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MAKING CONNECTIONS

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Acknowledgements

It is a great honour to be invited to deliver the 16th Libby Harricks Memorial Oration. Although I did not have the good fortune to know Libby Harricks I have been inspired by her extensive work, her energy and advocacy achievements, and her commitment to providing all Australians with access to appropriate and quality services. I also note we both love to use the term 'Shhh'; Libby used it as an acronym and I am using it with the word 'hearing' to create a pun on a common farming activity—*shearing*.

Not only is it an honour to deliver this Oration but a wonderful opportunity to present on the early findings of *Shhh hearing in a farming environment* project. The material presented in this paper draws on previous research and the current *Shhh* project funded by the National Health and Medical Research Council Project Grant GNT 1033151. The *Shhh hearing in a farming environment* is a collaborative project and I wish to acknowledge the work of co-researchers Anthony Hogan, Warwick Williams, Cate Mercer-Grant and Rebecca Taylor, National Centre for Farmer Health work colleagues Adrian Calvano, Tracey Hatherell, Corrina Lee, Heidi Mason and the Victorian Branch of Better Hearing Australia in particular Gwen Rosengren and Kathleen Pearce for their support. I would also like to thank David Park, Alison Kennedy and Jacquie Cotton for their feedback and assistance. I wish to thank the Deafness Forum of Australia, and the Oration Committee in particular Dr Jenny Rosen, for their kind invitation to present at this conference.

Finally, to the farm men and women and their partners who have participated in, contributed to and improved our services over the last decade – thank you.

Introduction

This is a story of engagement. Engagement with people who live in areas where access to services is difficult; people who live on farms and who have noise induced hearing loss. As they produce food and fibre for domestic and international consumption they also



experience other health, wellbeing and safety challenges. These challenges include increased rates of suicide, workplace death and injuries, poorer health outcomes for lifestyle diseases and shortened life expectancies. This is a story about helping these farm men and women prevent further hearing loss and empowering them to become astute and noise-conscious consumers. This story is not about the latest medical or audiological breakthrough. It is about what it is to be human and to hear. It contains lessons for us all.

This paper will provide a background on the health, wellbeing and safety of Australian farmers. It will discuss a successful method for engaging them to address their health, wellbeing and safety challenges – the Sustainable Farm Families program. It will highlight how using this program and connecting with other fields of expertise such as audiology, social sciences, hearing rehabilitation, and noise exposure measurement, a new approach was created – *Shhh hearing in a farming environment* – that improved the lives of farm men and women and made a significant difference to the management of their hearing loss. These differences were observed through improved noise control in the home and on the farm, the use of hearing tactics for improved communication, changed purchasing patterns and an increased use of the appropriate and correct hearing protection. Importantly, it will outline how essential it is for service providers to be prepared to go beyond the traditional one-on-one clinical approach to ensure they make a difference, and to recognise health in its broadest contexts –workplace, family, social stigma, right through to new technology and ultimately engaged and serious health consumers. This will necessitate looking outside the medical professions and using the workplace, industry groups and family as the sites for health, wellbeing and safety programs. Unequivocally, it will mean changing the way our health services are delivered.

Australian Agriculture

Farming enterprises share many similarities with small businesses. They are often family owned and operated, possess a small number of direct employees and involve long working hours. According to the National Farmers Federation (2012) over 95% of farm businesses are family owned or operated. Australian farm production is a key part of our nation's economy while globally it is the largest exporter of wool, (Department of Primary Industries, 2012), second largest exporter of barley (Food and Agriculture Organization of the United Nations, 2011), third largest exporter of dairy (Dairy Australia, 2012) and beef (Meat and Livestock



Australia, 2014), and fourth largest for cotton (Cotton Australia, 2012). Australia's farmers have been recognised as some of the most efficient agricultural producers in the world (Department of Foreign Affairs and Trade, 2012) and in May 2013, the Commonwealth Government of Australia launched the first National Food Plan (Department of Agriculture Fisheries and Forestry, 2013) outlining its vision for Australian agriculture to feed the rising middle class of our northern neighbours.

Surprisingly, the number of farmers in Australia available to support this vision is few. In 2011–12, the ABS reported that approximately 335,000 people were directly employed in agriculture, forestry and fishing, representing less than three per cent of Australia's workforce (Australian Bureau of Statistics, 2011). Of these 335,000 people only 121,000 reported agriculture as their main business activity (Australian Bureau of Statistics, 2012a).

Health, wellbeing and safety

Those employed in farming are typically shown as being a male, ageing population who work long, hard and irregular hours, often on their own (Australian Bureau of Statistics, 2012b). However, farmers are more than just an occupational group. Australian farms frequently feature co-located living arrangements, an extended family work force, and unique patriarchal family and social structures (Alston, 1986). While women represent less than 25% of full time occupational farmers (Australian Bureau of Statistics, 2012b), they contribute significantly through support roles both on and off the farm. In some ways this leaves them exposed to insidious harm through irregular assistance, the use of equipment they are not intimately familiar with due to spasmodic involvement and the ongoing burden of the triple shift of family, work, and the farm. Farming community members, particularly men, are frequently described using terms that emphasise physical toughness, self-reliance and stoicism (Hogan, Scarr, Lockie, Chant, & Alston, 2012). These descriptions reflect an often-carefree attitude to health and wellbeing, a reticence to seek help for mental health concerns and a tendency towards high-risk behaviour patterns.

Work done by Fragar, Depczynski, and Lower (2011) showed the all causes death rate for male farmers and farm managers was 33% higher than that of the wider Australian male population of the same age. Male farmers displayed higher rates of death from cardiovascular disease, motor vehicle accidents and certain cancers when compared to both rural and urban populations (Fragar et al., 2011; Fragar & Franklin, 2000). Farmers, both

as an occupational group and as people who reside on farms, also have higher rates of suicide than both rural populations as a whole and the general Australian population (Miller & Burns, 2008) and the reasons for this are multifactorial (Caldwell, Jorm, & Dear, 2004; Hogan et al., 2012). Numerous studies have found that, rather than seek assistance when they recognise personal psychological distress or acute health issues such as chest pain, people in rural communities will conceal their distress and possess a limited capacity and social competence to identify and express their stressors or pain (Baker, McCoombe, Mercer-Grant, & Brumby, 2011; Fraser, Smith, Judd, & Humphreys, 2005; Hogan et al., 2012; Judd et al., 2006; Miller & Burns, 2008).

Noise induced hearing loss

In their report *Listen Hear!* Access Economics (2006) suggested that approximately one in six (17%) of the Australian population is affected by hearing loss. National and international research highlights that hearing deficits are present in farming populations at much higher rates than the general population (Lower et al., 2010; McCullagh & Robertson, 2009; Senate Community Affairs References Committee, 2010; Voaklander, Franklin, Depczynski, & Fragar, 2006; Williams, Forby-Atkinson, Purdy, & Gartshore, 2002). It is also reported that 60% of Australian farmers have hearing loss with an average hearing-age profile 10–15 years worse compared to the general Australian population (Williams et al., 2002). Being able to hear effectively is important for farmers to avoid potential accidents and injuries to themselves, work colleagues and bystanders. This is particularly important on farms where the workplace is the home, a place where families live, children play and friends visit, all in close proximity to operating machinery, farm equipment, livestock and motorbikes. Hearing impairments such as hearing asymmetry and fair/poor self-reported hearing loss have been significantly associated with agricultural injuries (Choi et al., 2005). In the 2011 Safe Work report the agriculture, forestry and fishing industries had the highest rate of workplace deaths (Safe Work Australia, 2012).

The 2010 Inquiry into Hearing Health in Australia identified a large proportion of rural workers and farmers suffer from acquired hearing loss. The inquiry recommended a campaign to target those at highest risk of acquiring hearing loss, raise the level of awareness of hearing health issues, help de-stigmatise hearing loss and promote services for people who are hearing impaired (Senate Community Affairs References Committee, 2010). Sustainable Farm Families research gathered data from



1417 farming families across Australia and found hearing difficulties were self-reported in 49.9% of men and 29.1% of women in at least one ear while 31% of participants reported trouble hearing in both ears. In total 36.7% of farmers aged less than 60 years suffered some form of hearing loss while 53.7% aged 60 years or above suffered from hearing difficulties.

As a population group at risk what is the affect of hearing loss on farming families? What potential is there for them to change and take action to manage and prevent further hearing loss? What happens when we challenge the cultural notion of stoicism, move outside of our normal paradigms of practice and work to engage with farm men and women to learn, understand and change their behaviour?

Methods to engage with farm men and women

To work with farm men and women and develop the *Shhh hearing in a farming environment* program we combined three evidence-based programs. Firstly, a farmers' health program the Sustainable Farm Families™ program, which was known to successfully engage farm men and women. Secondly, the Montreal Hearing Help Program (MHHP) based on Héту and Getty's rehabilitation program for people affected by hearing loss (Héту & Getty, 1991). Finally the National Acoustic Laboratories (NAL) collaborated to further develop an on-farm noise audit involving farmers gathering noise measurements typical of their noisiest regular activities (Depczynski, Franklin, Challinor, Williams, & Fragar, 2005; Williams et al., 2002). Further detail on the core aspects, their relevance to the engagement of participants and the connections between these programs is now explained.

Sustainable Farm Families™ (SFF)

SFF™ ran very successfully for 10 years and underwent numerous independent reviews (Pearson, 2010; Storey, 2009) and evaluations (Sison & Storey, 2010), featured in a number of publications (Blackburn, Brumby, Willder, & McKnight, 2009; Brumby, Martin, & Willder, 2010, 2013; Brumby, Willder, & Martin, 2009) and was the subject of economic analyses, particularly regarding cardiovascular disease and diabetes (Boymal, Rogers, Brumby, & Willder, 2007; Chudleigh, Simpson, & Lai, 2012). It was also recognised with numerous public and primary health awards¹, which included winning the 'Excellence in consumer involvement in their own care' Public Health Award (Department of Human Services, 2005). A SFF™ program typically ran over two to three years, included annual health assessments, education and workshop

1 <http://farmerhealth.org.au/page/about-us#awards>

sessions, action planning and self-reflection. A key success factor in SFF™ was contextualising farmer health into the familiar "Triple Bottom Line" (TBL) format used for measuring business success and sustainability against economic, social and environmental parameters as described by Elkington (1997). In a farming context the TBL consisted of the financial resources, natural resources (farm land, water, livestock) and human resources (employees, labour units and, to a lesser extent, the family). The SFF™ program used the TBL to get farmers to identify their health, wellbeing and safety as key assets in a farming business.

SFF™ programs ran in every state and mainland territory of Australia and across the cropping, dairy, sugar, cotton, broad acre, horticultural and pastoral industries. The program design covered a multitude of topics including the state of rural health, cardiovascular disease in farming populations, diabetes, farm health and safety, men's health, women's health, stress, diet and nutrition, anxiety and depression, physical activity, business decisions and health and cancer. By participating in SFF™ farm men and women were able to make significant gains in their knowledge of health, wellbeing and safety issues, improve their clinical indicators and change their safety behaviours. However, little time was allocated to addressing those 45% of participants who indicated they had hearing loss. This was due to a variety of reasons including the cultural characteristics of the nursing staff – it seemed easier and more appropriate to check blood pressure, blood glucose and cholesterol and take anthropometric measurements than to address hearing loss. SFF™ staff had little or nil experience with hearing loss and the urgency of issues such as trauma, CVD, diabetes, mental health and the effect of the millennium drought were overwhelming. It also seemed that loss of hearing was perceived as a normal part of life and ageing (Wu et al 2010). It was felt that hearing loss was 'taken for granted'– this is how it was, this is what happened and such is life. This could be and mostly is interpreted as stoicism; however to be stoic one must be informed and the choice not to act is taken with full knowledge of the potential consequences (Brumby, 2013). Moreover, there was a misconception of the impact that hearing loss had on the life of the participants and the life of those around them. Having seen the effectiveness, repeatability and transferability of SFF™ we wanted to build on the known key success factors and lessons from SFF™. This led us to consider the work of renowned Montreal based Professors Héту and Getty (1991) and their rehabilitation program for people affected by noise-induced hearing loss. Their work reflected what we were seeing in the farmers affected by hearing loss and the experience of their partners.



Methods to engage people with hearing loss

Montreal Hearing Help Program (MHHP)

Héту and Getty's work undertaking a rehabilitation program for people affected by hearing loss (Héту & Getty, 1991) showed that the effects of hearing loss are often misperceived by the affected workers, their families, partners and friends. This finding resonated with our experiences of the effects of hearing loss in farm men and women. Furthermore, this impairment is misinterpreted by significant others such as family and fellow workers as an unwillingness to communicate and that the hearing impaired person appears to lack interest or concentration. Not surprisingly, hearing impaired persons are known to be reluctant to acknowledge their hearing loss; they deny the loss exists by modifying their personal behaviours, blaming others and avoiding situations requiring intensive hearing or listening. As they do not believe they have a hearing loss or impairment it is therefore not necessary to seek professional assistance to improve or protect their current hearing.

The Montreal Hearing Help Program (MHHP) was designed to reach people who do not seek help and are reluctant to undertake any steps toward solving their hearing difficulties and reduced communication abilities (Héту, Riverin, Getty, Lalande, & St-Cyr, 1990). These reduced communication abilities often cause misunderstandings that result in unnecessary conflict and unfair blame, lost intimacy, reduced social contact and increased anger (Taylor & Hogan, 2012). In the farming environment home is the workplace and the consequences of these misunderstandings and disaffection falls heavily on to the family members. Amplifying this situation is the commonality of the extended family in Australian farming businesses where reduced listening and communication abilities are felt across generations, escalating the problem for spouses and family members. The very nature of farm work, which is often geographically and socially isolating, may create a further barrier to seeking assistance. If assistance is ever sought the very notion of accessing help may be difficult, as highlighted in the recent parliamentary report, due to the limited or non-existent providers of rehabilitation programs and personal costs (Senate Community Affairs References Committee, 2010).

The MHHP provides three types of interventions. These are:

- Information on deafness – its signs, its consequences and adjustments to facilitate better listening.

- Psychosocial support – provided through discussion and support on stress and relaxation.
- Skill development through problem solving skills, role-playing, practising hearing tactics and access to instrumental aids and devices.

These three interventions target the hearing impaired person, in this case the farmer or agricultural workers, their family and friends, their workplace with support and information from health services.

The MHHP was structured to take 8-10 hours, be undertaken in a group environment and be delivered to people with known hearing impairment. In adapting the MHHP to the *Shhh hearing in a farming environment* we drew on the work of Professor Anthony Hogan and in particular his workbook *Easier Listening* (Hogan, 2008). This workbook provided information on hearing loss, a learning log, and opportunities for reflection and exercises for skill development, for example "Tricks of the Trade – asserting yourself". This format sat very well within the structure and design of the SFF™ program where farming participants were accustomed to writing in their SFF™ Resource Manual. Adaptation of the MHHP also included a hearing test using a Madsen Xeta audiometer and followed the process adopted from Better Hearing Australia (Vic)² who also assisted in some workshops and were involved on the *Shhh hearing* steering committee. All those participants who had self-reported hearing loss and their partners undertook this hearing assessment.

Methods to determine noise exposure and prevent hearing loss

On-farm noise audit

Undertaking a health assessment and giving people health, wellbeing and safety data that related to them, their farm and their work was very important to the success of the SFF™ program (Brumby, 2013). Therefore, engaging with the farmers individually, as well as their partners, their farm business and their workplace, was fundamental. Many farming activities are noisy and represent a hearing health hazard. The regular exposure to farm noise results in progressive hearing loss producing frustrations and hazards in daily work, family life and community interactions. Previous on-farm work undertaken by Dr Warwick Williams of the National Acoustic Laboratories (Depczynski et al., 2005; Williams et al., 2002) provided a structure to highlight the noise levels of the participants'

2 <http://www.betterhearing.org.au>



farm activities through the development of an on-farm noise audit. In developing this aspect of the program we were cognisant that previous research had been undertaken in this area. In particular the important finding by Williams et al. (2004) that taking a hearing assessment and/or educating people about their noise exposures was not enough to change behaviour and prevent future exposures (Williams et al., 2004). Consideration of Lusks et al (1999) work on the use of hearing protection devices and feedback from previous SFF™ participants indicated that the timing and frequency of interventions are vital considerations to ensure successful behaviour change. Importantly the recognition that one-off interventions were likely to fail and ongoing interaction in some form is important to address this. Thinking about ways to overcome these known limitations and incorporate these findings to provide a lasting legacy became fundamental to the *Shhh hearing* process.

The on-farm noise audit was comprised of two parts. The first involved the farmers working with the *Shhh hearing in a farming environment* trained health staff to gather noise measurements that they considered typical of their noisiest regular activities. Examples of these include farm machinery, livestock handling, milking equipment, shearing and woolshed machinery, tractors with and without cabs, power tools, motor bikes, quad bikes and some domestic appliances such as mix masters. These measurements were taken using a CEL-244 digital integrating Sound Level Meter.

The second part involved the use of personal dosimeters to assess and record personal noise exposure information from individuals working on farms using CEL-350/K4 dBadge dosimeters. This information was used to examine the typical daily noise exposures. On-farm activities were summarised in a short individualised report (Appendix 1). The report for each particular farm outlined noise levels, acceptable exposure times, an explanation of their meaning and implication and brief suggestions about how to reduce noise exposure.

The combination of these three programs led to the development and implementation of *Shhh hearing in a farming environment*, which was funded by the National Health and Medicine Research Council GNT1033151 in 2011. Figure 1 illustrates the various program inputs and strengths and the specific external factors affecting farmer engagement.

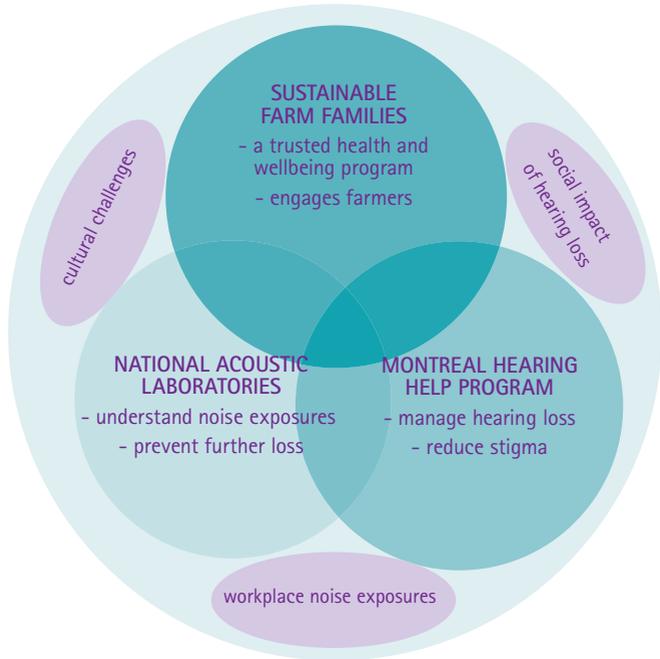


Figure 1 Making the Connections – programs used to address and prevent further hearing loss in farm men and women and develop the *Shhh hearing in a farming environment* method.

Making the Connections – Shhh hearing in a farming environment

The *Shhh hearing* program was designed to test the hypothesis that participating in early intervention hearing services focussed towards farming families will contribute to (a) significant reduction in the impact of hearing loss on farmers and (b) educate and empower farmers on their capacity to reduce their noise exposure (NHMRC Project Précis). In reflecting the input of the three previously evidenced-based programs *Shhh hearing in a farming environment* incorporated (i) screening for hearing loss through both self reporting and audiogram (ii) those with hearing loss attending workshops based on the MHHP and SFF™ (iii) undertaking an on-farm noise exposures audit (iv) evaluating farm men and women's capacity to reduce their noise exposure. An example of the time lines and data collection to enable analysis of these factors is shown in Table 1.

Table 1 The Shhh hearing intervention and data gathering schedule

WORKSHOP 1 BASELINE	ON-FARM NOISE AUDIT	3-5 MONTH FOLLOW-UP	TELEPHONE INTERVIEW	WORKSHOP 2 6-month follow-up
INTERVENTION (1 DAY): <ul style="list-style-type: none"> • Focus group sessions • Hearing health sessions • Table discussions • Easier listening work book • Health assessment 				INTERVENTION (½ DAY): <ul style="list-style-type: none"> • Focus group sessions • Hearing health • Table discussions • Easier listening work book • Health assessment
CLINICAL DATA: <ul style="list-style-type: none"> • Screening Audiogram • BMI (height/weight) • Fasting total cholesterol/glucose • Blood pressure • Heart rate • Waist / hip measurements • Respiratory 	ON FARM DATA: <ul style="list-style-type: none"> • Daily dosimeter recording • On-farm noise measurement using SLM • Dosimeter activity diary 			CLINICAL DATA: <ul style="list-style-type: none"> • BMI (height/weight) • Fasting cholesterol/ glucose • Blood pressure • Heart rate • Waist / hip measurements • Respiratory
SELF-REPORTED DATA: <ul style="list-style-type: none"> • Demographics* • Age, Country of origin • Alcohol/smoking behaviours* • Known health conditions* • DASS • Pre noise exposure awareness • Hearing protection • Farm safety & injuries sustained • Hearing loss impact • BIRT 		SELF-REPORTED DATA: <ul style="list-style-type: none"> • Post noise exposure knowledge/ awareness • Hearing protection • Hearing loss impact • BIRT 	SELF-REPORTED DATA: <ul style="list-style-type: none"> • Hearing aid purchase • Use of hearing tactics • Action plan progress 	
LEARNING AND BEHAVIOUR: <ul style="list-style-type: none"> • Develop action plan • Workshop 1 evaluation 	LEARNING AND BEHAVIOUR: <ul style="list-style-type: none"> • On- farm noise report • On- farm noise audit evaluation 			LEARNING AND BEHAVIOUR: <ul style="list-style-type: none"> • BARS • Redevelop action plan • Workshop 2 evaluation

The *Shhh hearing* program aimed to work with 100 farm men and women and, where possible, their partners. The focus on this paper at this time is the 56 men and women who formed the intervention group of which 64% (36) were male and 36% (20) were women. The vast majority were born in Australia and all spoke English as their main language. The average age was 59 years with no statistical difference between the age of women and men participating. Seven workshops were held at seven separate sites located in Victoria and Queensland. Many partners participated and contributed but these are not discussed in this paper, however for some both members of the farm attended and had hearing loss. Fifty-four of the 56 participants had an on-farm noise audit undertaken with the participants indicating at least one of the following farming activities: sheep production (66%), beef cattle (42.9%) cropping (50%) and dairy production (7%). Just under half the farmers reported mixed enterprises, common of many Australian farm businesses.

Only 12.5% of participants reported their health to be fair or poor, although 32.1% (18) reported suffering a farm injury or illness in the previous 6 months. This figure represents a higher percentage of accidents than reported by other SFF™ participants and may support research undertaken by Choi et al. (2005) indicating an increase in farm accidents is associated with hearing loss. Moderate to severe body pain in the previous 4 weeks was reported by 50% (28). The three-frequency average hearing loss left ear was 42 dB and 39 dB right ear. This is common in farming populations; the left ear hearing loss is often associated with shooting and older style tractors without cabins. All 56 (100%) participating farmers rated noise on their property as a problem before the commencement of the program.

Shhh hearing in a farming environment was delivered via two structured workshops at least six months apart, but not more than 12 months apart, and included an on-farm noise audit as shown in Appendix 1. Each workshop was designed to connect assessment and measurement through the personal audiogram and on-farm noise audit with information sharing and group learning on noise exposures, hearing loss and its social impact. Each participant received a copy of Hogan's (2008) *Easier Listening* workbook which provided coverage of some workshop topics and a space to reflect and document thoughts throughout the workshop. This was important in making the connection between what happened on-farm in relation to noise exposure, what they experienced in hearing loss, the effect on their partners, family and friends and what action they needed



to take. Typically the group size varied from four (4) to nineteen (19) and included partners that were able to attend. The topics covered during workshop one included:

1. A physical health assessment and audiogram
2. The worst things about living with hearing loss (as a person affected by hearing loss and as a partner effected by the person with hearing loss)
3. Understanding your audiogram results – what sounds do you miss?
4. Noise exposures on-farm – what do the figures mean?
5. Hearing tactics – which included a variety of scenarios and role-play including:
 - a. Going to a barbecue (BBQ)
 - b. Learning to make a request
 - c. Going out to dinner
 - d. Doctors surgery
 - e. 'Push back' – what happens when you become assertive.
6. Action planning

A key part of the workshops was the understanding of 'Push back'. 'Push back' is when a person with a hearing problem makes their problem known to others and requests some consideration from others such as speaking slowly and clearly, reducing other noises or asking other people to look at them when they speak and, in response people without hearing loss assert their rights back. The common result is that people with hearing loss find this 'push back' confronting, give up trying and retreat. The workshop provided useable and realistic tactics to improve skills in dealing with 'push back'.

Another key part of the workshop was the development of an action plan based on SMART goals (Specific, Measurable, Assignable, Realistic and Time-related) developed by Dr. George Doran (1981). These actions or goals were documented and formed part of the research record. Participants could choose more than one if they wished and must relate to hearing loss and the lessons of managing or increasing their control of noisy situations. Of the 56 participants 4% (2) chose not to participate in action planning leaving 54 participants providing 148 specified goals.

These actions are shown in Figure 2 with taking control of noise –this could be on-farm or at home – having the highest number of preferences, followed by psychosocial actions. Psychosocial actions included the use of management techniques to minimise hearing and listening difficulties, using 'tricks of the trade towards easier listening' as described by Hogan (2008) and taking time to relax and reduce stress. Assistive devices rated third and included hearing aids as well as devices to improve TV viewing pleasure for both the participant and their family. Importantly these participant responses highlighted very clearly to the research team and other health professionals that taking action on hearing loss doesn't equate to getting a hearing aid.

At the second workshop participants were asked to report back on their progress and rate each previously planned action. A behaviourally anchored rating scale (BARS) designed for the SFF™ program was used (Brumby, Wilson, & Willder, 2008). The scale is vertically presented with points ranging from zero to five, where zero means 'did absolutely nothing' and five represents 'great results beyond my expectations' as is shown in Table 2. This combines a narrative and numerical rating scale to assist in quantifying achievement for participants.

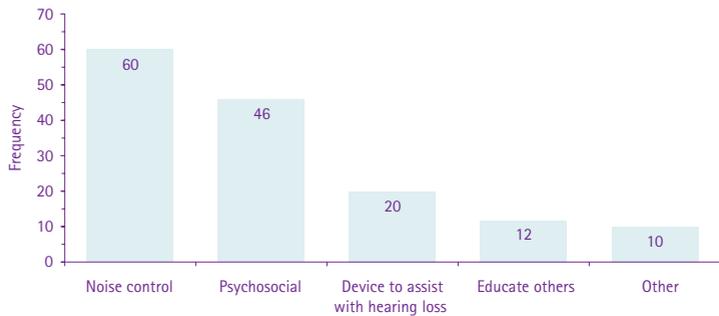


Figure 2 Action plan choices following workshop 1 (n=148 actions)

Source: Brumby, S., Williams, W., Hogan, A & Mercer-Grant, C. (2014) *Shhh hearing in a farming environment* Unpublished data. NHMRC Project Grant GNT1033151.



Table 2 SFF™ Behaviourally Anchored Rating Scale.
Source: Brumby, Wilson, Et Willder, (2008).

SCALE	DESCRIPTION
5	Great results beyond my expectations
4	Had an impact others could see
3	Followed through with moderate results
2	Got started for a few weeks
1	Thought about it
0	Did absolutely nothing

The above scale allowed participants to rate their own achievements from the previous workshop providing examples of good/poor or effective/ ineffective behaviours while working to achieve their *Shhh hearing* action plans. The chart in Figure 3 shows how the participants individually rated themselves at workshop two, which was held between 6-8 months after workshop one. As participants chose more than one action area, multiple responses are expected to match their chosen actions. What is immediately obvious from the BARS is the number of actions (80%) –and therefore participants– that had 'followed through with moderate results', or 'had an impact others could see' (30%) or displayed 'great results way beyond their expectations' (23%).

Analysis of the on-farm noise audits revealed some interesting patterns of which two are mentioned here. Firstly, the findings from the audit showed that overall the average on farm exposure was greater than the current recommended Australian Exposure Standard of 85 dB (LAeq, 8h) or 1.01 Pa2h (Pascal squared hours). This general result means that those involved in farming activities need to reduce their overall noise exposure to maintain their hearing health (Williams et al., 2014). This finding confirms the self-reporting of our baseline survey showing that 100% (56) of farmers recognised that workplace noise was a problem on their farm.

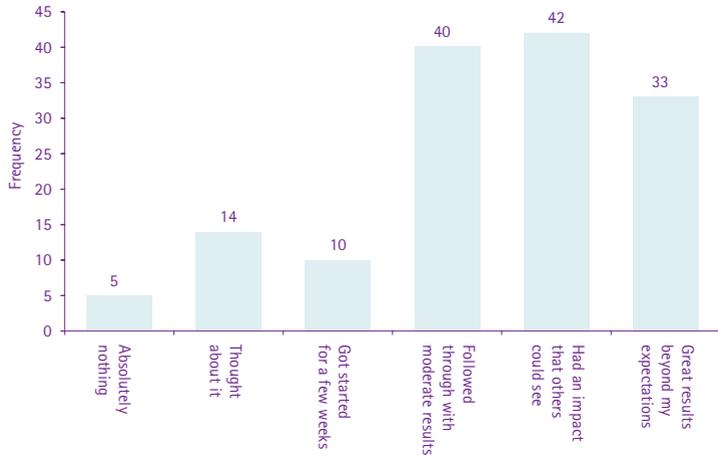


Figure 3 Participant BARS scores at workshop two.

Source: Brumby, S., Williams, W., Hogan, A & Mercer-Grant, C. (2014) *Shhh hearing in a farming environment* Unpublished data. NHMRC Project Grant GNT1033151.

Secondly, no difference in the exposures (Pa2h) or the peak levels between males and females at the $p < 0.05$ significance level was found (Williams et al., 2014). This in itself was a useful finding and meant that the information in the workshops was able to be directed at the whole group rather than identifying and targeting differences based on sex. It may also help to explain why some partners were found to have undiagnosed hearing loss given the likelihood of similar on-farm exposures. The lack of differences is possibly a reflection of the nature of farm family businesses where men and women are often involved in similar tasks and therefore on-farm noise exposures.

Participants' responses to the question 'in the last month how often have you worn hearing protection in noisy situations on farm' are shown in Figure 4. Comparing the baseline and post-program responses at 6-8 months shows the changes in practice participants made in the use of hearing protectors. A Wilcoxon test indicated a significant difference in how often participants reported wearing hearing protection in noisy situations, $z = -3$, $p = .002$, with a statistically higher number of participants wearing hearing protection post-intervention. This is an important finding as previous work undertaken (Williams et al., 2004)

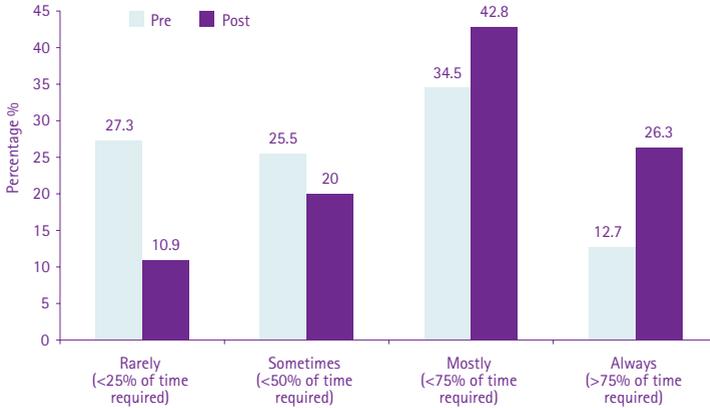


Figure 4 Pre and post responses to the question "in the last month how often have you worn hearing protection in noisy situations on farm?"

Source: Brumby, S., Williams, W., Hogan, A Et Mercer-Grant, C. (2014) *Shhh hearing in a farming environment* Unpublished data. NHMRC Project Grant GNT1033151.

showed that while having a hearing test performed and the results explained increased the overall awareness of noise and the risk of exposure, there was not a corresponding increase in the use of hearing protection over time. This new finding affirms the *Shhh hearing in a farming environment* process.

Other preliminary analysis has shown that as a result of the intervention farm men and women were more confident, better able to respond to their environments, the TV didn't bother others as much (some had purchased hearing assistive devices), their partner better understood their hearing needs, hearing loss interfered less with their relationships, they sought more down time for themselves after work. Participants were inclined to rate their hearing loss more seriously following the interventions. This is similar finding to Héту et al who reported that as a result of the MHHP people rated their hearing more severely. This is also consistent with the hypothesis that people misperceive the effects of their hearing loss, are reluctant to acknowledge difficulties and feel no urgency to try and solve them (Héту, Jones, & Getty, 1993).

Conclusion

There are a variety of reasons why farm men and women do and don't engage with health organisations, health professionals and hearing services. Addressing their health, wellbeing and safety status requires not only structural reforms and resources, but also needs to overcome the barriers that inhibit interaction. These barriers include the contextual considerations of understanding farming communities, social stigma and the strong cultural identity of self-reliance. An important and vital part is to ensure that programs and policies are put in place that are suited to farming communities which are not just the backwash of metropolitan campaigns (National Rural Health Alliance, 2011). The connections that are meaningful to them, their family and their farm business, must be made. This means looking outside of the health and the medical arena to engage more broadly with the social determinants of health and the use of the workplace, industry and family as the sites for health, wellbeing and safety programs.

Shhh hearing in a farming environment reinforces and confirms how important it is to continue with group work. The actual bringing together of farm men and women was achieved mostly through the commonality of farming. The image of the Australian farmer is deeply ingrained in our psyche and learning together as peers using common experiences of farming was important. This sharing of experience was seen during the second *Shhh hearing* workshop with participants sharing tips on how to reduce machinery noise, discussing the nuances of new assistive devices, conferring on how to manage noise at family functions and revealing the relief once they told others they had a hearing loss. We did, however, find that differing industry groups were quite parochial. For example dairy and prime lambs were not a natural fit, as opposed to cropping and prime lambs possibly due to the different machinery and equipment involved in these production systems. Staff members' knowledge of farming was also critical to create a sense of understanding and trustworthiness when working with the farm men and women –they knew we had walked in their shoes.

Shhh hearing in a farming environment builds on what we know from science, technology, social science, learning and behaviour change to help people hear more, listen better and prevent further damage. There are lessons that we can take from our engagement with farm men and women and apply in other populations with noise induced hearing loss. These lessons include being more honest about our practice and realising that engagement is hard work. It requires motivation, leaves no space for apathy by providers and requires strong political will and support. Farm men and women may not independently seek health or medical information but that does not mean they do not wish to. A highlight of the program was hearing the farmers discussing the purchase of new farm equipment after they had made the connection between noise exposure, the prevention of future hearing loss, managing their own hearing loss and making good choices for their farm business. They now take their mobile phones complete with a sound level meter app to try out the potential machinery and even household purchases. As one farmer said "It sure feels better to be giving 'push back' to the manufacturers rather than receiving it".

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Appendix 1

NATIONAL CENTRE FOR
**FARMER
HEALTH**

In partnership with



Report of your farming noise exposure



Jack & Jill MacDonald
“JJ Farms”

1 January 2014

*Dr Warwick Williams – National Acoustic Laboratories
Clinical Assoc Prof. Susan Brumby, Ms Cate Mercer-Grant,
Ms Heidi Mason (RN), Mr. Adrian Calvano (RN)
– National Centre for Farmer Health*

Did you know?

85 decibels (dB) - is the **maximum** permitted level of noise you should be exposed to daily.

75 dB - is the standard level of noise you can be exposed to daily with **negligible risk**.

1 Pascal squared hour (Pa²h) is equal to **85dB** and is your **MAXIMUM DAILY ALLOWABLE NOISE DOSE** during an 8 hour working day.

Recommended usage time (**T_{rec h}**) is the maximum level of time you can perform a particular task for before exceeding the standard.

The noise thermometer below shows the dB rating of some of your farming tasks, along with common farming tasks.



The above noise levels are approximate and should only be taken as a guide

Adapted from the website of Australian Hearing, <http://www.hearing.com.au/> accessed 2 April 2012

How does your noise exposure measure up?

The tasks measured were given an average allocated time that you might perform them for daily. With the total hours of shearing activities set at 8 hours per day, we have looked at a typical day for a rouseabout and a typical day for a shearer.

The dB reading in the left column tells you how each activity rated. Most tasks working at rouseabout classer table, wool press running were under the 85dB recommended maximum except for the reading taken at the elbow joint of the shearing down tube - noting that the shearers do get close when shearing.

The maximum recommended usage time in Trec (h:m) is also shown for each individual task so you can see that you could spend over 30 hours working at the classer table before meeting the recommended daily limit of 85 dB or 1 Pa²h. By comparison, just 1 hour 24 minutes working close to the elbow joint of the shearing downtube would put you over the recommendation. The total noise exposure for an 8 hour farming day for a rouseabout was 0.52 Pa²h and for a shearer was 2.42.

Table 1
Daily exposure of rouseabout and shearer

<i>Rouseabout</i>	dB	Time	Exposure	T_{rec}
Task	(L_{Aeq})	(h)	(Pa²h)	(h)
Following rouseabout - ear level	83.1	6	0.49	12.39
At classer table	79.1	1	0.03	31.12
Wool press running	84.2	1	0.11	9.62
Actual		8	0.63	
Mean	82.13		0.52	
<i>Shearer</i>				
Task				
Elbow joint of the shearing downtube	93.10	4	3.27	1.24
Shearing - 1 metre from elbow joint	83.50	4	0.36	11.30
Actual		8	3.62	
Mean	88.30		2.42	

This is the dB reading

This is the maximum recommended usage time

This is your daily exposure

Keep in mind that this calculation does not take into consideration the use of hearing protection, and if you are using class 5 ear muffs this will decrease each dB reading by up to 34dB hence lowering your daily Pa²h reading significantly.

How can you prevent hearing loss?

In table 1, the tasks which fall under the recommended daily maximum have been highlighted in green and the tasks that are over the recommended daily maximum are highlighted red. This is to remind you to use noise control measures when performing these tasks.

If you wanted to limit your noise exposure and prevent hearing loss, you could take simple noise control measures such as wearing correctly fitted earplugs or muffs when performing tasks you anticipate will be noisy (i.e. using chainsaws or other noisy machinery).

We hope this information has been helpful to you. Thank you for allowing us to come and visit your farm and if you have any questions please contact us at the National Centre for Farmer Health on (03) 5551 8533.



Ear level to Rouseabout

83.1 L_{Aeq}



Elbow joint of shearing downtube

93.1 L_{Aeq}

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