

Milking their health for all its worth? Improving the health of farming families through facilitated learning

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Abstract: The Victorian Dairy Industry has an annual turnover of \$5,125 million and produces over two thirds of the nation's fresh milk and cheese, but what do we know about the health of the dairy men and women who drive this industry, and how can health professionals and industry assist them to focus on the health of the people involved in the farm business? The Sustainable Dairy Farm Families (SDFF) program undertook research exploring the health, wellbeing and safety of Victorian Dairy farming families across eleven locations. The program involved physical assessments, reviewed health conditions and health behaviours and provided education relating to common health conditions. Risk factors were identified for chronic and lifestyle diseases such as cardiovascular disease, diabetes and cancer. Participants were referred to health professionals as required and reassessed over three years concluding in 2007. The program has influenced participants' decisions about their health and improved some clinical indicators. A cross-sectoral intervention appears to be an effective method for improving health, wellbeing and safety in farm men and women and their families.

Keywords: farming, learning, health, dairy, safety

Introduction

The Australian dairy industry is Australia's largest processed food industry, and ranks in the top four of the nation's rural industries. At the farm gate the Australian dairy industry was valued at \$3.2 billion in 2006/07 and according to the Australian Bureau of Agricultural and Resource Economics (ABARE) report dairy provides an estimated regional economic multiplier effect of 2.5 (ABARE 2008). Australia also exports over \$3 billion worth of milk and related products making it one of the world's leading exporters of dairy products. The dairy industry is one of Australia's leading rural industries in terms of adding value through further processing, with much of this processing occurring close to farming areas, and generating significant economic activity and employment in country regions.

The recent global financial crisis has affected Australian dairy industry exports and this reduced demand and the relative strength of the Australian dollar has halved the price per litre paid to dairy farmers. With the dairy industry operating in a highly competitive world market, precise management and coordination undertaken by all dairy businesses is vital in order to survive. When we assess this industry we see farming families make decisions, plans and choices that optimise profit and production for the benefit of the family business. However, there is limited acknowledgement about the effects of health of the dairy farmer on the production and profitability of the dairy farm. Important questions emerge in this context: Do dairy farmers consider their health and its impact on their business? Does the health of dairy farmers have differences and similarities with other agricultural industries such as broadacre farmers?

The Sustainable Farm Families (SFF) and the Sustainable Dairy Farm Families (SDFF) projects are initiatives developed by Western District Health Service in Hamilton, Victoria through a unique process of intersectoral collaboration involving health services, university, agricultural agencies, training bodies and farming communities. This combination of industry partners work together to address the health, wellbeing and safety of farming families across Australia and in particular the Victorian Dairy Industry. A successful application was made to the Geoffrey Gardiner Foundation for funding to research the Victorian Dairy industry using the SFF framework, education and assessment process.

The SFF program provided participants with information on personal health, wellbeing and safety whilst exploring attitudes to personal health. The program also provided opportunities for learning ways to improve the health and safety of people working on dairy farms. The positive outcomes from interventions in both industry groups (broadacre and dairy) have been recognised through publications and reports associated with both research projects (see Brumby et al. 2008; Brumby et al. 2009). It is important to use these new learnings to compare the two industry groups and make recommendations in relation to key findings to policy makers in both the health and agricultural industries.

This paper reports on the outcomes from the SDFF project undertaken in the Victorian dairy industry from 2004-07. We also provide information on the key similarities and differences between two agricultural sectors; dairy and broadacre. Using the research data and

interventions from both industry groups, we discuss and explore the similarities and differences. We also offer an hypothesis to explain what these clinical indicators tell us about the nature of farming businesses in these two sectors and the resultant health and well being of the people farming in these industries.

Theoretical framework

The SFF and SDFF programs were developed by drawing on both the adult learning and health promotion frameworks. Evidence from health promotion informed us that different teaching approaches can either stifle or encourage the attainment of health knowledge by population groups (Wass 2000). Wenger advised that in communities of practice people who share a concern or a passion for something they do will learn how to do it better as they interact regularly (2005). In addition Keen et al. (2005, p. 6), suggest that 'our social and ecological sustainability depend on our capacity to learn together and respond to changing circumstances' and that many of our current approaches to learning and responding to change occur within traditional institutional arrangement and values. Azjen and Fishbein's (1980), theory of "reasoned action and planned behaviour" focuses on the belief that behaviour change occurs when individuals and groups:

- Share values and beliefs
- Share a common commitment to their new found knowledge
- Discuss with peers how best to respond to the information delivered in their daily lives, and
- Share an understanding of the possible negative effects of poor health behaviours within their business.

In the SDFF and SFF program the farming business is both the traditional institutional arrangement as described by Keen et al. (2005) and the shared concern or passion as described by Wenger (2005). The understanding of the individual impact of health, well being and safety on the farming business is the additional learning and knowledge that the participant gains through this learning model. That is, health, wellbeing and safety while initially viewed as a separate domain from the farming business is recognised as pivotal to both the emotional and economic success of the family farm business.

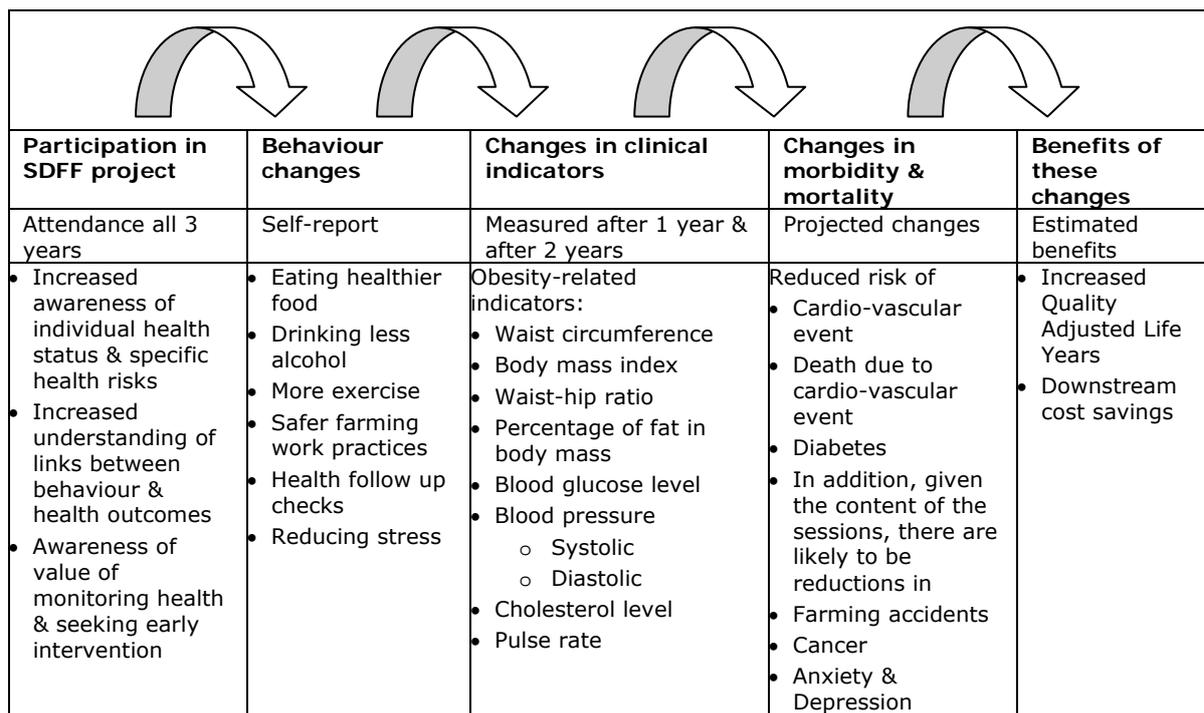
To assist participants in applying these learning's and taking action both at an individual and the farm family business level we draw on Kolb's adult learning model. While Kolb is focussed on individual learning, the lessons from this work are that designing suitable adult learning experiences requires a process to support objective understanding and concrete action. In our case, it is based on objective measures of health and providing suitable reflection on what this means through focus groups and individual counselling. The process also provides opportunities for future action through a joint action plan between farmer and health professional. The SDFF process reflects a supported learning model based on Kolb's contribution to our thinking about individual learning, rather than a style of "teaching".

Using Kolb's (1984) learning model we were able to engage effectively with participants to assist them to learn key concepts about health and wellbeing and farm safety by using their own experiences. Kolb's model allows participants to become active members of the learning process by experiencing the concept, reflecting in the learning, comprehending and then planning to use this new information within their farming life. Working with participants in small group formats has assisted in this learning process, as they are able to learn from others with similar agricultural interests and share the new information and conceptualise how the new health information can be used in their own business.

The education process

The process allowed us to work with a population that we now recognise represented a high change challenge, in that their health status was poorer than their metropolitan cousins (AIHW 2007). The SDFF program consists of a structured two-day workshop in year one and a one-day workshop in year two and three. Participants were recruited from the dairy industry directly (word of mouth) and via collaborative industry partners (e.g. WestVic Dairy) for each of the programs. The broadacre and dairy programs were delivered using the same education format over three years of intervention. A total of 128 broadacre and 210 dairy farmers were sampled over the three year period. Topic delivery and format was similar for both industry groups. The sequence of intended outcomes, as set out in Figure 1, shows how the workshop process facilitated individual behaviour change. For example, increased awareness and understanding led to specific behaviour change which impacted on clinical indicators leading to improved health and wellbeing.

Figure 1. The SFF Model of Change.



Source: Boymal, Rogers, Brumby & Willder (2007)

Focus group information was gathered from participants at the start of the first workshop to gain an insight into their views about the current health issues relating to the farming industry. Questions were asked about their farming unit, reason for attendance and the current value of health in their farming entity. The focus group information was essential in determining the evaluative framework associated with each industry. Key areas of concern gathered were health information, access to services and issues affecting the industry.

The topics in the workshop were chosen to reflect the current health issues affecting rural populations. While data on the health and well being of farming families could not be separated from data for rural populations, farmers were typically surprised to learn that the health status of rural people was poorer than in metropolitan areas. Just how farmers compared to rural populations was the basis of much discussion early on in the workshop. Key topics included:

- The state of rural health
- Cardiovascular disease
- Cancer including bowel and skin
- Farm health and safety
- Stress and stress management
- Diet and Nutrition – supermarket tour
- Gender related topics delivered in separate groups e.g. prostate cancer, impotence, women’s health and breast cancer

Two health professionals with expertise in rural health, men’s and women’s health and farming experience facilitated sessions. The third party evaluation (Boymal et al. 2007) of the Sustainable Farm Families workshop program identified that one of the key successes of the education, assessment and review processes was that the two original health professionals continued to assess the same participants with the same equipment at a similar time of year over the three years. This made the data gathering more reliable and created the opportunity to develop strong linkages with participants and effective sharing of information about the causes of poor health and appropriate remedies. Conducting the workshops at the same time each year reduced the risk of seasonal workload influences affecting the clinical results.

Hip circumference was measured after removing folds of clothing and was measured with a tape measure to the nearest 0.5 cm. Weight was measured in kilograms to the nearest 0.1 kg. Height was measured in centimetres to the nearest of 0.5 cm on a portable stadiometer. Body Mass Index (BMI) was calculated using the formula BMI = weight (kg)/height (m)². A BMI of 30 or greater was considered as obese while other measurements were ranked based on WHO definitions (Balkau 2002)

Physical assessment

A success of the program was the one-on-one physical assessment process that all participants were offered each year as part of their participation in the program. The 30 minute physical assessment also involved the collection of information related to the current state of health of each of the farming family members. The process was structured to undertake initial screening on arrival of participants following a minimum of 10 hours of fasting to aid in accuracy of the testing procedures. Initial screening followed a 3-5 minute initial assessment including the following privately recorded tests:

- Fasting total cholesterol and blood glucose
- Weight and height measurement
- Body mass index
- Body fat percentage
- Blood pressure and pulse
- Waist and hip measurement

A comprehensive one-on-one private assessment followed the initial assessment taking up to 30 minutes and included the gathering of information covering:

- Evaluation and discussion of initial physical assessment results
- Allergies and current medications
- Familial history and incidence of disease
- Neurological assessment
- Skin and integumentary assessment
- Cardiovascular assessment including heart sound assessment
- Respiratory assessment and auscultation
- Gastrointestinal assessment and risk for upper and lower GI disorders
- Urological assessment for relevant risk and disorders
- Sexual history and assessment for disorders
- Social history

Ethics approval was granted from the South West Health Care Ethics committee on the undertaking of specific objectives. The committee made several recommendations including the need to refer participants with fasting cholesterol or blood glucose levels greater than or equal to 5.5 mmols to their General Practitioner and to use the Heart Foundation's (2002) minimal requirements for exercise.

Results

The average baseline characteristics of the SFF and SDFF participants are presented in Table 1. The mean baseline for body mass index in both the dairy (28.14) and broadacre (26.06) programs were above the healthy range threshold of 25. Dairy participants recorded higher BMI, waist circumference, blood glucose and blood pressure levels than broadacre farmers. Only baseline total cholesterol levels were lower for dairy farmers, which appears counter intuitive to public perceptions of dairy farmers producing and consuming products high in saturated fats and cholesterol. These results are also reflected in the percentage of participants at risk in terms of clinical indicators.

Table 2 below highlights the number of people at risk with four key clinical indicators being body mass index, cholesterol, blood pressure and blood glucose and highlights the higher rate of clinic issues in the dairy population.

The gender of the participants at risk in terms of clinical indicators, perception of health and behaviours is shown in Table 3. Higher percentages of dairy women farmers did not undertake adequate physical activity, had higher waist measurements and not surprisingly this was reflected in raised blood glucose levels. The dairy women also received the highest amount of referral for further follow up with 73 percent of participants being referred. Thirty-four per cent of dairy women indicated that their health interfered with the quality of their life. Conversely, more men noted moderate to severe pain and also higher consumption of alcohol at high risk levels.

What is noticeable in Table 2 and 3 is that the clinical indicators in a number of dairy participants suggest that a large number were at a higher risk for preventable lifestyle conditions such as CVD and diabetes and also experienced higher levels of body pain. The exceptions were total cholesterol level and alcohol consumption being lower than broad acre farmers.

Table 1. Baseline characteristics of SDF and Broad acre participants

Variable	SDF		SFF Broad acre program	
	Number of participants (n =210)	Percentage of participants	Number of participants (n = 128)	Percentage of participants
Male	109	52%	69	54%
Female	101	48%	59	46%
Born in Australia	195	93%	121	95%
Current smoker	15	7%	5	4%
Previous smoker	41	20%	28	22%
Variable	Mean	Standard deviation	Mean	Standard deviation
Age	49	10.98	47	8.79
Body mass index (kg/m ²)	28.14	4.75	26.06	3.44
Total cholesterol (mmol/L)	4.98	0.97	5.49	1.10
Waist circumference (cm)	95.7	13.15	91.18	10.79
Blood sugar level (mmol/L)	5.07	0.82	4.88	0.63
Blood pressure (systolic) (mm Hg)	131.25	16.26	126.28	15.13
Blood pressure (diastolic) (mm Hg)	82.57	9.58	79.34	9.08
Pulse rate	75	8.55	72.89	9.26

Table 2. Number of participants at risk in base year for specific clinical indicators

	Percent of participants (dairy)	Percent of participants (broad acre)
Body mass index \geq 25	78	52
Total cholesterol level \geq 5.5 mmol/L	29	35
Blood pressure (systolic) (mm Hg) \geq 140	40	20
Total blood sugar level \geq 5.5 mmol/L	17.6(16.6)*	10

* people with diabetes, even when their diabetes is well managed are likely to have a high early morning fasting blood sugar level. Of the 5 dairy farmers with a pre-existing diagnosis of diabetes, 3 had blood glucose levels above 5.5 mmol/L. If participants with a pre-existing diagnosis of diabetes were excluded from the analysis then 16.6% of dairy farmers would have been at risk in the base year

Discussion broad acre

Workshops were conducted across Victoria, New South Wales and South Australia in 2003-2006. The majority of agricultural operations included, mixed grazing, cattle and sheep, viticulture, and cropping. The farming groups were keen to discuss the issues effecting modern day farming operations and ways in which farming has changed in the recent years. Some interest was directed at the dry weather conditions and early indications of ongoing water shortages. There was limited to nil discussion relating to climate change rather drought.

These farmers rated themselves as having a high level of physical activity and good to very good health. Their idea of physical activity was usually associated with work on the farm and felt this was ample to maintain good cardiovascular fitness.

Key discoveries

Broadacre farming families were found to have significant issues that directly influenced their health. Through focus group discussion and physical assessment processes participants were able to communicate many of the issues specific to their industry.

Work ethic Broadacre farming families felt their workplace was different from other farming industries in that they were required to manage risk related to seasonal indicators more than farmers in other sectors were. This was evident in the preparation of crops and the resultant harvesting process through the year. Twenty-hour days were not uncommon during harvesting and isolation and poor sleeping habits were a regular occurrence at that time. In contrast, these farming families reported periods of time when the work demands were reduced and minimal work was required to keep the farm operational at other times of the season. Participants often worked off farm to provide additional financial support and the shared role of husband and wife on the farm was complicated by managing farm, work and family.

Table 3. Gender and health indicators of SDF and SFF participants

<i>Factor</i>	SFF Men n=69	SDF Men n=109	SFF Women n=59	SDF Women n=101
Health Demographic				
Australian born (%)	97	93	91	91
Spoke English at home (%)	100	98.2	100	97
Average Age (years) Range	48 (20-74)	49 (23-76)	46 (28-63)	47 (22 -71)
Drink alcohol once per week (%)	86	67	67	54.5
Drink high-risk levels ^a at least once a month (%)	54	44	22	12
Perceptions of Health				
Physical activity 30 min per day most days (%) ^b	75	85	73	72
Report health as good, very good to excellent (%)	90	93	94	92
Suffer moderate –very severe bodily pain (%)	30	27	16	22
Health interfered with activities of daily life	30	40	29	34
Health Indicators				
Waist size above recommended level ^c	26%	37.6	38%	56%
Elevated Body Mass Index ^d	70%	73.4%	21%	47%
Elevated cholesterol ^e	43%	38.5%	38%	18%
Elevated fasting blood glucose ^f	13%	15.6%	8.6%	17%
Urinary problems ^g	43%	41.2%	61%	55%
Suffering from muscle, joint pain, back pain	68.6%	72.5%	41%	59%
Participants referred for further follow up (% with actual numbers in brackets)	60% (42)	63% (69)	71% (41)	73% (74)
Total number of referrals written – GPs, dietetics, clinics and counsellors	45	70	53	93

Source: Brumby SA, Willder SJ, Martin J. 2009

^a More than 6 standard drinks in any one day for men and four standard drinks for women (National Health and Medical Research Council 2001).

^b Physical Activity for 30 minutes on most days of the week (Heart Foundation 2002)

^c Waist circumference greater than 88cm in women and 102 cm in men associated with greater risk of diabetes (International Diabetes Institute 2001)

^d Body Mass Index over 25 greater chance of cardiovascular disease, diabetes (Better Health Channel 2005).

^e Fasting screening cholesterol over 5.5mmol referred to General Practitioners for further follow up (Southwest Ethics Committee 2003)

^f Fasting blood glucose over 5.5mmol referred to General Practitioners for further follow up (Southwest Ethics Committee 2003)

^g Dribbling of urine when lifting, cough or sneeze, getting up more than once through the night, difficulty controlling flow (Continence Foundation of Australia 2002)

Food and lifestyle During the overlap of both the SFF and SDF program, it was noticed that the broadacre farmers as a group had significantly higher levels of fasting cholesterol than dairy farming families. This prompted the researchers to ask the question about meat consumption and the slaughtering of their own farm grown meat for personal family consumption. This question was not asked until year three of the broadacre program. Of the original 128, 112 participants responded to this question with 62.5 percent indicating that they slaughtered their own meat; 96% killing sheep (lamb, mutton, two tooth) and 27 percent also slaughtering beef. Pork, rabbit and duck were also mentioned. This may have some clinical indication in the level of fasting cholesterol, which was higher than the dairy farming families who had informed us that very few dairy farmers slaughtered lamb for their personal consumption. Through pre-workshop survey questions it was clear that diet and nutrition knowledge was poor. While the recommended meat serving sizes of 120 grams was met with hilarity in the workshop, the clinical indicators showed that the broadacre workshop participants had reduced their consumption of cholesterol over the three years of the program.

Health indicators A summary of the health assessment results were reported back to each workshop at the end of the first year. Key health indicators revealed significant health issues relating to potential diseases and increased mortality and morbidity, which became the motivation, both individually and collectively for change and also peer support – as most knew several other farming families participating in each program. In the elevated sample there was a greater improvement in clinical indicators over the life of the program, indicating that increased understanding between diet, exercise had impacted on clinical indicators. As outlined by Blackburn et al. 2009, high risk participants in the SFF Program reduced their risk for lifestyle disease such as cardiovascular disease and diabetes.

Alcohol consumption for both men and women was higher amongst broadacre farmers than dairy farmers. Both men and women in the broadacre groups rated their health as good, very

good or excellent. However, the need for referral for further follow up in both broadacre and dairy groups was approximately 70% for females and 60 % for males.

General findings

There were many trends that were relevant to their industry as listed below:

- Rashes, skin conditions and suspicious skin spots were common amongst the group and revealed prolonged skin exposure issues and constant rashes involving heat, fungal infections and dermatitis.
- Sexual dysfunction including erectile dysfunction and impotence was noted in the male sample yet below what was detected in the dairy participants
- Physical activity was minimal in males and females (although self reported as adequate) and many noted social isolation, seasonal pressures and distance to services as key reasons for this.
- Farm health and safety issues were prominent including lack of helmet use due to heat and discomfort and the belief that they were 'safe riders'. Parents said they encouraged children to wear helmets.
- Safe use of equipment and plant was often stated to be dependent on money to maintain this to a safe level.

Discussion dairy industry

The dairy industry group had 210 participants selected from the 10 dairy industry regions across Victoria (and an eleventh workshop held in Melbourne for dairy industry leaders from across the State). The farming enterprises focused primarily on dairy with a few involved in beef farming. The sample was similar in demographics to the broad acre group with mean age, nationality and self reporting of health status. While it was more difficult to recruit dairy farmers (who worked morning and night and attendance at day-long workshops was problematic for some) the workshops were well attended and retention rates over the three years were high. The SDFF program was adapted to facilitate their attendance by starting later and finishing earlier to allow for milking requirements.

Group participants were happy with their level of health and self rated this as very good to excellent at the same rate as the broad acre groups. Participants felt that working with bodily pain was the norm and this was highlighted with up to a quarter of men and women experiencing bodily pain on a regular basis.

Work Ethic The work ethic within the dairy industry was different to the broad acre families with both husband and wife being the key farming unit driving production and operations within the business. The restriction of the dairy enterprise was evident with minimal time available to travel, holiday and even support community activities. Farmers also noted the difficulties in accessing additional labour to support the operation of the farm and the lack of confidence exhibited by many dairy farmers to entrust others to look after their farm. Many stated that holidays have been non-existent for years due to the workload demands of the farm. This demand limited the families' ability to get off the farm and socialise as well as limiting other activities including physical exercise, participating in groups, sporting or social opportunities for children and more general community engagement. The increased risk of burnout and the challenge of work life balance has also been recognised by the dairy industry (Ison 2007) There was limited reporting of off dairy farm work with husbands and wives having equal responsibilities on the farm. Roles and responsibilities were in most cases equally shared and each understood and respected the role of the partnership in this type of farming enterprise.

Food and lifestyle Many highlighted that they do not access the vat for their source of milk for consumption. Dairy farms were located in more closely settled rural regions and closer access to towns with larger supermarkets and choices available, than the broadacre farmers. This also included purchasing milk – particularly low fat brands. The dairy farmers were asked in the second year if they slaughtered their own meat for personal consumption with 61% indicating they did. Only 32% reported killing sheep but 93% (n= 107) reported killing beef and also pork and poultry. Food consumption patterns were more regular with breakfast, morning tea, lunch and other meals consumed together. Access to physical activity was limited and they believed the completion of activities associated with farming was sufficient enough for positive health benefits; as was noted by broad acre farmers. Dietary knowledge was similar to the broad acre group with minimal knowledge relating to food composition, daily requirements and label reading principles.

The level of elevated blood glucose results within the dairy industry was concerning and over the three years this continued to remain a significant indicator. Results for the dairy industry

revealed over 17% of females and 15% of males had fasting blood glucose readings elevated above 5.5 mmols. This was higher than the broad acre group.

Health Indicators A common theme noted within the dairy sample was the high level of fasting blood glucose levels, high body mass index and waist hip ratios outside the recommended ratios. Weight issues were common and significantly higher in the females when compared to the female broadacre farmers. Women in particular have a relatively sudden increase in their level of risk at menopause as the protective effects of oestrogen on cardiovascular risks diminish. Many women also experience metabolic changes that result in weight gain and a subsequently higher risk of both cardiovascular disease and diabetes. Bodily pain was common with moderate to severe pain a daily occurrence and referral levels were marginally higher than the broadacre farmers.

General findings

The dairy industry prompted us to question the influencing factors that exist amongst different farming enterprises and how these contribute to the health status of farmers in these industries. Of interest was the level of sexual dysfunction reported by men and the level of concern revealed by the females. The female participants would often state that the level of intimacy and sexual contact was low and expressed that they would hope that their partners would discuss this during their physical assessment. The men when asked about their sexual function discussed many factors including tiredness, lack of interest, difficulty and the need for supportive intervention such as PDE5 inhibitor use (Phosphodiesterase inhibitors e.g. Viagra) and contacting clinics for review. Our discussions with participants (one-on-one) often centred around the level of sleep participants had and the time constraints experienced on the dairy farm as contributing factors for this health and well being issue. To date we have not had this level of concern about a sexual health issue reported by participants from other agricultural industries (the SFF program has been undertaken in sugar and cotton in addition to broad acre and dairy).

Other health issues included:

- A high level of self reported skin and noted issues which mainly affected the hands, through calluses, cuts and affected by dermatitis.
- High level of self reported bodily pain including arthritis, back and joint pain.
- Increased levels of psychological distress were noted within the sample, which was demonstrated with the Kessler 10 psychological assessment scores.
- Men and women had poor knowledge relating to gender specific health issues including prostate, continence, breast screen and cancer screening.

Action Planning

Following the year one program, participants were asked to identify areas where they could improve their health, wellbeing or safety.

In both the SFF and SDF program these activities was successful with men and women from the same farm setting different personal goals, adopting different actions and achieving different outcomes. Participants indicated two – three actions that often linked with their clinical indicators, suggesting that the participants' were aware of areas they needed to address. This method of participation and engagement was very popular among SFF participants with 325 participants forwarding their action plan (96% response from the baseline year) and over 930 actions documented reflecting the enthusiasm for addressing their own priorities.

More dairy farmer participants chose to focus on stress management rather than increase their physical activity or reduce their weight and this is reflected in their clinical outcomes in Table 4. The rate of change and improvement in the dairy farmer clinical indicators is less than the broad acre farmers who focussed more on diet and exercise in their action plans. Since 2006, much more publicity around type two diabetes and the risks for people with higher body mass index and waist circumference has increased awareness in the general population of this relationship. Whereas previously most people knew about the causes of cardiovascular disease and heart attacks and took steps to reduce their consumption of cholesterol, much less was known in the general community about being overweight and the increased likelihood of type two diabetes.

Table 4. Mean change in clinical parameters from baseline to year 3 for those at risk in base year, dairy and broad acre.

Clinical Indicator	Dairy Mean (±Standard Error)	Broad acre Mean (±Standard Error)
Body mass index ≥ 25	- 0.17 (0.12)	- 0.44 (0.16)**
Total cholesterol level ≥ 5.5 mmol/L	-0.48 (0.14)***	- 1.26 (0.12)***
Total Blood sugar level ≥ 5.5 mmol/L	0.18 (0.17)	-0.56 (0.15)**
Waist Circumference - Women >88cms	-1.10 (0.85)	-3.17 (0.69)***
Waist circumference - Men > 102 cm	-2.42 (0.67)***	-3.25 (1.498)
Blood pressure (systolic) (mm Hg) ≥140	-10.68 (1.71)***	- 12.5 (1.91)***
Blood pressure (diastolic) (mm Hg) ≥90	-10.10(0.96)***	-5.00(1.40)**

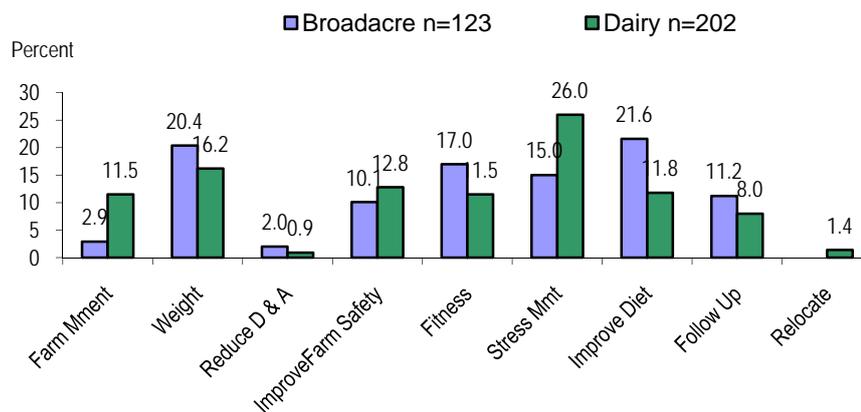
P≤0.05*, P≤0.01**, P≤0.001***

Conclusion

The SDFP and SFF programs are continuing to provide Australia's health industry with important information relating to the health of our farming families. This research has revealed that there are both similarities and differences related to key health indicators and psychosocial aspects of the broadacre and dairy industry groups. Both industries have different work patterns, daily and seasonally, and this affects farmers health, wellbeing and safety in different ways. As people age, health risks generally increase and the number of people with clinical indicators that put them at risk increase over time. While the mean ages of the dairy and broad acre farmers were not significantly different the distribution of ages did vary between the 2 groups. There were a higher proportion of dairy farmers aged over 50 as compared to broad acre farmers. The proportion of women aged over 55 was also significantly higher in the dairy farming group

The SFF and SDFP program has influenced participants' decisions regarding diet and nutrition, exercise, behavioural (safety) and lifestyle factors through increasing knowledge, objective measurement of health indicators (see Table 4) and subsequent changes through documented action plans (see Figure 2). Participation in this SFF program is associated with an improvement in some clinical indicators and participants have reported changes in their knowledge and behaviour undertaking actions across a range of personal, family and farm related areas (Brumby et al. 2008). It is the only program that attempts to address this public health issue in the Australian farming community. The newly established National Centre for Farmer Health at Deakin University, in partnership with the Western District Health Service, recognise that more research needs to be undertaken with farmers to find the relationship and balance between life as a farmer and the health indicators. We continue to focus on reducing the number of people who increase their clinical risk factors during the program, as well as on reducing the risk levels for those who are at risk at the start of the program.

The finding through the SFF projects has informed us of the health status of farm families and their capacity for change through increasing their knowledge, addressing their health indicators and empowering behaviour change. These findings suggest that cross-sectoral intervention (health, industry, research, farmer groups, service delivery) is an effective method for improving health, wellbeing and safety in farm men and women and their families. The success of this program is a combination of several key factors: it addresses primary health concerns of family families and it locates the discussion of improved health and wellbeing within the context of the family farming business. It does this by working with other family families in a participatory workshop format. It engages industry, health services and universities in a purposeful process of enquiry that aims to enhance the health, wellbeing and safety of Australian farming families.

Figure 2. Action planning choices following year 1 workshop

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