration in a dose dependant manner. This reduction was observed in both the initial neurogenic pain phase at dose of 177mg/kg, and the secondary inflammatory phase at doses of 30mg/kg and above. Both the individual B vitamins and the B1_B6+B12 mixture also produced reduced licking time in both the first and second phases in a dose dependant manner. Co-administration of rhodiola extract (27.5 ± 5.2mg/kg) with B1 (173.5 ± 29.4mg/kg), B2 (5.8 ± 1.8mg/kg), B6 (102.8 ± 17.5mg/kg), B12 (24.0 ± 17.5mg/kg) and the B1+B6+B12 mixture (164.7 ± 17.5mg/kg) all produced synergistic antinociceptive effects. The rhodiola + B2 was the most potent combination, followed by rhodiola + B vitamin mix (B1+B6+B12), the rhodiola + B6 and finally the rhodiola + B12. No side effects were observed in the mice.

The mechanism of action underlying the antinociceptive activity of *Rhodiola rosea* was found
to involve the GABA/BDZ and 5-HT<sub>1A</sub> receptors but not the opioidergic system. The authors also report that antinociceptive effect of rhodiola involves the nitric oxide-cGMP-<sup>K</sup> channel pathway.

The use of herbal medicine in combination with nutritional supplements in the treatment of pain is common however scientific evidence regarding combinations, doses and additive or synergistic effects have been limited. This well-designed study has provided valuable information regarding the synergistic nature of rhodiola in combination with selected B vitamins and has the potential to influence clinical prescribing.

**Selenium and silymarin combination in men’s health**


Benign prostatic hyperplasia (BPH) is a common, age-related, non-malignant enlargement of the prostate gland associated with lower urinary tract symptoms (LUTS), including poor stream, hesitancy, terminal dribbling, incomplete voiding and frequent urination.

A randomised, double-blind pilot trial was conducted to assess the effects of a combination of selenium and silymarin in men with LUTS, BPH and prostate specific antigen (PSA) <2.5ng/ml. The selenium-silymarin (Se-SM) mix was in tablet form containing 80µg selenium as L-selenomethionine in inactivated whole cell yeast and 190mg of a standardised extract of silymarin.

In total, 55 non-smoking and non-alcohol-dependent men were recruited for the study and were randomised to take placebo (n=29, aged 55±10.0 years) or Se-SM (n=26, aged 55±5.8 years) tablets three times daily for six months. Participants were instructed not to change diet or lifestyle during the study period. Exclusion criteria allowed stronger conclusions about synergistic or additive effects to be made.

This was the first study to evaluate the effects of a Se-SM combination on LUTS in men with BPH, finding the combination to be very effective in reduction both voiding dysfunction and PSA levels after six months of treatment. This is a promising pilot study and future studies that investigate the potential synergistic effects of silymarin in combination with selenium and identify optimal dosing regimes will provide further evidence supporting the use of silymarin and selenium in men with LUTS and BPH.

**Euphorbia hirta and biofilm inhibition and eradication**


In recent years, the increasing occurrence of antibiotic-resistant biofilm forming pathogens has become a global issue of concern. Approximately 70% of all microbial infections are associated with biofilms, which develop when planktonic microorganisms aggregate together forming a thin layer. Close contact of several of these thin layers leads to the growth of dense, three dimensional structures accommodating millions of planktonic cells operating together to form a shield called biofilm. Biofilms are more difficult to treat as bacteria within are vastly resistant to potent antibacterial agents.

*Euphorbia hirta* L., of the Euphorbiaceae family, has been used traditionally for treatment of gastrointestinal, bronchial and respiratory disorders and its proven pharmacological activities include antioxidant, antibacterial, antifungal, diuretic, anthelmintic, antihypertensive, anxiolytic, antimalarial and anti-inflammatory. The aim of this study was to analyse the potency of *E. hirta* extracts as a potential biofilm inhibitor and eradicator against clinical isolates and standard strains, as well as comprehensively characterise the methanolic extract of *E. hirta* aerial part.
grows in Malaysia using gas chromatography and mass spectrometry (GC-MS).

Susceptibility of E. hirta to a variety of clinically resistant gram-positive and gram-negative bacteria capable of forming biofilms and causing severe infections were tested, with minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) being assessed using two-fold serial dilutions of E. hirta extract with 1mg/1ml as the highest in-test concentration. Ceftazidime, a clinically established antibiotic, was used in a parallel experiment as a positive drug control. MIC was defined as the lowest extract concentration that completely inhibits the growth of microorganisms. MBCs were determined as the lowest concentration that yielded nil bacterial growth on agar plates.

Among all the pathogens assessed, Pseudomonas aeruginosa was the most susceptible to E. hirta extract. Moderate growth inhibition was observed against Enterococcus faecalis, Bacillus cereus and P. aeruginosa. Mild antibacterial activity of E. hirta was observed against Salmonella typhi, Bacillus subtilis and Staphylococcus aureus. Biofilm inhibition activity of E. hirta was most potent against P. aeruginosa with some inhibition also observed against E. faecalis. Additionally, E. hirta extract effectively eradicated the established biofilm of P. aeruginosa with some weak anti-biofilm activity also demonstrated against E. faecalis.

The GC-MS profile of the methanol extract of E. hirta revealed nineteen chemical compounds, of which terpenoids was the most abundant. It was suggested that the observed broad-spectrum antibacterial activity of E. hirta could be attributed to the terpenoids, with the detachment of planktonic cells from the biofilm and altering the composition of the cell membrane as possible modes of action.

Given the serious health threats of antibiotic resistant infections, this study provides important and valuable findings for the potential of Euphorbia hirta in the treatment of infectious ailments. The antibacterial and biofilm inhibitory and eradication activity of E. hirta against Pseudomonas aeruginosa demonstrates its effectiveness in infections caused by this pathogen. Future research to investigate the potential role of using E. hirta as a biofilm control agent in infection prevention in hospitals and healthcare centres is warranted. Additionally, research investigating the potential to combine E. hirta with specific antibiotics to assess possible synergy through different antibacterial actions may provide beneficial information against resistance infections. Given the current demonstrated efficacy of E. hirta against P. aeruginosa, it is important to review appropriate use of the herb with respect to dosing and duration, as well as monitor any patterns of resistance that may develop to ensure ongoing effectiveness of the herb in the future.

**Outcomes after cranberry use during pregnancy**


Cranberry (Vaccinium macrocarpon), traditionally used for the treatment of urinary tract infections (UTIs), is one of the most commonly used herbs during pregnancy with reported prevalence of over 5%.

The widespread use of cranberry during pregnancy despite limited efficacy and safety data in this setting led study authors to investigate whether use of cranberry during pregnancy was associated with an increased risk of malformations. The secondary aim was to assess whether cranberry usage during pregnancy was associated with selected pregnancy outcomes such as stillbirth/neonatal death, low birth weight, preterm birth, low Apgar score, neonatal infections and maternal vaginal bleeding.

Data were provided by the Norwegian Mother and Child Cohort Study (MoBa) with additional records from the Medical Birth Registry of Norway (MBRN). MoBa is a population-based prospective cohort study including more than 100,000 pregnancies from 1999 to 2008. Participants in MoBa completed three self-administered questionnaires, the first completed in week 13-17, the second completed at week 30 and the final questionnaire completed when the child was 6 months. The MBRN registry contained relevant information on the pregnancy, delivery, and health of the neonate.

The health questionnaires asked women if they had experienced specific complaints, including UTIs, with ability to specify treatment including product used and the exposure window. Additionally, women were required to describe use of all vitamins and dietary supplements, including alternative/herbal remedies; however, timing, duration or indication could not be specified.

To be included in the present study, women must have completed the first questionnaire and have MBRN data available. Women were excluded if they gave birth to multiples or infants with chromosomal malformations. The total study population included was 68,522 pregnancies of which 68,198 (99.5%) resulted in a live delivery, and the median gestational period was 40 weeks.

The overall rate of malformations was 4.7% and the median gestational period was 40 weeks.

In total, 919 (1.3%) women reported using cranberry during pregnancy of which 13.2% used cranberry during the first trimester and 61.6% reported use during early pregnancy that could include up to 6 months prior to conception.

The study found no increased risk of congenital malformations, stillbirth/neonatal death, preterm delivery, low birth weight, small for gestational age,
low Apgar score and neonatal infections. The study, however, did find an increased risk of vaginal bleeding occurring after week 17 among women who used cranberry in late pregnancy; however, this was not significant after adjusted analysis. The authors report cranberry to potentially increase the risk of bleeding through its capacity to inhibit platelet aggregation due to its salicylic acid content and as such recommend further investigations regarding maternal bleeding.

The strengths of the study include its large sample size, whilst limitations include a potential for some recall bias and selection bias due to a low response rate, the self-reporting nature of the questionnaires, and the lack of information about the dose and form of the cranberry administered, indications, and potential variations in quality. Dietary intake of cranberry products was also not accounted for.

The authors highlight that antibiotics should be encouraged for any UTI experienced throughout pregnancy to reduce the risk of complications associated with UTIs and potential progression to pyelonephritis, and that a recent Cochrane review did not support a clear role for cranberry either for the prevention of, or treatment of UTIs. This study was not designed to assess the efficacy of cranberry for treatment or prevention of UTIs during pregnancy, but provides valuable information regarding its safety and impact on birth outcomes.

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New physical activity guidelines: Move more, sit less


Australia’s Physical Activity and Sedentary Behaviour Guidelines were recently released by the Australian Government Department of Health, with some major revisions to previous guidelines. Supported by a rigorous evidence review process, the revised guidelines provide greater consistency with international evidence and guidelines.

The guidelines provide recommendations regarding physical activity and sedentary behaviour for children, young people, adults and older Australians. For the first time, the latest guidelines also introduce recommendations regarding sedentary activity and time spent sitting, including watching television and use of electronic media such as DVDs, computer and other electronic games. Consideration to the relationship between physical activity (including amount, frequency, intensity and type of physical activity) and health outcomes, including risk of chronic disease and obesity; and to the relationship between sedentary behaviour/sitting time and health outcomes including the risk of chronic disease and obesity have influenced the guidelines.

For infants, physical activity should be encouraged from birth, particularly supervised floor-based play in a safe environment. Toddlers (ages 1-3) and pre-schoolers (ages 4-5) should be physically active every day for at least three hours, spread across the day. The guidelines recommend that children under 2 years should not spend any time watching television or using other forms of electronic media. From the ages of 2-5 years, sitting and watching television and use of other electronic media should be limited to less than one hour per day. With the exception of sleeping, from birth to 5 years, children should not be sedentary, restrained or kept inactive for more than one hour at a time.

For children aged 5-12 and young people aged 13-17, the guidelines suggest at least 60 minutes of moderate/vigorous intensity exercise daily, which is consistent with previous guidelines. New inclusions are the recommendations that activity should include a variety of aerobic activities, including vigorous-intensity activity; children and young people should engage in activities that strengthen muscle and bone on at least 3 days/week; and that more activity of up to several hours per day is associated with additional health benefits. Additionally, recommendations for sedentary behaviour include to minimise the time spent sedentary on a daily basis; to limit electronic media for entertainment to less than two hours per day; and to break up long periods of sitting as often as possible.

The recommendations for adults aged 18-64 are made irrespective of cultural background, gender or ability and encourage that any physical activity is better than doing none. Evidence suggests that there is a greater rate of risk reduction at the lower end of activity levels so significant benefits can be achieved. The amount of exercise recommended has increased and adults should aim to accumulate 150-300 minutes of moderate intensity physical activity or 75-150 minutes of vigorous intensity exercise per week, or an equivalent combination of both, and that adults should be active most, if not all, days every week. Whilst the lower end of the activity level will provide some benefit against cardiovascular disease, diabetes and psychosocial and musculoskeletal problems, activity at the upper end of the scale is required for prevention of unhealthy weight gain and some cancers. Activity specific to muscle strengthening, such as resistance training, is recommended on at least two days per week. Additionally, sedentary behaviour guidelines for adults advise to minimise the amount of time in prolonged sitting and to break up long periods of sitting as frequently as possible.

For older Australians aged 65 and over, the recommendations include to do some form of physical activity, irrespective of age, weight, health problems or ability. Ideally, older people should be active daily in as many ways as possible and accumulate up to 30 minutes of moderate activity on most days. Doing a range of activity that incorporates fitness, balance, strength and flexibility is recommended. People who have not been physically active for some time are recommended to start at an easily manageable level and increase the type, frequency and amount accordingly.

The ABS recently released results from the Australian Health Survey 2011-12 finding that only one third of children and one in ten young people undertook the recommended 60 minutes of exercise, and that 60% of Australians did less than the previously recommended
30 minutes of moderate intensity physical activity daily. The survey also concluded that less than one in three children and young people achieved no more than 2 hours of screen-based entertainment and that nearly 70% of Australian adults are either sedentary or have low levels of physical activity. Such findings highlight the need for greater promotion of the new guidelines. Being physically active and limiting sedentary behaviour every day is essential for health and wellbeing. Consistent with international recommendations and an increasing body of evidence, the new guidelines address sedentary behaviours, including screen time from birth, as well as physical activity. The increased levels of physical activity and reduced sedentary behaviours recommended for children and adults may positively influence our population of both young and old.

Eat those nuts


Rich in unsaturated fatty acids, fibre, vitamins, minerals, antioxidants, phytosterols and other bioactive substances, nuts are a nutrient-dense food and their consumption has been associated with numerous beneficial health effects in a number of observational studies and clinical trials. Reductions in various mediators of chronic diseases including oxidative stress, inflammation, visceral adiposity, hyperglycaemia, insulin resistance, and endothelial dysfunction have been observed with nut consumption. Despite these findings, the association between nut consumption and mortality remains unclear.

Data from two large, prospective US cohort studies of nurses and other health professionals were examined to assess the association of nut consumption with total and cause-specific mortality. The Nurses Health Study (NHS) is a prospective study of 121,700 women that commenced in 1976 and the Health Professionals Follow-Up Study (HPFS) is a prospective study of 51,529 males who were enrolled in 1986. Follow up questionnaires are sent biennially to update medical and lifestyle information. Participants were eligible for inclusion if data was available from the validated food-frequency questionnaire (FFQ) from their study. Participants were excluded if they had a history of cancer, heart disease or stroke; did not provide information on nut intake; or did not provide information on anthropometric measures or physical activity; resulting in final analysis of 76,464 women from the NHS and 42,498 men from the HPFS.

Nut consumption was measured using the validated FFQs administered every 2-4 years. To minimise deviations in dietary variation over time, the cumulative average nut consumption was calculated. In the event of diagnosis of major illness, the investigators suspended further updates of dietary variables due to the potential for major dietary changes after such diagnosis; however, follow-up for mortality continued.

During 30 years of follow up from the NHS participants and 24 years follow-up of the HPFS participants, a total of 11,229 deaths were documented. A significant dose-dependent inverse association between nut consumption and total mortality was observed with participants consuming nuts seven or more times per week having a 20% lower death rate when compared with non-consumers of nuts. Results were similar for both peanuts and tree nuts and the inverse association was seen across all subgroups.

A number of sensitivity analyses to minimise the influence of smoking, extremely low or high BMI, sodium intake, Mediterranean diet, olive oil intake, diabetes at baselines, and diagnosis of diabetes were performed with the findings of the significant inverse association between nut consumption and total mortality remaining unchanged.

The strengths of the study are its size, the long follow up periods and the frequency of updated dietary and medical information. As the study is observational, however, the results cannot elicit a cause and effect result, and only an association between nut consumption and reduction in mortality can be deduced. Despite the effect observed being dose-dependant, significant reductions in mortality was observed across all levels of nut consumption, so the appropriate quantity for an individual should be considered together with potential for unwanted effects of high nut consumption. Additionally, the potential for error in measurement due to the self-reporting nature of the questionnaire is inevitable. As data were not available on the type of nuts (e.g. salted, spiced, roasted or raw), further understanding into the effect of preparation of nuts and mortality would be useful.

Timing of food intake and obesity


A recent article by Garaulet and Gómez-Abellán provides an overview of some of the recent evidence investigating the timing of meals and impact on obesity or weight loss and offered some potential reasons as to why meal timing may influence weight and obesity.

Recent studies have demonstrated a link in energy regulation to circadian clock patterns, suggesting a potential role of food timing in the role of obesity. Additionally, the distribution of caloric intake across the normal wake episode appears to influence not only obesity but also weight loss, independently of the caloric load. In a study where subjects were assigned to high caloric intake during breakfast or dinner, the high caloric breakfast group was associated with increased weight loss and waist circumference and reduced insulin resistance.
than in the dinner group. Another study demonstrated that
the timing of the main meal (lunch) in a Mediterranean
population was predictive of weight loss independent of
the 24-hour caloric intake.

The authors propose several reasons for these outcomes
surrounding food intake time and weight. Energy intake
and expenditure is different depending on timing of meals
– individuals who do not eat early in the day may have
increased hunger later and may have a greater overall
daily energy intake. Studies have indicated that evening
type eaters have a higher propensity to put on weight and
less ability to lose it.

Unusual feeding time may produce chronodisruption,
where peripheral circadian clocks of the heart, liver or
pancreas become desynchronised from the central clock
in the suprachiasmatic nucleus. Food is an external
synchroniser of our peripheral clocks and can influence
our behaviours. Unusual feeding times may induce
a disruption of the circadian system that may result in
unhealthy consequences in humans.

Hormonal pathways may be involved in the
mechanisms between meal timing and weight loss,
with alterations in timing of food potentially affecting
the circadian rhythmicity of the numerous hormones
involved in metabolism including insulin, glucagon,
adiponectin, corticosterone, leptin, chemerin, lipocain
and visfatin.

Timing of food intake may produce its affects via
alterations in digestive organs and adipose tissue. A
number of digestive and intestinal enzymes are expressed
in a circadian manner and are synchronised by foods
and accordingly, changes in timing of food can modify
rhythmicity.

The effect of food components may also have an
association with the timing of food intake and its effect on
metabolic pathways. Timing of the meal, food volume,
energy content and the macronutrient composition may
influence circadian rhythms and the synchronising of
central and peripheral clocks. A high fat diet may lead to
disruptions in circadian expression of metabolic factors,
for example; however, food restriction without calorie
reduction or fat reduction may attenuate the disruptive
effects.

Genetic factors are also an important consideration in
the association between meal timing, obesity and weight
loss with variations in clock genes having been reported
with the effects on the timing of preferred food intake.
Genetic polymorphisms have been identified and linked
with eating behaviours including skipping breakfast,
snacking behaviour and later eating habits.

Timing of food intake is a modifiable behaviour. If
ongoing research in this area continues to provide insight
into its influence of energy regulation and consequently
the risk of obesity, clinical strategies regarding food
timing intake may be warranted.

Breast milk feeding and food allergy
development

Grimshaw K, Maskell J, Oliver E, Morris R, Foote, K, Mills, C,
Roberts, G, Margetts B. 2013. Introduction of complementary
foods and the relationship to food allergy. Pediatrics;

Breast milk is protective against many conditions
however its role in allergy is not well understood.
Differences in guidelines and recommendations for
duration of exclusive breastfeeding vary, with the World
Health Organisation (WHO) recommending that all
infants be exclusively breast fed for six months, and
other organisations, including the American Academy of
Paediatrics, recommending that solid foods be introduced
between 4-6 months of age for allergy prevention.
For further understanding of the relationship between
breastfeeding, complementary feeding and allergy
development, a nested, case-control within a cohort study
was undertaken.

The Prevalence of Infant Food Allergy (PIFA) study
is a prospective birth cohort of 1140 infants recruited
between 2006 and 2008 from the UK. It has a longitudinal
prospective cohort design, with participating women
invited to keep food diaries (type of food but not amount)
for their infants from birth until 1 year of age. Timing
of specific events such as first introduction of infant
formula or any solid/semi-solid food, and the age at
which breastfeeding stopped were also recorded. Food
diaries were returned monthly and symptom sheets were
provided every two months to facilitate identification of
symptomatic infants. Possible cases of food allergy were
investigated further with diagnosis made by double-
blind, placebo-controlled food challenge (DBPCFC).

In the present study, infants from the PIFA study who
were diagnosed as having a food allergy according to
DBPCFC and two age-matched controls with birthdates
closest to the index were included for analysis.

Of the 1140 infants from the PIFA study, 41 were
diagnosed as having a food allergy according to
DBPCFC. The median maternal age was 33 years and the
median infant weight was 3420g. Median age at the
start of symptoms of food allergy was 24 weeks and median
age at DBPCFC was 56 weeks. Hen’s egg and cow’s milk
were the two most common allergens identified, with
eczema and vomiting the common presentations.

The rate of breastfeeding of infants was high with
95% of all mothers initiating breastfeeding for a median
duration of 20 weeks. The median duration for exclusive
breastfeeding was 8 weeks with 50% of mothers still
exclusively breastfeeding at 9 weeks. Exclusivity was
lost to whey-based formula for 78% of infants, with rice
being the second most common food. No significant
differences between breastfeeding initiation, duration, or
exclusive breastfeeding duration was observed between
the symptomatic and control infants.
No difference in timing of the introduction of cow’s milk was reported, however a protective effect on food allergy was demonstrated when cow’s milk protein was given concurrently with breast milk. It was not possible to ascertain whether a similar benefit might occur for other allergenic foods because there were insufficient numbers of infants consuming these foods while still being breastfed; 66% of study mothers had stopped breastfeeding by 26 weeks when wheat, egg, fish and other commonly allergenic foods are often introduced.

Solids were introduced significantly earlier in food-allergic infants compared with control infants, with 15% of food-allergic infants introduced to solids between weeks 12-16 compared with only 9% of control infants. The authors suggest their findings implicate 17 weeks as a crucial timepoint with solid food introduction prior to this being associated with increased risk of allergic disease.

The authors report that the increase in duration of breastfeeding and the mean age at which solids, particularly allergenic ones, are introduced may have resulted in a reduction in the duration of complementary feeding where the infant receives both breast milk and solids, and as such, there may be a potential role of concurrent breast feeding on food allergy development. The study findings support delaying the introduction of solid foods until at least 17 weeks, and supports that breast feeding should continue while solids are being introduced and beyond. Further research into the effects of breastfeeding exclusively to 26 weeks and allergy development are still required due to insufficient numbers of women still exclusively breastfeeding for that length of time in the current study, to help further understand the optimum duration of exclusive breast feeding for the best health outcomes of infants.

Sugar sweetened beverages and endometrial cancer


Endometrial cancer is one of the more prevalent cancers and is a common cause of cancer death worldwide. Factors that increase oestrogen exposure have been associated with an increasing risk of endometrial cancer such as greater body fatness, postmenopausal oestrogen therapy, late menopause and nulliparity. Whilst these risk factors have been mostly associated with type I-oestrogen dependent endometrioid tumours, the relationship with type II endometrial cancers remain less clear. Diabetes and obesity have also been associated with increasing risk of endometrial cancer, and with consumption of sugar-sweetened beverages (SSB), the leading source of added sugars in the US diet, being associated with a higher risk of obesity and type 2 diabetes, a biologically plausible link between SSB consumption and risk of endometrial cancer was explored by study authors in a study published in Cancer Epidemiology, Biomarkers & Prevention. Specifically, the association between dietary intake of SSB, other sugar-rich food groups and sugars and the risk of type I and type II endometrial cancers amongst postmenopausal women was evaluated.

This prospective cohort study among postmenopausal women used data from the Iowa Women’s Health Study (IWHS) in which 41,836 women provided information through a self-administered survey assessing demographics, anthropometry, reproductive and lifestyle factors, family history of cancer, medical history and dietary intake that was mailed to randomly selected women aged 55-69 years in 1986.

Dietary intake was assessed using the Harvard Food Frequency Questionnaire (FFQ), which involved reporting the usual intake frequency of 127 food items during the past 12 months. A typical portion size for each food item was provided to guide participants. The FFQ included four questions specific to usual intake frequency of SSB, a question specific to ‘sugar-free soft drinks’ and addressed other added sugar intake through a ‘sweets and baked goods’ category comprising of 13 questions. Anthropometry data collected included weight and height, used to calculate BMI, and waist and hip measurements to calculate waist-hip ratio (WHR).

The IWHS cohort has been followed for vital status and cancer incidence annually and data from the cohort baseline until 31st December 2010 was used for the current analysis. Endometrial cancers identified were classified into type I and type II.

From the IWHS participants, 23,039 women were included in the current study with survey responders excluded if at cohort baseline (time of completion of the original survey) there was a history of cancer (except non-melanoma skin cancer), history of hysterectomy, incomplete dietary information, or extreme dietary intake defined as <600 or >5000kcal/day. Additionally, women were excluded if diagnosed with endometrial cancer in situ (n = 21) and sarcoma (n = 10) during follow up.

During the follow-up, researchers identified a total of 592 invasive endometrial cancers (506 type I and 89 type II) reported between 1986 and 2010. The mean ages were 72.6 years and 74.4 years for type I and type II respectively. Older age, higher BMI, higher WHR, history of diabetes, early menarche, delayed menopause, and oestrogen use were associated with higher risk of endometrial cancer whilst women who never smoked or who experienced greater number of live births were at lower risk of endometrial cancer.

Women who reported higher consumption of SSB were at higher risk of type I endometrial cancer in a dose-dependent manner. Compared with non-consumers of SSB, women who reported the highest consumption
of SSB had a 78% increased risk of type I endometrial cancer. Fruit juice consumption in isolation was not associated with increased risk of type I endometrial cancer, however when fruit juice intake was added to SSB intake, the risk of type I endometrial cancer was 38% higher in the highest consumption group than in the lowest consumption group. These associations became stronger after adjusting for BMI, thus suggesting factors other than body weight may be involved in the link between SSB and type I endometrial cancer. No associations were identified between type II endometrial cancer and body mass index, physical activity, diabetes and cancer did not differ between SSB drinkers and non-drinkers. As such, extrapolating the current findings that the major sweetener added to SSB in countries which do not use SSB had a 78% increased risk of type I endometrial cancer. Fruit juice consumption in isolation was not associated with increased risk of type I endometrial cancer, however when fruit juice intake was added to SSB intake, the risk of type I endometrial cancer was 38% higher in the highest consumption group than in the lowest consumption group. These associations became stronger after adjusting for BMI, thus suggesting factors other than body weight may be involved in the link between SSB and type I endometrial cancer. No associations were identified between type II endometrial cancer and body mass index, physical activity, diabetes and cancer did not differ between SSB drinkers and non-drinkers. As such, extrapolating the current findings that the major sweetener added to SSB in countries which do not use SSB in isolation was not associated with increased risk of type I endometrial cancer, however when fruit juice intake was added to SSB intake, the risk of type I endometrial cancer was 38% higher in the highest consumption group than in the lowest consumption group. These associations became stronger after adjusting for BMI, thus suggesting factors other than body weight may be involved in the link between SSB and type I endometrial cancer. No associations were identified between type II endometrial cancer and body mass index, physical activity, diabetes and cancer did not differ between SSB drinkers and non-drinkers. As such, extrapolating the current findings that the major sweetener added to SSB in countries which do not use HCFS as a major sweetener should be done with caution.

Different bifidobacteria strains lead to different outcomes in premature infants


The microbiome of premature infants is known to differ significantly from that of term infants and is likely due to multiple factors including early and repeated exposure to antibiotics, immaturity of the intestinal innate immune system, lengthy hospital stays, feeding patterns and reduced skin contact time. The current study was designed to assess the effect of two different probiotic bifidobacteria strains, *Bifidobacterium longum ssp infantis* (Binf) or *Bifidobacterium animalis ssp lactis* (Blac) on the faecal microbiota of premature infants.

The different species of bifidobacterium used are known to thrive in different circumstances. The Binf strain has the enzymes necessary to thrive in the presence of human milk oligosaccharides (HMOs) and is known to influence the microbiota of the infant through breastfeeding. The Blac strain has the capacity to consume lactose, however it does not contain the enzymes to digest HMOs and is unable to thrive in an environment where HMOs are the sole carbon source.

The study was comprised of two clinical trials: one in formula fed infants and one in breast milk fed infants. In the first open trial, 12 formula-fed premature infants were randomly assigned to receive increasing doses of either formula + Binf or formula + Blac for 5 weeks. In a second open label, cross over trial, 9 premature infants who were being breastfed were randomly assigned to receive Binf (4x10^9 twice daily) for 2 weeks followed by a one week washout (WO) before receiving 2 weeks of Blac (4x10^9 twice daily) (H+Binf/Blac) or the alternative (H+Blac/Binf). Stool specimens were collected at baseline and then weekly for 5 weeks for the formula fed infants; and at baseline, after the first course of probiotics, after WO, and after the second course of probiotics in the breast milk fed infants.

In the infants receiving formula, the Binf group showed an increase in total bifidobacteria and microbial diversity compared with those receiving formula plus Blac. Additionally, colonisation with Blac was observed to be transient and actually decreased with an increasing dose. There was no clear dose response noted, and it was postulated that genetics or other factors may influence an individual’s ‘responsiveness’ to probiotic administration.

In the human breast milk fed infants, supplementation with Binf was associated with consistently greater increases in faecal bifidobacteria when compared with Blac supplementation. The *B. longum* group, including Binf plus other *B. longum* subtypes, was the most prevalent bifidobacterium among the human milk-fed infants, regardless of the probiotic administered. Despite continued administration of Blac over the 2-week period, the *B. animalis* group did not appear to be able to consistently colonise.

Overall, the combination of breast milk and the Binf strain was most effective at normalising the faecal microbiota.

A consideration in premature infants is the common and serious condition of necrotising enterocolitis (NEC). Premature infants who develop NEC are observed to have different microbiota when compared to premature infants that do not. One of the observations is a bloom of γ-Proteobacteria just prior to the onset of NEC. In this study, neither group in the formula fed trial had a decrease in faecal γ-Proteobacteria. In the human breast milk-fed group, supplementation with Binf strain was associated with a decrease in γ-Proteobacteria, which may be one of the most important findings of this study.

Although the results were interesting, there are limitations in applying the data in a clinical setting. In an attempt to minimise challenges in using over the counter...
probiotics with unknown composition and viability, the investigators used strains of bifidobacteria which were grown specifically for the study to allow confirmation of purity and viability. Although this provides benefit in a scientific setting, it remains to be seen from a clinician’s perspective as to whether the same benefits apply with commercially available strains.

**Mental health and moving to greener areas**


Mental health and wellbeing is a modern public health issue with unipolar depressive disorders being a major cause of morbidity and disability. Epidemiological studies have reported findings that individuals living in the greenest urban areas tend to have better mental health than those living in the least green areas. There are a number of possible explanations for this and the use of cross-sectional data in past studies has limited causal inferences.

To address some of the questions using longitudinal data, the investigators aimed to assess how mental health patterns were affected when moving to greener or less green urban areas and comparing data for the three years post move. Additionally, they asked which of three hypotheses might be a reason for the change in mental health: The adaption hypothesis, in that an initial peak following the move to green areas is not sustained and returns to premove levels; the sensitisation hypothesis, in that mental health benefits will not be apparent initially as benefits take longer to occur; and the shifting baseline hypothesis, in that the impact on mental health may be immediate and sustained.

Adult samples were drawn from the British Household Panel Survey, a national representative longitudinal survey of over 5000 UK households that ran annually from 1991 to 2008. Participants that had mental health data for five consecutive years and who relocated to a different residential area between the second and third years were included. Samples were limited to participants from England only. Mental health was measured using a general health questionnaire where respondents reported mental health “in the past few weeks” compared to “usual” for six positive and six negative mood states. Green space was defined as percentage of land categorised as green space and domestic gardens. Mental health was followed for the three years following the move to ascertain the longer term effects of the move.

For the 594 individuals who moved to green urban areas, mental health was seen to improve within a year and stayed at approximately the same level for the following two years, consistent with the shifting baseline hypothesis. The results were less straightforward for the 470 individuals who moved to less green areas. The predicted decline in mental health was observed to occur prior to the move to less green areas and was followed by rapid adaptation to living in the less green area with mental health scores returning to baseline in the postmove years.

The authors propose the premove decline observed in the group moving to less green areas could be due to anticipation of moving to the area, which may have negatively impacted upon mental health or alternatively, declines in mental wellbeing may have precipitated the move itself.

Limitations of the study are the relatively small samples sizes and difficulties in stratifying for other variables including age and income. Additionally, the motivations for moving were not included in the modelling analysis which could provide additional useful information. Nevertheless, the study demonstrated that moving to greener urban areas was associated with sustained mental health improvements which may be important from a public policy and town planning perspective, but from a clinician’s perspective provides further insights regarding the importance of green space in mental health.
AJHM based CPE Questionaire

The AJHM based CPE questionnaire system is a voluntary system designed to assist members in the accumulation of NHAA CPE points. Questions are divided into the appropriate subject categories (herbal medicine and medical science) and each question refers to an article in this issue of the Australian Journal of Herbal Medicine. Points accumulated through completion of these questions should be recorded in the NHAA CPE diary. Each completed question is worth one mark in the relevant category. Your completed CPE diary should be returned with your membership renewal at the end of the financial year. For further information please see the NHAA CPE Member’s Manual on the NHAA website www.nhaa.org.au.

Medical science questions – AJHM 26(2)

1. The recently updated Australia’s Physical Activity and Sedentary Behaviour Guidelines make which of the following recommendations:
   a) For adults aged 18-65 years, accumulate 30 minutes of moderate intensity physical activity daily and limit electronic media for entertainment to two hours per day
   b) For those aged 5-17 years, 60 minutes of moderate/vigorous intensity exercise daily is recommended with electronic media for entertainment to be limited to three hours per day
   c) For children under 2 years, limit time watching television or using other forms of electronic media to one hour per day
   d) Adults aged 18-64 years should accumulate 150-300 minutes of moderate intensity physical activity or 75-150 minutes of vigorous intensity exercise per week and minimise the amount of time in prolonged sitting

2. With reference to the study on breast food, complementary feeding and food allergy, which of the following statements is incorrect:
   a) Introduction of solid foods before week 17 was associated with an increased risk of allergic disease
   b) Solids were introduced significantly earlier in food-allergic infants compared with control infants
   c) A protective effect on food allergy was demonstrated when egg was introduced in the infant’s diet concurrently with breast milk
   d) A protective effect on food allergy was demonstrated when cow’s milk protein was introduced in the infant’s diet concurrently with breast milk

3. In the study investigating different bifidobacteria strains in premature infants, which of the following statements is correct:
   a) The Bifidobacterium longum group was the most prevalent bifidobacterium among the formula-fed infants, regardless of the probiotic administered
   b) The Bifidobacterium animalis ssp lactis strain has the enzymes necessary to thrive in the presence of human milk oligosaccharides
   c) In the breast milk-fed infants, supplementation with Bifidobacterium animalis ssp lactis was associated with consistently greater increases in faecal bifidobacteria when compared with Bifidobacterium longum ssp infantis supplementation
   d) In the breast milk-fed infants, supplementation with Bifidobacterium longum ssp infantis strain was associated with a decrease in γ-Proteobacteria

4. In the study about greener spaces and mental health, which of the following is incorrect:
   a) Individuals who moved to green urban areas experienced improvements in mental health within one year which was sustained for the following years
   b) Epidemiological studies have reported findings that individuals living in the greenest urban areas tend to have better mental health than those living in the least green areas
   c) Individuals who moved to less green areas experienced a decline in mental health immediately after the move which was followed by rapid adaptation with mental health scores returning to baseline in the postmove years
   d) The study demonstrated moving to greener urban areas was associated with sustained mental health improvements

5. In the study investigating sugar sweetened beverages and endometrial cancer, which of the following statements is false:
   a) Women who reported higher intake of sugar sweetened beverages were at higher risk of type I endometrial cancer in a dose-dependent manner
   b) High-fructose corn syrup is the major sweetener added to sugar sweetened beverages in all countries
   c) Factors other than body weight may be involved in the link between sugar sweetened beverages and type I endometrial cancer
   d) The risk of type II endometrial cancer was not associated with intake of sugar sweetened beverages and sugars
Medical science questions – AJHM 26(2)

1. With reference to the article on cranberry use during pregnancy, which of the following statements is true:
   a) A recent Cochrane review demonstrated a clear role for cranberry in the prevention and/or treatment of UTIs
   b) The study found increased risk of congenital malformations, stillbirth/neonatal death, preterm delivery, low birth weight, small for gestational age and neonatal infections following cranberry use through pregnancy
   c) The study found no increased risk of congenital malformations, stillbirth/neonatal death, preterm delivery, low birth weight, small for gestational age and neonatal infections following cranberry use through pregnancy
   d) An increased risk of vaginal bleeding occurring after week 17 among women who used cranberry in late pregnancy, which remained significant after adjusted analysis

2. In the study reporting effects of silymarin and selenium in men with lower urinary tract symptoms, which of the following statements is incorrect:
   a) A reduction in the PSA value was observed at the end of 180 days in the Se-SM arm whilst the placebo arm experienced an increase in PSA levels
   b) The beneficial effect on urinary excretion may be similar to action of potassium-sparing diuretics due to unchanged potassium levels in the Se-SM group
   c) Plasma selenium levels remained steady in the Se-SM group and the placebo group
   d) Significant improvement in total IPSS score, irritation, obstruction and quality of life questions were observed in the Se-SM group

3. In the study reviewing the effect of Euphorbia hirta as an antibacterial agent, which of the following is true:
   a) Euphorbia hirta extract effectively eradicated the established biofilm of Pseudomonas aeruginosa with some weak anti-biofilm activity also demonstrated against Enterococcus faecalis
   b) Biofilm inhibition activity of Euphorbia hirta was most potent against Enterococcus faecalis with some inhibition also observed against Pseudomonas aeruginosa
   c) The antimicrobial and biofilm inhibitory and eradication activity of Euphorbia hirta against Pseudomonas aeruginosa demonstrated its effectiveness in infections caused by this pathogen
   d) Strong growth inhibition was observed against Enterococcus faecalis, Bacillus cereus and Pseudomonas aeruginosa

4. The multinational study reviewing herbal medicine use during pregnancy found:
   a) Australia, Poland and Russia had the largest percentage of women reporting using herbal medicine through pregnancy with rates of 53.8%, 49.8% and 49% respectively
   b) Herbal medicine use was mostly for chronic diseases rather than ailments related to pregnancy
   c) In Western Europe, herbal medicine initiated on advice of a physician was the most common source of recommendation
   d) In most countries women relied on informal sources of information, such as one’s own initiative, friends/family, internet, magazines and media in their decision to use herbal medicine throughout pregnancy

5. With reference to the study on the effects of Rhodiola rosea and B vitamins, which of the following statements is true:
   a) Rhodiola rosea was found to display antinociceptive activity involving the GABA/BDZ and opioidergic system but not the 5-HT$_{1A}$ receptors
   b) Rhodiola rosea was found to display antinociceptive activity involving the GABA/BDZ and 5-HT$_{1A}$ receptors but not the opioidergic system
   c) Rhodiola + B vitamin mix (B1+B6+B12) was the most potent combination, followed by rhodiola + B2
   d) Co-administration of rhodiola extract with B1, B2, B6, B12 and the B1+B6+B12 mixture all produced additive antinociceptive effects
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The NHAA International Conference on Herbal Medicine has been a stimulating event held every three years. Due to the popularity of this conference we are excited to present the conference biannually. This is a premier event attracting over 500 delegates including national and international Western herbal medicine, naturopathic, integrative medicine and allied health practitioners, students, nurses, researchers and academics. **Sustainable Health Care** is the theme of the 2015 conference.

**Abstracts should address one of the following subthemes:**

- **Sustainable health and wellness:** the role of the herbal medicine practitioner in the understanding, prevention and management of chronic conditions such as cancer, heart disease, mental health, diabetes, and hormonal conditions.
- **Sustainability of the profession:** the role of herbal medicine practitioners in primary care, integrative medicine, regulation, the changing professional and political environment.
- **Sustainability of herbal medicines:** environmental issues, regulatory issues, growing and manufacturing.
- **Sustainability in practice:** business models, practitioner self-care, legal issues, social media, ethics.
- **Sustainability in herbal medicine research:** practitioner participation, research design and funding.

Plenary, concurrent sessions, workshops and posters will be considered that are consistent with the themes outlined. We are particularly interested in presentations that can provide a practical application for herbalists, naturopaths, and health practitioners using herbal medicines.

**ABSTRACT SUBMISSION DEADLINE: 31 JULY 2014**

For more detailed information visit the website at www.nhaa.org.au or email icprogram@nhaa.org.au