



**BETTER HEARING FOR FARMING FAMILIES PROJECT**

**JUNE 2007 - MAY 2008**

**FINAL REPORT**

**PREPARED FOR  
DEPARTMENT OF HEALTH AND AGEING**

**BY**

**The Australian Centre for Agricultural Health and Safety**

**21 May 2008**

## Table of Contents

List of Acronyms.....	1
Executive Summary.....	2
Introduction.....	6
Results.....	7
Project Limitations .....	15
Information Dissemination .....	15
Attachment 1 - Reference Group.....	17
Attachment 2 - Monitoring & Evaluation Framework.....	18
Attachment 3 - Social Network Analysis.....	24
Attachment 4 - Communication Plan.....	39
Attachment 5 - Aim To Keep Your Hearing .....	42
Attachment 6 - Farm Noise and Hearing Loss .....	43
Attachment 7 - Rural Noise Injury Factsheet.....	44
Attachment 8 - Project Evaluation Paper (Draft 1).....	45

## List of Acronyms

CWA	Country Women's Association
ENT	Ear Nose and Throat Specialist
GP	General Practitioner
NSW	New South Wales
RFDS	Royal Flying Doctor Service
SNA	Social Network Analysis

## **Executive Summary**

### ***Aim:***

Within the framework of the *Noise Injury Prevention Strategy for the Australian Farming Community*, the Project implemented local demonstration programs in three New South Wales (NSW) communities. The aim was to reduce the impact of noise injury on farm family members across rural Australia.

### ***Objectives:***

1. In each of the three NSW rural communities proposed, the Project sought to:
  - i. Improve awareness of priority noise injury prevention and hearing health practices; including specific issues that place farm families at greater risk of hearing loss.
  - ii. Improve access to services providing hearing health advice, screening, assessment and management / devices for those in the farming community with a hearing loss. Access may be physical or financial; and advocacy for better availability of services, where gaps are identified.
  - iii. Improve networking of services in local communities, to sustain the ongoing hearing health needs of farming families are being met beyond the Project period.
2. The Project will produce an evaluation report with recommendations for implementing the program across rural communities in Australia.

The three sites were selected based on geographical considerations, population size, the nature of agricultural production and the level of locally available support. The sites were nominally defined as Broken Hill (Greater Western Area Health Service), Casino (North Coast Area Health Service) and Tamworth (Hunter-New England Area Health Service). Consequently, this selection entailed the involvement of a major regional centre (Tamworth), a smaller rural area (Casino) and a remote area (Broken Hill).

### ***Interventions***

In each area a small advisory group of interested stakeholders was convened to provide local inputs and to ensure future sustainability. In Casino and Tamworth an initial phase that focused on general awareness raising utilizing the local media and the distribution of existing noise injury resources through targeted mechanisms to farmers e.g. direct mail-outs from agricultural suppliers, NSW Farmers and Agricultural Show Societies, was completed. Simultaneously an assessment of the local hearing health networks was undertaken to determine the existing information links and referral pathways for farming families. The results of this Social Network Analysis (SNA) were then used to develop the second phase interventions. This included an increased emphasis on agricultural retailers as an information conduit to farmers. For hearing services in both locations the private audiometry services, Nurse Audiometrists, Ear Nose and Throat Specialist (ENT) and General Practitioners (GP) were central players.

In the Broken Hill area agreement to conduct a fly-around in the remote north-west of the state was reached. This intervention included audiometry screening for 60 individuals from the seven stations/townships visited. In addition to the screening all participants received information on preventative approaches to noise injury. Given the potential socially isolating impact that hearing loss may have and its link with mental health, a representative from the Greater Western Area Health Service mental health team also participated in this fly-around, adding further scope and substance to the visits.

The second phase interventions in Casino and Tamworth both included a training session for local agricultural retailers and other individuals that were important information links in their respective areas (as identified in the SNA). These sessions covered basic information pertaining to the extent of the problem in rural Australia, how noise injury can be prevented, how farmers can maintain the hearing they have and the type of local services available to assist them if they want further assessment. Resources for distribution at the shop front relating to noise injury and corflute signage listing the details of local hearing services, were provided. This was supported by media promotions including advertising for local services in the print media.

### **Results**

*Improve awareness of priority noise injury prevention and hearing health practices; including specific issues that place farm families at greater risk of hearing loss.*

A strong public profile has been developed through extensive local media coverage and information distribution outlining the core issues relating to noise injury. The identification of shooting as a serious impediment to hearing health and the development of a new resource has enhanced awareness in this area. Incorporating existing network stakeholders in disseminating information has also resulted in greater awareness.

*Improve access to services providing hearing health advice, screening, assessment and management / devices for those in the farming community with a hearing loss.*

The promotion of local hearing services as part of the Project has been reflected by a small increase in utilization by farmers in one area. In the far-west the uptake by farming families (and subsequent hearing screening results), suggest an unmet need exists for these services in remote areas. The mobile audiometry booth in Casino will provide a significant, long-term and sustainable method to engage farming families in promoting hearing health on the North Coast.

*Improve networking of services in local communities, to sustain the ongoing hearing health needs of farming families are being met beyond the Project period.*

Greater involvement with other agencies also working with farmers including the Country Women's Association (CWA), LandCare and specific health services like mental health, is required. This will enable hearing health messages to be implemented as a package rather than as a single isolated issue. The involvement of local service providers in Casino and Tamworth will foster more long-term involvement with the Farmsafe groups in these areas. Similarly, the GP Divisions have made hard and electronic copies of resources for on-going use available to their members. In the far-west the Royal Flying Doctor Service (RFDS) has included the electronic resources in its portfolio of patient resources, enabling these to be downloaded at any location and provided to patients in remote locales. In Tamworth, the Farmsafe group is actively working with local agricultural retailers to promote hearing screening at the upcoming Ag-Quip field days (August 2008) and during activities at the new Equine Centre. Similarly, the Casino Farmsafe group will be utilizing the new hearing booth at local activities including PRIMEX and local Agricultural Shows throughout the North Coast.

### **Recommendations**

Follow-up meetings with the advisory groups in Casino and Tamworth plus the RFDS in Broken Hill, provided feedback on the interventions and defined areas for future work. This was supplemented through the workshop forum of the final Reference Committee meeting. Recommendations have been nominally separated into those that have national and local application.

### National

1. Revise the Farmsafe Australia Noise Injury Prevention Strategy to develop a relevant institutional framework to implement and deliver services as identified in the Project e.g. including new stakeholders such as the Rural Divisions of General Practice, Royal Flying Doctor Service and agricultural retailers.
2. Negotiate and schedule hearing health presentations at the annual merchandising conferences for major agricultural retailers.
3. Integrate hearing health with other agencies/projects that are already working with farmers to “package” and distribute relevant information e.g. the Rural Divisions of General Practice Mental Health Drought Support program, Older Farmers program being rolled-out through Rotary, General Practice Farmer Health Tool Kits, State farmer conferences, mens and rural health gatherings.
4. Further examine the potential of introducing incentives to farming families for noise reduction initiatives and screening through insurance companies.
5. The Rural Industrial Relations group convened by Workcover NSW should meet with NSW Farmers and the National Acoustic Laboratories to investigate the feasibility of a new colour coded system to facilitate the use of hearing protection and noise exposure control. The findings would then be referred to the Heads of Workplace Safety Authorities meeting for national consideration.
6. As a member of Farmsafe Australia, that the Country Women’s Association play a key role in advocating for policy issues impacting on hearing health.
7. Increase access to and availability of hearing screening e.g. introduce Medicare rebates for private providers, ensure mobile screening at convenient and accessible venues.
8. Examine potential sponsorship of mobile audiometry booths for regional areas by service groups such as Lions, Rotary and Zonta.
9. Re-assess the availability and role of Nurse Audiometrists within NSW Health (and relevant public providers in other states), in relation to assisting with the implementation of hearing health initiatives for farming families.
10. Address the apparent unmet need for adult hearing health information and screening in remote areas with existing health service providers e.g. RFDS nationally
11. Increase promotion of Telscreen II (1800 826 500) as an initial self-check hearing assessment through existing forums e.g. Older Farmers Project.
12. Discuss the potential for a sponsorship agreement with hearing aid manufacturers to support targeted promotion of local services (corflute signage and advertising) throughout Australia using the “Hear For Life” branding.
13. Include promotion of assistive devices (TV/telephone) and how to purchase these in relevant information resources e.g. Older Farmers Project resource package.
14. Maintain a strong linkage with the research initiatives of the National Acoustic Laboratories e.g. noise cancelling head sets for use in audiometric testing at agricultural field days.

Local

15. Undertake local community assessments before intervening to define networks and address information and service gaps. Formal (using Social Network Analysis) or informal approaches (discussion group of interested stakeholders) are both valid.
16. Introduce pre-publicity for mobile hearing screening venues using relevant agricultural retailers and/or producer agencies (e.g. NSW Farmers).
17. In addition to screening and personal hearing protection (short-term), increase the emphasis on higher-order noise reduction strategies within the hierarchy of control in local promotions e.g. re-designing workshop layout, safer working practices etc. Conduct hearing health information sessions with local agricultural retailers and stakeholders.

## **Introduction**

The Better Hearing for Farming Families Project was funded by the Commonwealth Department of Health and Ageing as a component of the National Injury Prevention Program. The Project period was June 2007 - May 2008. A broadly based Project Reference Group of interested stakeholders was convened to oversee the initiative (Attachment 1).

### ***Aim:***

Within the framework of the *Noise Injury Prevention Strategy for the Australian Farming Community*, the Project implemented local demonstration programs in three NSW communities. The overarching aim was to reduce the impact of noise injury on farm family members across rural Australia.

### ***Objectives:***

1. In each of three NSW rural communities proposed, the Project sought to:
  - i. Improve awareness of priority noise injury prevention and hearing health practices; including specific issues that place farm families at greater risk of hearing loss.
  - ii. Improve access to services providing hearing health advice, screening, assessment and management / devices for those in the farming community with a hearing loss. Access may be physical or financial; and advocacy for better availability of services, where gaps are identified.
  - iii. Improve networking of services in local communities, to sustain the ongoing hearing health needs of farming families are being met beyond the Project period.
2. The Project will produce an evaluation report with recommendations for implementing the program across rural communities in Australia.

To assess the progress in attaining this aim and objectives, a Project framework and evaluation plan was designed with specific performance indicators being identified (Attachment 2). The Project Reference Group approved the plan.

### ***Target population:***

Farming sub-populations of the three proposed rural NSW communities of Casino, (Northern Rivers), Tamworth (North-West Slopes) and Broken Hill (Far-Western NSW).

This has been further sub-categorised into two separate groups:

1. Primary targets - are those groups that will be the direct beneficiaries of the interventions (i.e. they will either increase their knowledge/awareness of noise injury prevention and/or enhancing access to screening/treatment services)
2. Secondary targets - are those groups that will facilitate the successful implementation of the interventions



## ***Overall approach***

The key steps within this Project as defined in the proposal were:

1. Establish an overseeing Reference Committee
2. Establish local advisory groups to guide interventions
3. Undertake an assessment of local hearing health networks to identify strengths and weaknesses
4. Implement locally focused interventions to meet the Project objective and aims
5. Evaluate impacts
6. Define issues for future consideration and make suitable recommendations

## **Results**

### *1. Establish an overseeing Reference Committee*

The Reference Committee to oversee the Project consisted of representatives from a diverse range of stakeholders including the Australian College of Audiometrists, NSW Farmers, NSW Health, National Acoustic Laboratories and the Commonwealth Department of Health. The committee met by teleconference at approximately three-monthly intervals throughout the duration of the Project. In lieu of a national workshop, a final face-to-face meeting to review the overall achievements of the Project, determine lessons learned and to provide direction for future intervention approaches was also conducted. This document includes these inputs.

### *2. Establish local advisory groups to guide interventions*

The local advisory groups in Casino and Tamworth met formally on three occasions each throughout the Project and provided excellent guidance on relevant issues. In addition there was considerable on-going contact with representatives in fine-tuning the directions of the interventions in each site. Several of the members also provided significant inputs to enable close and considerable linkages to producers e.g. machinery dealers and NSW Farmers. In Broken Hill the local advisory group lacked the coherence of the other sites. Despite difficulties in engaging the central agencies in this work, some important assistance was forthcoming enabling the fly-around audiometry screening in the remote North-West corner of the state.

### *3. Undertake an assessment of local hearing health networks to identify strengths and weaknesses*

An assessment of local hearing health networks utilizing Social Network Analysis (SNA) was undertaken in the Casino and Tamworth districts. Due to difficulties in the first six months of the Project in gaining traction in the Broken Hill region, and the fact that the area covered in the proposed fly-around covered approximately 25% of NSW, it was not seen as feasible to undertake the assessment in this area given the limited time available for the pilot.

The assessments incorporated a total of 27 responses (Tamworth 17; Casino 10). While data for both sites have been analysed and released to the local advisory groups, the quality of data for the Tamworth area was much stronger in that a broader array of agencies completed the assessment. It is worth noting that the profiles for the networks in each site were relatively similar in terms of information distribution and client referral patterns. In summary, the results indicate that for Tamworth key conduits for information are the Nurse Audiometrist, Workcover NSW and agricultural retailers. In Casino, the major information sources are

Workcover NSW, private audiometry services, ENTs and Nurse Audiometrists. For hearing services in both centres the private audiometry services, Nurse Audiometrists and ENT/GP are central.

As this was the first assessment of its type relating to hearing health networks for farmers in Australia, a paper has been submitted to the Australian Journal for Rural Health based on the Tamworth data (Attachment 3). Further details on the strengths, weaknesses and potential areas for future interventions are outlined in this attachment. However, this pilot study has identified several key elements required to potentially strengthen networks that may be broadly applicable in rural areas.

#### *4. Implement locally focused interventions to meet the Project objective and aims*

The following details summarise the major results of the Project.

##### *4.1 Broken Hill*

A single-phase intervention was undertaken in the Broken Hill area. Given the large-scale of agricultural operations and the immense distances between properties, initial discussions with the local advisory group favoured the provision of audiometric screening in more remote far-west sites (covering a component of the RFDS area), rather than focusing on the Broken Hill township per se. The audiometrist that undertakes the annual RFDS assessments in conjunction with the ENT specialist (predominantly for children), was contracted to assist with the screening.

Local contacts at a range of stations were identified and small scale needs assessments undertaken to identify potential uptake. The initial verbal assessment with station managers reported little interest, however upon further discussion with local stakeholders it was revealed that there was a substantial level of support to undertake the assessments. The geographic coverage for the screening covered three different health areas (the Greater Western Area Health Service Mitchell and remote clusters, plus Queensland Health). In total 60 screening tests were completed at Monolon Station, White Cliffs health clinic, Ourimbah Station, Wanaaring health clinic, Hungerford health clinic, Marrapina Station and Tibooburra health clinic. A further 15 tests for children or adults not involved in agriculture were also completed. In addition to the Project co-ordinator and the contracted audiometrist, a representative from the mental health team operating as a part of the Greater Western Area Health Service accompanied the group. This inclusion was based on the debilitating social impacts that hearing loss (prevalent in older farmers) is known to have and the related mental health implications.

The preliminary results from the 60 clients screened indicate that there are significant occupationally related hearing deficits in this sample. The impact of firearms on hearing in this sample appears to be a major issue. While further analysis of the results is in progress, this reinforces the potential to address the predominantly unmet need for hearing health in remote populations. Given the nature of these results it is proposed that a further short report comparing these far-west data with the existing NSW data will be written for inclusion in the Australian Journal of Rural Health or a similar academic publication.

##### *4.2 Casino*

A two-phase intervention period was utilised in the Casino area. Phase one (October 2007) consisted of a fundamental awareness-raising program drawing on local media and the distribution of core resource materials to farmers. A Communications Plan for the Project was developed (see Attachment 4). Media included a release in the local paper plus an interview on ABC rural radio. In addition, information was distributed via local Agricultural Show Societies, Ballina and Lismore Councils, and NSW Farmers. Planned activities at the local Agricultural Shows were cancelled due to the Equine Influenza outbreak.

The second phase consisted of a training seminar launching the intervention period (March 4). A total of 15 representatives participated from a range of sectors, however there were none of the agricultural retailers present. Notwithstanding this limitation, information has been distributed to all local agents and also via the networks of those present at the evening - this includes CWA, NSW Farmers, GPs etc. There has also been significant media coverage through ABC radio, NBN TV and in the local press (Northern Star, Northern Farmer and Express Examiner). The print media coverage included advertising of local services and continued through till April 12. A proposition to conduct on farm noise assessments was cancelled due to the impact of the floods in the region during February 2008. Discussions with NSW Health regarding the provision of a mobile hearing booth have resulted in the purchase of a mobile hearing-screening booth. This new piece of equipment will enable audiometric screening at events such as local agricultural field days, shows and cattle sales etc. This will also ensure the longer-term sustainability of work relating to hearing as screening has been identified in this program as a central component of any future intervention.

#### *4.3 Tamworth*

The first phase of the Project occurred in October 2007 and focused on awareness raising related to generic noise injury issues and also the way in which noise could be minimized in the upcoming harvest period (particularly for those operating headers). This phase included distribution of existing resources by direct mail to producers (utilizing the mailing services of two agricultural retailers and NSW Farmers), media releases in the local press and on ABC rural radio. The Farmers of the Future field day for high school agricultural students that incorporated noise issues, was cancelled due to the Equine Influenza outbreak. A training session with Practice Nurses within the North West Slopes Division of GPs regarding audiometry was conducted in November. Additionally, a presentation to all first year nursing students was completed.

Second phase activities (Feb/March 2008) focused on work with the agricultural retailers. A total of 22 participants including a good mix of stock traders, machinery dealers / suppliers and high school agricultural teachers participated in the noise training seminar. Information was provided to all outlets for distribution and display (including a small number that did not attend the training). The GP Division has also agreed to include the resources on their web site to enable practitioners to access this as a patient resource. Excellent media coverage has occurred through ABC radio, NBN TV, PRIME TV and in the local press (Northern Leader and Country Leader). All CWA groups within the branch also received a copy of the materials and a briefing on hearing from the CWA representative that attended the training.

Attempts were also made to hold an additional session in Walcha (about 100km east of Tamworth), however this did not eventuate. Despite this all relevant agencies in this area have also been provided with the resource material, which was supplemented via media advertising and editorials in the Walcha News and Advocate.

The new shooters information brochure that was a recommendation of this local advisory group was completed and copies made for distribution. The core package of information resources for the Project including the new shooters information is included as Attachments 5, 6 and 7. Agreement has also been reached with two local agricultural retailers (those that assisted in phase one) to distribute the shooting brochure in their direct mail-outs to producers in early August. This brochure will be accompanied by an invitation to participate in the hearing screening that will be conducted at Ag-Quip (Aug 19-21, 2008).

## 5. *Evaluate impacts*

The following points summarize the broad impacts of the Project in relation to the specific objectives. In addition, a paper for release in a suitable academic journal to enable further dissemination of the results is being developed, the first draft of this paper evaluating the Project and outlining future recommendations is included as Attachment 8.

*5.1. Improve awareness of priority noise injury prevention and hearing health practices; including specific issues that place farm families at greater risk of hearing loss.*

- i. Extensive local media coverage and information distribution has outlined the core issues relating to noise injury and has ensured wide coverage of this information in the target group.
- ii. The identified need and subsequent development of a new resource relating to hearing protection when shooting, reflects the Projects responsiveness to local issues.
- iii. The use of distribution networks that are familiar to farmers and their families i.e. agricultural retailers, Agricultural Show Societies, RFDS clinics and NSW Farmers etc has been central to the effective promotion of noise injury prevention and related services.

*5.2. Improve access to services providing hearing health advice, screening, assessment and management / devices for those in the farming community with a hearing loss. Access may be physical or financial; and advocacy for better availability of services, where gaps are identified.*

- i. The promotion of local hearing services has resulted in an increase in service utilization by farmers in one centre. While direct cause and effect cannot be demonstrated this approach does illustrate some potential for further uptake of services. Future service evaluations should include a reply-paid survey for all new clients to complete.
- ii. The conduct of the screening in the far-west and the relatively good uptake by farmers and their families, also illustrates an unmet need in these remote areas (where hearing services tend to focus almost solely on children).
- iii. Purchase of a mobile audiometry screening booth for use at local agricultural field days / sale yards etc in Casino and more broadly for the North Coast Area Health Service will significantly extend coverage.

*5.3. Improve networking of services in local communities, to sustain the ongoing hearing health needs of farming families are being met beyond the Project period.*

- i. The SNA identified new players with a significant role in hearing health i.e. agricultural retailers and highlighted existing networks. This has strengthened the networks in these areas.
- ii. Several issues relating to screening (including cost, staffing, role of women, convenience and integration with other health/farm business issues) impacting on service utilization were identified and need consideration in future interventions.
- iii. Greater involvement with other agencies also working with farmers (i.e. not just audiometry / audiology services) is required. For example, integration with the CWA, LandCare and specific health services like mental health, need to be developed and maintained - so that hearing health becomes more of a package rather than trying to be promoted as a single issue.
- iv. In Casino and Tamworth, local service providers have participated within the Project including both GP Divisions – the Divisions have also made hard and electronic copies of resources for on-going use, available for their members.
- v. The RFDS has included the electronic resources in its portfolio of patient resources, enabling these to be downloaded at any location and provided to patients in remote locales.

- vi. The mobile audiometry booth in Casino will provide a significant, long-term and sustainable method to engage farming families in promoting hearing health. Indeed, this will be the first time for ten years that screening will be conducted at local agricultural field days, demonstrating the re-ignition of interest in this area.
- vii. In Tamworth, the Farmsafe group is actively working with local agricultural retailers to promote hearing screening at the upcoming Ag-Quip field days (August 2008) and the new Equine Centre. This has already resulted in a new screening initiative at the TOCAL field days with Landmark, several hundred kilometres from Tamworth.
- viii. Given the important role of agricultural retailers in information provision identified in the SNA, on a national/state-wide level there is potential for presentations relating to hearing loss at the annual merchandising conferences for agencies like Landmark, Elders, Wesfarmers and other Rural Co-ops.

6. *Define issues for future consideration and make suitable recommendations*

At the final Reference Committee meeting, discussions within a workshop forum focused on the lessons learnt and the manner by which the Project could be effectively implemented throughout other areas of Australia. A central finding of this workshop was that further discussions with key groups are required to maintain progress and will be scheduled into the operations of the ACAHS and Farmsafe Australia. The following are separated into predominantly national and local level recommendations.

National

The SNA analysis has provided a unique insight into the networks that facilitate hearing health. The findings have implications for future initiatives as the process has identified several new and significant stakeholders that need to be engaged to optimise implementation e.g. General Practice Divisions, RFDS and agricultural retailers. In light of the findings of this Project it may be timely to **review the Farmsafe Australia Noise Injury Prevention Strategy to develop a relevant institutional framework to implement and deliver services as identified in the Project** and in collaboration with these stakeholders.

Based on the significant role that agricultural retailers were identified as having in the SNA, one consideration could be to place a greater emphasis on promotion of hearing health (as opposed to just the promotion of hearing protection equipment), in a more clearly defined and strategic manner. This could include **presentations relating to hearing health at the annual merchandising conferences for major agricultural retailers** such as Landmark, Elders, Wesfarmers and Rural Co-ops etc. If possible this could subsequently be followed up by locally based agricultural retailer seminars (similar to what has been conducted within the Project that also attempted to link in with other key hearing health stakeholders e.g. Country Women's Association, NSW Department of Primary Industries and high school agricultural teachers etc).

**Enhancing links with other agencies that are already working with farmers to “package” and distribute the hearing health information** would be beneficial. For example, this could include the Rural Division of General Practice Mental Health Drought Support Program, Older Farmers Program being rolled out through Rotary, RFDS and General Practice Farmer Health Tool Kit. Furthermore, agencies like State Farmer Organizations, Rural Lands Protection Boards, LandCare and Local Catchment Authorities could play both a leadership and information dissemination role in relation to hearing health. As indicated in the far-west activities, aligning the service with the mental health area was also useful as several conjoint issues arose for participants. Using hearing health as a focus point to get attention was relatively non-threatening for most participants and this then opened up the potential to discuss other issues such as mental health and men's health. Adoption of any or all of these approaches would enable hearing health to become more of a package rather than trying to promote itself as a single issue.

A message that was repeatedly provided through formal and anecdotal feedback was that hearing health was not perceived as a high priority until extensive damage was already evident. As such, reaching and engaging individuals with prevention messages is problematic. Consequently tying hearing health to other issues that may have greater acceptance was important e.g. maximising farm productivity. Moreover, efforts to **examine the potential of introducing incentives to farming families for noise reduction initiatives and screening through insurance companies** were identified.

**The Rural Industrial Relations group convened by Workcover NSW should meet with NSW Farmers and the National Acoustic Laboratories to investigate the feasibility of a new colour coded system to facilitate the use of hearing protection and noise-exposure control.** The findings would then be referred to the Heads of Workplace Safety Authorities meeting for national consideration. Currently, Workcover NSW, the National Acoustic Laboratories and representatives of the Construction Industry are in discussion regarding such a system. The system denotes: (a) green as a safe area where protection is not required; (b) amber as an area where the user and other bystanders within a 10 meter radius need hearing protection; and, (c) red where the user and bystanders within a 20 meter radius require protection. The simplicity and applicability of such an approach was strongly supported during the final Project workshop.

Farm women play an important role in relation to hearing health, particularly in prompting men to undertake screening and to adopt preventive practices. However to date, this potential has been largely untapped. Hence, **as a member of Farmsafe Australia it is recommended, that the Country Women's Association play a key role in advocating for policy issues impacting on hearing health.** Additionally, the Association could enhance its involvement at the local level by promoting hearing health issues.

Hearing screening is an important mechanism to ensure the buy-in of producers to address hearing related issues. However, screening needs to be highly visible and readily accessible at venues where producers typically congregate. Potential forums for screening include major regional and local agricultural field days, local business specific field days (e.g. Landmark monthly), horse and hobby days, cattle sales etc. Screening at external venues is often difficult as there are few centres with mobile facilities. The purchase of the mobile booth in Casino (covering the North Coast Area Health Service) is one mechanism to assist with the provision of such a service. For private screening providers, efforts to enable a Medicare rebate for screening should also be investigated. Consequently, there is a need to **increase access to and availability of hearing screening e.g. introduce Medicare rebates for private providers, ensure mobile screening at convenient and accessible venues.**

Experience from the Casino area where the purchase of a new mobile audiometric booth will enable screening at agricultural field days for the first time in ten years, is palpable evidence of the importance of having suitable equipment available. This booth will enable coverage over a significant geographic area, providing an excellent return on investment over many years. Therefore, other rural areas that find themselves in a similar situation with a lack of suitable equipment may wish to **examine potential sponsorship by service groups such as Lions, Rotary and Zonta to purchase mobile audiometry booths.** An additional benefit of this approach is that it would be likely to encourage uptake and further involvement by the service group members plus farming families in the region.

It is beyond question that the presence of suitable mobile equipment to ensure that hearing screening is both readily accessible and available is vital. However, it is also crucial that suitably trained staff are available, willing to use this equipment (often outside of conventional working hours e.g. weekend agricultural field days) and supported by their employing agency in this role. Responsibility for the provision of publicly funded hearing screening in NSW rests predominantly with Nurse Audiometrists working for NSW Health.

The importance of this role was highlighted by their identification as key conduits for both preventative and clinical services in the SNA. Throughout Australia there are different state-based arrangements for the integration of publicly funded hearing screening with the respective State/Territory health systems i.e. not all have Nurse Audiometrists. Notwithstanding this variation between states, **there is a need to re-assess the availability and role of Nurse Audiometrists within NSW Health (and relevant public providers in other states), in relation to assisting with the implementation of hearing health initiatives for farming families.**

The Project demonstrated considerable hearing deficits in the far-west illustrating **that there is an unmet need for adult hearing health information and screening in this remote area.** The receptivity of the participants to the hearing health and particularly the preventative information relating to shooting and hearing protection, was very high. Steps to **work with remote health service providers e.g. through the RFDS nationally** should be undertaken.

Given the vastness of rural and remote Australia, providing mobile audiometric testing for all farming families while encouraged, is untenable. Additionally, there may be some farming family members that will not subject themselves to hearing assessment for a range of reasons including confidentiality. Consequently, as a first step it would be useful to **increase promotion of Telscreen II as an initial self-check hearing assessment.** Telscreen is an initiative of Australian Hearing that provides a very basic assessment of hearing function and can be conducted confidentially over the phone (1800 826 500). This should be undertaken by inclusion of these details in existing forums and information dissemination channels for farmers e.g. Rural Division of General Practice Mental Health Drought Support program, Older Farmers Program being rolled out through Rotary, and General Practice Farmer Health Tool Kit.

There are relatively few financial resources available to increase awareness and promote services. Feedback from the Project suggests strong support for the development of the corflute signage using the “Hear for Life” branding that lists local service providers. These durable signs were designed for placement in suitable locations where farmers may frequent e.g. agricultural retail outlets, stock and station agents, GP clinics and cattle/sheep sale yards etc. Annually there are approximately 100,000 new hearing aids purchased in Australia and given the ageing of the population, this figure is likely to increase into the future. Consequently, to extend the impetus of this initiative in promoting local services and increasing awareness, **discussions should be held with hearing aid manufacturers to investigate the potential for a sponsorship agreement to support targeted promotion of local services** throughout Australia using the “Hear For Life” branding.

There was a perception that in some instances private hearing providers are over-servicing clients by recommending hearing aids in cases that may not be fully justifiable. Similarly, it was perceived that the marketing of hearing aids took precedence (due to financial returns for providers), rather than perhaps simpler and more cost-effective assistive devices such as those for hearing the TV and/or telephone (e.g. see <http://www.printacall.com.au>). Consequently, there is a need to **increase promotion of assistive devices as a potential solution for specific clients and how to purchase these.** These details need to be inserted in relevant information resources such as the Older Farmers Project resource package etc.

The research arm of the National Acoustic Laboratories is currently engaged in developing noise-cancelling headsets that can also be used to undertake audiometric screening. As the typical agricultural field day environment where hearing screening is undertaken for farming families is noisy, this may impact on the assessments. Hence, there is value in **maintaining a strong linkage with the research initiatives of the National Acoustic Laboratories** to test and enable rapid uptake of any advancements in screening procedures at agricultural field days.

### Local

As experience in Casino and Tamworth indicates **undertaking local community assessments to define networks and address information and service gaps before intervening is useful** e.g. the identification of agricultural retailers as a central information link was not hypothesised. While there were some similarities in the results from these two centres, it must also be noted that the data are site specific. Hence, it may be useful in future to replicate these assessments perhaps in a modified manner in other centres to validate the findings and to determine their applicability across sites.

The way in which a community assessment can be undertaken is largely dependent on the availability of local resources, but either a formal or informal mechanism may be valid and provide useful information to guide any subsequent intervention. Formal methods could adopt the Social Network approach used in this Project, however in most instances resources will not be available for such an assessment. Alternatively, informal approaches should involve several small and practical steps including:

- a. Convening a small (core) group of interested service providers with an interest in hearing health for farming families
- b. This group identifies other key individuals/agencies interested in hearing health for farming families (expanded group)
- c. Both the core and expanded group representatives respond to the following questions (1) who do they provide hearing health information to? (2) how could the flow of prevention information could be improved? (3) who do they provide clinical / screening services for? (4) how could clinical / screening services could be improved?
- d. Collate the responses and record the links – this can be done in a simple table format
- e. Draw on these data to define an implementation approach that builds on the existing network and local circumstances

As previously highlighted local level access to and availability of hearing screening is highly important to enhance hearing health and engage farming families in the process. If screening is organised at these local venues, **pre-publicity using relevant agricultural retailers and/or producer agencies (e.g. NSW Farmers) should be undertaken** as the only cost is the printing of a one page flyer advertising the screening. This will not only promote the screening but will also normalize and add credibility to the status of interventions relating to hearing health, as they are seen to be supported by agencies familiar to farming families.

Currently all resource materials pertaining to noise in the agricultural industries draw on the hierarchy of control as best practice in noise abatement. Notwithstanding this, the overwhelming emphasis continues to be on the use of personal hearing protection and it is sometimes difficult to engage farmers interest beyond this lower order (yet important) intervention. A mechanism to address this issue may be **the utilization of examples drawn from farmers in the immediate area that have adopted higher-order approaches to reduce the overall noise burden e.g. re-designing workshop layout, safer working practices etc.** An added benefit of promoting these cases is that it localizes and demonstrates real life examples of prevention approaches that may resonate more strongly with local farming families.

The training sessions for local agricultural retailers and other relevant stakeholders varied in their ability to attract retail representatives. Notwithstanding this limitation, the sessions were well received and provided a valuable forum to either establish a network of new contacts or strengthen existing relationships. The value of these new relationships has already been demonstrated with improved links between Nurse Audiometrists and retailers. Given the earlier recommendation to work at a national level with major agricultural retail chains, it is also relevant to **reinforce the hearing health message through local agricultural retailers**



**and stakeholders by conducting similar information sessions.** While some modifications to increase the hands-on selection of suitable hearing protection would be included in future activities, the outline of these sessions is available upon request from the ACAHS for local groups that wish to conduct such an activity. An added benefit of extending these linkages with local stakeholders is that it broadens the network of contacts and interested parties not only in hearing health, but also more generally in farm safety issues.

## **Project Limitations**

There were several limitations to Project implementation that were beyond the control of the Project management team. The following points summarise the major limitations and briefly describes their impact on the Project.

- The short timeframe for the pilot (12 months) was effectively 10 months given the down periods over the Dec/Jan break.
- The extensive drought (particularly in the far-west) limited interest in the Project work as many producers were simply struggling to survive.
- The outbreak of Equine Influenza impacted on early activities, especially in Casino and Tamworth.
- The subsequent floods in the Casino area also limited the specific activities that were planned with farmers, as they were involved in significant re-fencing work at the time of the second phase.
- Adult hearing services are not a significant priority area for NSW Health
- Pivotal NSW Health audiometry staff in Casino and Tamworth had extended long service leave throughout the Project (12 weeks and 8 weeks respectively). Given their important roles this has provided some challenges in terms of continuity and implementation of the interventions.

## **Information Dissemination**

The Project results will be disseminated through several mechanisms to ensure broader adoption. These include: presentations at suitable forums reaching a mixture of health and agricultural representatives; inclusion of information outlining results and future steps forward in key agricultural media; all state and locally based farm safety groups/stakeholders; and, academic papers that focus particularly on reaching service providers and decision-makers in health management.

### *Presentations*

- Presentation and E-poster relating to the conduct of the Project at 6<sup>th</sup> Farm Health and Safety Conference 2007 (Adelaide 25-27 September, 2007).
- Final Project Reference Group workshop defining summary of initiatives and identifying lessons learned for future distribution and action (Sydney May 13, 2008).
- Deafness Forum (24-24 May, 2008) - presentation and discussion of Project recommendations for further action.
- Presentation to the General Practice and Primary Health Care Conference (Hobart 4-6 June, 2008).
- Presentation to next Farmsafe Australia meeting (June 20, 2008).
- Presentation confirmed for Population Health Conference (Brisbane July 7, 2008).
- Abstract submitted for presentation at the NSW Rural and Remote Health Conference (November 2008).
- Presentation and discussion at the next conference of the Australian College of Audiology (Sept 2009).

### *Agricultural Media*

- Final report to be distributed to the Kondinin Group for a summary article to be written and included in its national magazine (Farming Ahead).
- Article submitted for Country Web - NSW Rural Women's Network

### *State & local farm safety groups*

- Distribution of final report in addition to multiple copies of the hearing health resource package (over 7,000) to all state and locally based farm safety groups/stakeholders (Attachments 5, 6 and 7). This will also include availability of the electronic versions of these resources. It is also envisaged that on-going resource distribution will be significant.

### *Academic Papers*

- Social network analysis for farmers hearing services in a rural community - paper submitted to Australian Journal of Rural Health (Lower T, Fragar L, Depczynski J, Fuller J, Challinor K, Williams W).
- Bleeding from the ears: Improving hearing health for farming families - paper drafted for submission to Electronic Journal of Rural Health (Lower T, Fragar L, Depczynski J, Challinor K, Mills J, Williams W).
- Impact of firearms on hearing health in far-west NSW - short report to be drafted for Australian Journal of Rural Health (Lower T, Fragar L, Depczynski J, Borrett J)

A major component of future information dissemination and potential uptake of recommendations will be the on-going liaison that ACAHS and Farmsafe Australia will undertake into the future. For example, the importance of agencies such as the Rural Divisions of General Practice and their new drought support program, the RFDS in remote areas and agricultural retailers has been highlighted throughout this Project. Negotiations on a national level with these agencies to integrate hearing health approaches will be undertaken, thereby linking the community based findings of the Project into national coordinated action.

## **Attachment 1 - Reference Group**

### **Better Hearing for Farming Families Project Reference Group**

Dr Lyn Fragar (Chair)	Australian Centre for Agricultural Health and Safety
Kathy Challinor	Hunter New England Area Health Service
Julie Depczynski	Australian Centre for Agricultural Health and Safety
Samantha Diplock	Commonwealth Dept Health & Ageing
Andy Forrest	NSW Farmers
Dr Jeff Fuller	University Department of Rural Health Lismore
Tony Lower	Australian Centre for Agricultural Health and Safety
Dr David Lyall	University Department of Rural Health Broken Hill
Jan Mills	North Coast Area Health Service
Sharon Scherrer	Greater Western Area Health Service
Gerry Taniane	Australian College Audiology
Dr Warwick Williams	National Acoustic Laboratories

## Attachment 2 - Monitoring & Evaluation Framework

### Better Hearing for Farming Families Project

#### Monitoring & Evaluation Framework

##### Project Framework

This Project framework provides an overview of the proposed targets and strategies to meet the aim and objectives of the Better Hearing for Farming Families Project. The draft is designed as a tool to promote further discussion by the Project Reference Committee and local steering groups prior to the confirmation of a final Project framework.

Central to the framework are the designation of key target groups for the interventions in relation to both noise injury prevention and enhanced access to screening and treatment.

Key target groups in this draft have been classified into two separate categories:

3. Primary targets – are those groups that will be the direct beneficiaries of the interventions (i.e. they will either increase their knowledge/awareness of noise injury prevention and/or enhancing access to screening/treatment services)
4. Secondary targets – are those groups that will facilitate the successful implementation of the interventions

Due to the variation in target groups and their respective status/roles, not all target groups will be involved in both prevention and screening/treatment. Furthermore, some targets will have a greater or lesser emphasis on each of these elements. These factors and the hypothesized relative contribution to each (prevention and screening/ treatment services), are indicated in the attached framework. A description of the proposed strategies to engage each target group is also provided.

Goal: Reducing the impact of noise injury on farm family members across rural Australia.

##### Objectives:

1. In each of three NSW rural communities proposed, the Project will:
  - i. Improve awareness of priority noise injury prevention and hearing health practices; including specific issues that place farm families at greater risk of hearing loss.  
**Indicator:** Changes in self-reported knowledge and practices based on standardized questions
  - ii. Improve access to services providing hearing health advice, screening, assessment and management / devices for those in the farming community with a hearing loss. Access may be physical or financial; and advocacy for better availability of services, where gaps are identified.  
**Indicator:** Pre and post intervention measures of hearing service utilization by defined communities
  - iii. Improve networking of services in local communities to sustain the ongoing hearing health needs of farming families are being met beyond the Project period.

**Indicator:** Assessment of local prevention and hearing service networks completed (social network analysis), inclusive of identification of existing barriers and potential solutions to enhance service access and utilization. Demonstrable evidence of collaborative programs between agencies reinforcing prevention and screening/treatment services functioning.

2. The Project will produce an evaluation report with recommendations for implementing the program across rural communities in Australia.

**Indicator:** Report completed

### **Evaluation Plan**

Information from the Project framework has been utilized to identify potential evaluation indicators for the Project. These have been mapped broadly against the objectives and proposed strategies for each target group.

## Project Framework

Primary Targets	Prevention	Screening / Treatment	Strategies
Farmers	√ (50%)	√ (50%)	Drawing on existing networks (NSW Farmers, Pastoralists Assn etc) provide information within local media, meetings, newsletters re noise injury. To include clearly identified lists of (a) preventive approaches utilizing the hierarchy of control in addition to local sources of hearing protection equipment and (b) local hearing service referral networks
Farm families	√ (60%)	√ (40%)	Drawing on existing networks (Country Women's Association, Women in Agriculture etc) provide information within local media, meetings, newsletters re noise injury. To include clearly identified lists of (a) preventive approaches utilizing hierarchy of control in addition to local sources of noise protection equipment and (b) local referral networks
Shearers / Shooters	√ (50%)	√ (50%)	These aligned agricultural workforces are at significant risk from noise injury and as such have been identified as a specific target group. Accessing these groups will require engagement with local shearing contract agents in the Broken Hill and Tamworth areas, plus through local roo shooting/abattoir contacts in Broken Hill
Audiometrists – public & private	√ (30%)	√ (70%)	Identify existing service provision gaps, barriers and potential solutions to enhance access to services and utilization. Increase profile of existing services in local farming communities – local service clubs, producer organizations & Division of GPs.
<b>Secondary Targets</b>			
High School Ag Teachers	√ (100%)		Examining hearing protection focus in existing curricula and provide suitable resources to assist teachers in implementing appropriate noise injury prevention practices
GP Divisions, ENTs, pharmacists	√ (20%)	√ (80%)	Predominate role will be in linking for referrals – but availability of prevention information at practices is also important. Work with Divisions to highlight prevention mechanisms and local referral points
Agricultural retailers	√ (90%)	√ (10%)	Engaging local retailers in the promotion of hearing protection equipment and also providing a generic understanding of the source and impacts of noise injury. Their distribution networks may also be used to disseminate information – both preventive and in regards to referral networks
Rural Financial Counsellors	√ (20%)	√ (80%)	Ensure they have relevant contact details for local referral points. Provide basic prevention information that they may be able to draw upon in conversations with farmers and their families
Producer organizations / service clubs	√ (60%)	√ (40%)	NSW Farmers Association, Country Women's Association, Women in Agriculture, Pastoralists Association, service clubs etc serve as a conduit to reach suitable target groups
NSW Health	√ (70%)	√ (30%)	In collaboration with specific partners (e.g. local Health Promotion Units), prevention information will be disseminated in a suitable and timely manner. Information will be promoted at relevant local public exhibitions e.g. agricultural shows/field days.
NSW Agriculture	√ (70%)	√ (30%)	Provide basic prevention information and have relevant contact details for local referral points
Local agronomists/ ag scientists	√ (70%)	√ (30%)	Provide basic prevention information and have relevant contact details for local referral points
RFDS	√ (30%)	√ (70%)	Provide basic prevention information, hearing screening and referral services to remote stations
Local Media	√ (50%)	√ (50%)	Ensure targeted regular features on both prevention and hearing services that link with the locally defined social marketing campaigns in each pilot site and support the respective interventions.

## *Evaluation Framework*

### **Summary of activities for target groups**

As identified there are several core performance indicators for this Project that relate directly to attainment of the Project objectives. The following information summarises these results in respect to each of the key target groups.

#### *1. Farmers*

- 1.1 There has been significant interaction with farming groups through existing committee structures. This has predominantly been via the NSW Farmers networks with hearing issues being raised on several occasions in the Casino and Tamworth regional meetings. It has also included discussion at local Agricultural Show Societies in the area (Casino, Lismore, Kyogle, Alstonville and Bangalow)
- 1.2 In addition to excellent coverage in the local media during the intervention phases incorporating TV, radio and print media (see Indicator 13), NSW Farmers have included details of the Project in their monthly publication in each area that goes to all members (Casino =900; Tamworth = 250).
- 1.3 Based on this information it is conservatively estimated that >50% of farmers were exposed to the relevant information messages in the Casino and Tamworth areas.

#### *2. Farm families*

- 2.1 Excellent liaison with local networks particularly the CWA. Representatives from the CWA participated in the training seminars in Casino and Tamworth, with hearing issues being raised at the respective District Council meetings in these areas. Hearing was also listed as a major agenda item on the International Women's Day activities in Casino.
- 2.2 Information was provided and disseminated for discussion at the local CWA branch level (Casino = 23 groups: Tamworth = 10 groups) and during International Women's Day. This was also supplemented by resource provision to the local Show Societies in Lismore, Casino, Kyogle, Alstonville and Bangalow (~ 500). Additional information is also to be disseminated through the Country Web - the NSW Rural Women's Network quarterly magazine
- 2.3 Based on this information and in conjunction with the local media inputs it is estimated that > 50% of farming families were reached with the relevant information messages in the Casino and Tamworth areas.

#### *3. Shearers and Shooters*

- 3.1 Involvement of shearing contractors and roo shooters within the screening activities for the far west region was attempted. Several roo shooters participated in the audiometric assessments undertaken, all exhibiting significant hearing impairments. Following these assessments highly specific information relating to the importance of protection on all occasions when shooting was provided to these clients. The new shooting brochure developed within the Project was particularly useful in this regard. Although some part-time shearers participated in the screening, it was impractical to engage them more broadly during working hours (due to the contract nature of the work).

#### *4. Audiometrists – public and private*

4.1 Local service providers actively participated in the reference groups for Casino and Tamworth. The completion of the social network analysis has assisted in defining service provision gaps, barriers and potential solutions (see also section on SNA)

#### *5. High school agriculture teachers*

5.1 No assessment of the school curricula was undertaken

5.2 Resources were distributed to all schools in the Casino and Tamworth areas, with schools also being invited to the agricultural retailers seminar in each locality.

5.3 Reports from teachers in Tamworth indicate high usage of the materials (as a component of the Farming for the Future Field day).

#### *6. GP Divisions, ENTs, pharmacists*

6.1 The North West and Northern Rivers Divisions of General Practice each received prevention information for all GPs in their catchment (including prevention information and listings of local audiology services). This was both in hard copy and also in electronic format for inclusion and linkage with the Division web sites to enable practitioners' easy access to this patient information.

6.2 Corflute signage with an up to date list of suitable referral agencies was provided for display in the waiting rooms of surgeries. In Tamworth a training session was conducted for Practice Nurses in basic audiometric screening (n=10) and another session with nursing students at the University of New England (n=86).

#### *7. Agricultural Retailers*

7.1 All local retailers in the Casino and Tamworth areas received the promotional materials for distribution to customers (Farm Noise and Hearing Loss pamphlet, Rural Noise Injury Fact sheet and the Aim to Keep Your Hearing brochure). Sentinel retailers in Tamworth (Goodwin Kenny and Landmark) distributed the Rural Noise Injury Fact sheet in their monthly statements (n=1250). In Casino the two gun shops also received copies of the Aim to Keep Your Hearing brochure and corflute signage listing local service providers.

7.2 Corflute signage with an up to date list of suitable referral agencies was provided to all agricultural retailers for display in prominent locations within their stores in both Casino and Tamworth (e.g. adjacent to the counter and near the hearing protection equipment displays)

#### *8. Rural Financial Counsellors*

8.1 The Rural Financial Counsellors covering the Tamworth and Casino areas were provided with hard and electronic copies of the resource materials for use with their clients.

8.2 Corflute signage with an up to date list of suitable referral agencies was provided to the Counsellors for display in their offices

#### *9. Producer organizations and service clubs*

(see Indicators 1 and 2)

#### *10. NSW Health*

10.1 NSW Health representatives have been pivotal in each of the three sites to the implementation of the Project.

Representatives have attended several farm field days where information regarding hearing issues has been disseminated, including the Ag-Quip field days in Gunnedah (August 2007). Regrettably the Equine Influenza outbreak negated the conduct of similar activities at the



Farmers of the Future Field Days in Tamworth and several of the Agricultural Shows in the Northern Rivers area. Notwithstanding this issue the purchase of a mobile hearing booth as part of the Project for the North Coast Area Health Service will strengthen available screening services considerably. This will enable broad scale and sustainable hearing assessments at the local field days and other venues (eg cattle sales etc) well into the future. In the far-west the local NSW Health networks were invaluable in contacting potential clients for screening and ensuring their attendance in the remote sites.

### *11. NSW Department of Primary Industries*

11.1 Representatives from the DPI have participated in the SNA in both Casino and Tamworth, plus attended the agricultural retailers seminars. Information has been provided to these agencies to share with other staff and also with producers that they come in contact with through their daily work schedules.

### *12. Royal Flying Doctor Service*

12.1 The RFDS has been represented on the local reference group for Broken Hill and following the screening undertaken in the more remote sites of the far west, a package of information materials has been made available for distribution via the RFDS network. During the intensive screening process resources were distributed to all participants and made available at all township clinic sites for future use.

12.2 A total of 60 screening tests were completed at Monolon Station, White Cliffs health clinic, Ourimbah Station, Wanaaring health clinic, Hungerford health clinic, Marrapina Station and Tibooburra health clinic. In addition a further 15 tests for children or adults not involved in agriculture were also completed.

12.3 Of the patients screened two were referred for further attention.

12.4 Due to the short time interval between the assessment and this report we have been unable to ascertain the number and proportion of patients that have accessed referral services as a result of these assessments.

### *13. Local Media*

13.1 Local social marketing programs were designed for the intervention periods in Casino and Tamworth. Strategies were based on feedback from the social network analysis and based on the principles of the Health Belief Model in relation to prevention and screening / treatment issues. A communication plan to reflect these issues was developed for the Project. (Attachment 4). This was not logistically feasible for the far west.

13.2 Significant local media were engaged in both Casino and Tamworth covering radio, TV and print media. The coverage in these areas ensured high visibility for the Project. However, while the paid advertising coverage was straightforward, it proved more problematic in both sites to get the editorial (press releases) published.

### Attachment 3 - Social Network Analysis

Title: **Social network analysis for farmers hearing services in a rural community**

Authors: Lower, Tony  
Fragar, Lyn\*  
Depczynski, Julie  
Fuller, Jeffrey  
Challinor, Kathy  
Williams, Warwick

Address: Australian Centre for Agricultural Health and Safety,  
University of Sydney  
PO Box 256, Moree NSW 2400

Corresponding Author: PO Box 256, Moree NSW 2400  
Ph: 02 6752 8212  
Fax: 02 6752 6639  
Email: [lfragar@health.usyd.edu.au](mailto:lfragar@health.usyd.edu.au)

Author contribution: Lower, Tony 30%  
Fragar, Lyn\* 20%  
Depczynski, Julie 15%  
Fuller, Jeffrey 15%  
Challinor, Kathy 10%  
Williams, Warwick 10%

## Abstract

*Objective:* To complete a social network analysis of hearing health services for farming families in a rural community. This information will be used to identify approaches that can strengthen local service provision.

*Design:* A pilot survey of individuals/agencies that may work with farmers and their self-reported links with each other.

*Setting:* Major regional town in NSW

*Participants:* Thirteen agencies with a role in hearing health service provision

*Main Outcome Measure:* Reported service links for information exchange, client referrals and working together in assisting farmers to improve hearing health.

*Results:* The Nurse Audiometrist, WorkCover NSW and agricultural retailers have the lead role in disseminating relevant information within the network. For client referrals the Nurse Audiometrist, private audiometry services, GPs, ENT and industry groups played the major roles.

*Conclusions:* Social network analysis can assist in defining hearing health networks and can be used to highlight potential actions that can strengthen networks to enhance services for farmers and their families.

**Key words:** hearing health, farm, agriculture, occupational health

### What is already known on this subject?

- The hearing health of farmers is known to be compromised by their occupational noise exposure
- The uptake of hearing health information and services by farmers is patchy.

### What does this study add?

- Supports the use of social network analysis to assess hearing health networks in rural communities
- Illustrates the central role of the Nurse Audiometrist and some other service providers in this hearing health network.
- Identifies potential network enhancements that could further strengthen hearing health service provision.

## **Introduction**

Noise injury and the associated hearing loss is a significant problem in the Australian farming community.<sup>1</sup> Damage to hearing can be caused by prolonged and cumulative effects of A-weighted noise levels above 85 decibels (dBA) over many years; or by instant trauma associated with peak noise levels above 140 dBA.<sup>2</sup> Exposure to excessive noise sources, such as tractors, chainsaws and firearms without protection represent an unacceptable risk to the hearing health of farming families.

Information from hearing screening conducted at agricultural field days in NSW, indicates that approximately two-thirds (60-70%) of participating farmers have a measurable hearing loss.<sup>3</sup> This compares to an estimated 22-27% for the general Australian community.<sup>4</sup> Hearing loss is evident even amongst young farmers aged 15-24 years.<sup>5</sup> All those who are exposed to noisy farm activities are at risk of sustaining a noise injury. This includes farmers, farm-workers, bystanders and farm families - including children, who may be assisting with farm tasks.

Hearing loss sustained from noise injury can have disabling personal and social consequences for the affected person and their family.<sup>6</sup> Misunderstanding conversation leads to embarrassment and often results in the affected individual limiting verbal interactions thereby increasing social isolation. The increased effort required to follow conversation can also lead to fatigue, anxiety and stress.<sup>4</sup> Overseas studies have also demonstrated that the effects of hearing loss may be increased in rural areas, where access to health services is often limited; and persons with occupational hearing loss (such as farmers) can be at increased risk for injury as a result of their sensory impairment.<sup>7</sup>

Like the rest of the Australian workforce the age of farmers has continued to steadily rise from a median age of 47 years in 1986 to 51 in 2001.<sup>8</sup> The combined effects of hearing loss due to ageing (presbycusis) and occupationally related noise injury increasingly arises as a major health issue<sup>3</sup>. Assessment of how hearing services are currently provided to farming families and to define ways in which services may be enhanced, was a component of the Better Hearing for Farm Families Project (2007-8).

The focus of this paper is to report on a pilot assessment in one community drawing on social network analysis (SNA) to assess the links between local stakeholders involved in the provision of hearing services that assist farming families.

## **Method**

The study site was a major regional NSW town with an approximate population of (55,000). Local agricultural enterprises are mixed in nature and consist of cropping, cattle and sheep operations. Currently available hearing services include Ear, Nose and Throat specialists (ENT), Occupational medicine, private audiometry services, Commonwealth Government hearing health services provided by Australian Hearing and Nurse Audiometrists within local community health centres. Ethics approval for the project was received from the University of Sydney (Ref No. 10-2007/10368).

The method adopted drew on earlier work in rural Australia assessing service links for mental health.<sup>9</sup> Town networks were defined and bounded by developing a list of agencies that may assist in relation to either the prevention of hearing loss and/or provide rehabilitation services and are known to have contact with farming families in

the area. The initial list was developed by the research team and then discussed in detail with a local reference committee that oversaw the project. This ensured local input into the profiling and identification of all the potential stakeholders.

The survey instrument was also based on that used by Fuller et al.<sup>9</sup> Questions covered the agencies role in relation to both prevention and screening/provision of hearing services; the perceived burden of hearing loss in the farming community; links over recent times with other stakeholders related to the exchange of information; client referrals and co-operative solutions; perceived barriers and solutions for service providers to improve services; and perceived barriers for farmers in adopting hearing health measures and potential solutions. Face validity of the questions pertaining to barriers and solutions was achieved through consultation with representatives of the local reference committee and the National Acoustic Laboratories. Following ethics approval and subject consent, the survey was first emailed to all participants and a suitable time for completion of a phone interview negotiated.

Data were entered into the UCINET v6 software package (Analytic Technologies, MA, USA)<sup>10</sup> using a dichotomous scale (0 = absent: 1 = present). To enhance the validity of the data and to limit self-report bias, only InDegree data are reported here. That is, the data reflect comments that others have made about the links with each specific individual and do not include the self-reported links. This also means that in cases where a response to the survey was not forthcoming from an individual, that information on their role in the network could still be assessed based on the feedback of all other individuals in the network. These data were used to define the number of

links that each agency had with all others in the network and to determine the mean number of links across all agencies. Additional descriptive comments were elicited for several items, describing potential barriers/solutions to the uptake of hearing prevention and services.

## **Results**

A total of 16 agencies were identified as having a role in this area with 13 providing data to contribute to the assessment. Overall 10 agencies indicated they had a role in relation to prevention, seven focused on provision of clinical services / treatment and five reported a dual role. Table 1 shows the linkages indicated by responding organisations/individuals as to their respective interaction with other service providers.

Farmers were a small part of the overall client base for all agencies, with seven reporting it was less than 5%. This was understandable as only a few had hearing health as the core function of their service. On average, respondents believed that 51-70% of farmers had a hearing loss that would benefit from some sort of assistance.

Prevention information was predominantly relayed via attendance at agricultural shows or opportunistically during clinical visits. Meanwhile screening services were periodically provided at local agricultural shows however, the predominant mode of delivery was through specific clinical visits.

## **Network Linkages**

As illustrated in Table 1 data from the network analysis assessing the number of links between agencies indicated that the Nurse Audiometrist (7), WorkCover NSW (6), agricultural retailers (6) and ENT (5) were the major providers of information. These agencies had double the number of mean links across the entire network (2.53). Meanwhile the receipt of information was relatively well spread across most agencies (mean 2.71).

### **Insert Table 1 here**

As may be expected the referral patterns focused strongly on those agencies with a clinical role (Table 1), with the private audiology services (8), Nurse Audiometrist (7), ENT (7) and General Practitioners (GP) (6) featuring strongly. These agents represented the bulk of the linkages receiving referrals (mean 2.12). These links are visually displayed in Figure 1. Those making the referrals were most frequently reported as the Nurse Audiometrist (5), private audiology services (4), GPs (3), ENT (3) and industry groups (3), with the mean number of links being (1.75).

### **Insert Figure 1 here**

In relation to other ways in which the agencies may work together the Nurse Audiometrist (6), WorkCover NSW (5) and health promotion staff (5) dominated the network, having approximately double the number of mean links (2.76) for this criteria (Table 1).



## **Service Provision**

Perceived barriers to better hearing service provision included: distance; cost of advertising; lack of suitably qualified staff; stigma of hearing loss in the farming community; and, health service priorities. The need to increase the emphasis on hearing screening was seen as the first component of improved clinical services. The provision of free regular screening activities at locations where farmers congregate e.g. sale yards (i.e. increase mobile screening) and agricultural field days was strongly advocated. The extension of Medicare rebates or health insurance to cover hearing screening was also raised. Similarly, lobbying government to include farmers who are still working (but not making money) to be eligible for free hearing services through Centrelink was identified as important, particularly during the prevailing drought conditions. Undermining these initiatives is the lack of trained Nurse Audiometrists in rural areas, the fact that the provision of adult hearing services in NSW Health was not a priority issue and that farmers equate hearing services with the high costs related to hearing aids.

## **Adoption by farmers**

Respondents noted that farmers are embarrassed about being seen as having a hearing problem and a hearing aid. Furthermore, farmers do not think about the issue since hearing loss is a gradual process and there is no desire to change until the situation becomes acute.<sup>11</sup> Consequently, creating an increased awareness among farmers of the availability of hearing services through the media,(including the promotion of safe noise exposure limits) was deemed to be a high priority. This could include

strategically targeted advertising for example, around news/weather reports and cattle and commodity sales information, advising them of how hearing loss occurs and the likely impact on the individual and the family. It should also detail practical steps that can be taken using the hierarchy of control to limit noise exposure and not focus solely on hearing protectors. Incentives for noise reduction and screening through insurance companies need to be further investigated.

Access to women active in farming and young farmers was also felt to be important in further promoting prevention efforts. In accordance with earlier research<sup>12</sup> farm women were perceived by respondents to influence some of the decision-making in respect to Occupational Health and Safety (OHS) and hearing health. Younger farmers were also seen as treating farming more as a business than do older farmers, and hence, it was perceived that they generally tend to place a greater value on safety. In this context hearing health needs to be incorporated as a key feature tied to the long-term economics of the farm business. This is particularly important as farmers place their own health as a low priority when money is tight. Therefore, to gain maximum impact hearing issues need to be integrated with other broadly based industry topics such as maximising productivity, as otherwise farmers will not be interested.

## **Discussion**

This pilot assessment identified the central role that Nurse Audiometrists have in relation to hearing issues for farming families over this area. The role is significant in terms of both preventive information and referral pathways for clinical screening and

intervention. The results also highlight a strong role for the OHS authority (WorkCover NSW) and agricultural retailers in disseminating relevant information. In addition to the Nurse Audiometrist, the ENT, GP and private audiometry services understandably dominate the referral networks and subsequent provision of clinical hearing services.

This is the first time such an assessment has been conducted and provides useful guidance to further strengthen and expand these hearing health networks. Potentially this could include greater recognition of and guidance for the involvement of agricultural retailers in the provision of prevention information and in the promotion and normalisation of access to local hearing service providers. Furthermore, areas for expansion could include greater involvement of groups such as the Country Womens' Association, NSW Farmers, other industry bodies, Landcare and rural financial counsellors - all of which already play an important role in many other aspects of rural life for farming families, but were absent as information conduits in this assessment.

Limitations to this methodology include the use of a dichotomous scale and while this indicates whether a relationship is present, it does not define how strong that relationship is. For example in relation to referral pathways there is no quantitative data on how many individuals have been referred. Notwithstanding this limitation, self-report bias has been minimised by using only inDegree data for all analyses.

From a policy perspective linking noise injury with the broader agendas of groups already operating in rural areas appears feasible. For example, hearing impairment is

likely to have a major influence on social isolation and exacerbate mental health issues. This impact will become even more pronounced as the average age of farmers continues to climb, combining the effects of both occupational noise exposure and presbycusis. As such, hearing health services working with mental health providers may be an important first step benefiting both speciality areas and is an area worthy of future research and intervention.

Given the central role of the Nurse Audiometrist in this assessment, the progressive downgrading of provision of hearing services for adults within the NSW Health framework may have far reaching impacts on services for farming families in rural areas. While services for children remain the focal point for NSW Health and Australian Hearing, these data suggest that Nurse Audiometrists are central to the networks that service farming families in this community.

Data from this SNA has provided an initial snapshot of how hearing health networks function for farming families in this community. It has also provided guidance for future interventions that can strengthen these networks.

As the nature of networks are likely to vary from site to site, further assessment is required to extend this approach across other communities. However, this pilot study has identified several key elements required to potentially strengthen networks and these elements may be broadly applicable in rural areas.

## **Acknowledgements**

The Better Hearing for Farming Families project has been funded by the Commonwealth Department of Health. We wish to thank all respondents and the local reference committee for their various inputs.

## References

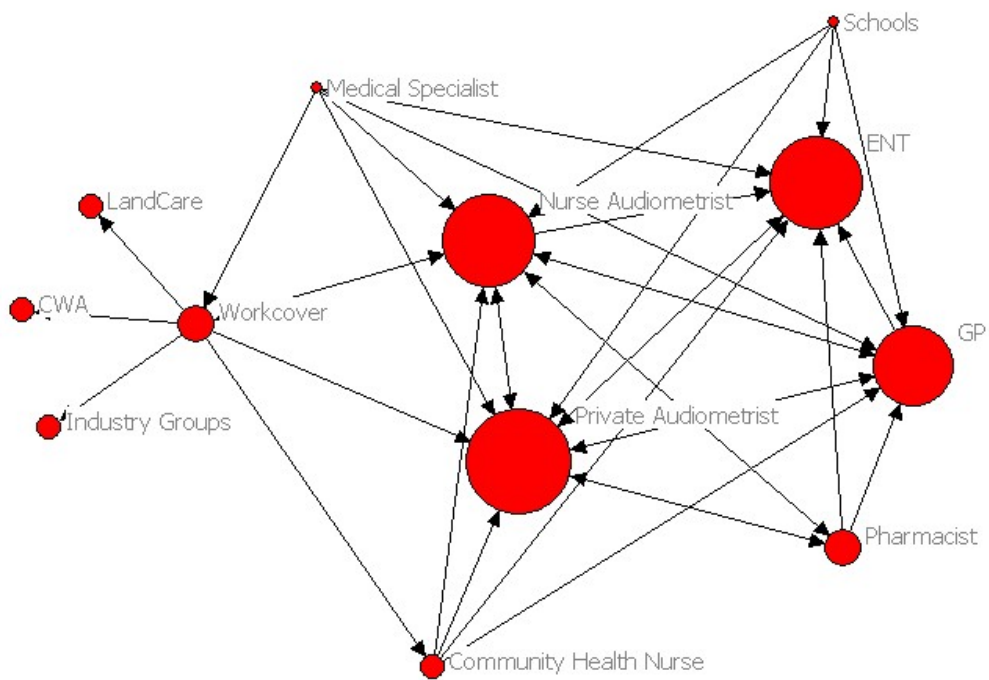
1. Williams W, Purdy S, Murray N, LePage E, Challinor K. Hearing loss and perceptions of noise in the workplace among rural Australians. *Australian Journal of Rural Health* 2004; **12**: 115 – 119
2. Clark W, Bohne B. Effects of noise on hearing. *Journal of the American Medical Association* 1999; **281**(17):1658-1659.
3. Voaklander D, Franklin R, Depczynski J, Challinor K and Fragar L. *Evaluation of the NSW Rural Hearing Conservation Program*. Sydney: NSW Health, 2006.
4. Williams W, Forby-Atkinson L., Purdy S, Gartshore G. Hearing loss and the farming community. *Journal of Occupational Health and Safety – Australia and New Zealand* 2002; **18** (2):181-186.
5. Franklin R, Challinor K, Depczynski J, Fragar L. *Noise exposure, hearing protection and noise injury in young adult farmers*. Moree: Australian Centre for Agricultural Health and Safety & Rural Industries Research and Development Corporation, 2002.
6. Westbrook M, Hogan H, Pennay M, Legge V. Workers' reactions to their noise-induced hearing loss: acknowledgement versus avoidance, *Journal of Occupational Health and Safety - Australia and New Zealand* 1992; **8**(3): 237 – 242
7. Depczynski J, Franklin R, Challinor K, Williams W, Fragar L. Farm noise emissions during common agricultural activities. *Journal of Agricultural Safety and Health* 2005; **11**(3), 325-334.
8. Australian Bureau of Statistics paper 4102.0 - *Australian Social Trends, 2003*. Canberra: ACT.
9. Fuller J, Kelly B, Sartore G, Fragar L, Tonna A, Pollard G, Hazell T. *Use of social network analysis to describe service links for farmers' mental health*. *Australian Journal of Rural Health* 2007; **15**: 99-106.
10. Borgatti S, Everett M, Freeman L. *Ucinet for Windows. Software for Social Network Analysis (V6.17)*. Harvard, MA: Analytic Technologies, 2002.
11. Alpiner JG. *Handbook of Adult Rehabilitative Audiology* (2<sup>nd</sup> edition). Williams & Wilkins: London; 1982.
12. Durey, A. Lower, T. The culture of safety on Australian farms. *Rural Society* 2004; **14** (1); 57-69.

**Table 1 – Number of service links for farmers hearing**

<b>Agency</b>	<b>Gave info</b>	<b>Received info</b>	<b>Referred to</b>	<b>Referred from</b>	<b>Work other ways</b>
Nurse Audiometrist (NSW Health)	7	5	7	5	6
Audiometry services (Private)	4	4	8	4	2
General Practitioners	3	4	6	3	4
Ear Nose Throat specialists	5	4	7	3	3
Medical Specialist (other)	1	0	0	1	2
Pharmacists	2	0	2	1	3
Community Health Nurses (NSW Health)	1	4	1	1	4
Health Promotion (NSW Health)	4	4	0	2	5
NSW Dept Primary Industries	2	2	0	2	4
Rural Financial counsellors	0	1	0	0	0
High School Agriculture Departments	1	3	0	1	2
WorkCover NSW	6	4	2	1	5
Industry Groups e.g. NSW Farmers, Pastoralists Assn., Grain Growers etc	0	3	1	3	3
Country Women's Association	0	2	1	2	1
Landcare/catchment groups etc	0	1	1	1	2
Agricultural retailers	6	3	0	0	1
Other Agency	1	2	0	0	0
<b>Mean Number of Links</b>	<b>2.53</b>	<b>2.71</b>	<b>2.12</b>	<b>1.75</b>	<b>2.76</b>

**Key:** Gave info - provides information to a third party  
 Received info - received information from a third party  
 Referred to - referred enquiry/individual to a third party  
 Referred from - client was referred from a third party  
**Work other ways - other unspecified action**

**Figure 1 - Referrals made to individual(s)/agencies across the network of service providers.**



**Note:** The size of the circle is proportional to the relative importance of the service provider.



## **Attachment 4 - Communication Plan**

### **Communication Plan (updated Aug 13)**

Credibility of message source, message design (simple one/two ideas), delivery mechanism (where – see below), target audience and behaviour (action)

#### **Why**

- Noise injury is a major problem for farmers that is preventable

#### **Who**

- Prevention – youth etc
- Prevention and maintain existing levels of hearing – older farmers
- Hearing services – existing farmers / those with a loss
- Specific groups – roo shooters, shearers
- Innovators, early adopters, mid term adopters, late term adopters & laggards

#### **What**

Core messages (three)

1. Prevent loss based upon adoption of hierarchy of controls
2. Maintain existing hearing
3. Improved quality of life by accessing/using hearing services

Identify credible sources of information for each aspect

- prevention
- maintenance
- hearing services

#### **When**

*Broken Hill*

TBC

*Casino*

Phase 1 – (Sept 25-Oct 31)

Phase 2 – (March 4 – April 28)

*Tamworth*

Phase 1 – (Sept 1 – Oct 31)

Phase 2 – (Feb 17- March 30)

#### **Where**

- Local media / outlets (locations e.g. ag retailers) – note noise injury is not a “sexy” topic so uptake may be patchy by local media
- Tied to local events – future farmers etc
- Through local producer and service clubs
- High schools
- Shearing contractors / abattoirs (roos)

**Identification of factors contributing to noise injury behaviours / outcomes**

	<b>Young farmers</b>	<b>Core Message(s) to be Delivered</b>	<b>Older farmers</b>	<b>Core Message(s) to be Delivered</b>
<b>Perceived Susceptibility</b>	Not susceptible – very low	Everyone is susceptible Loud music adds to risk	Moderate – high (dependent on personal exposure to others with loss)	Everyone is susceptible
<b>Perceived Severity</b>	Low	Low (tinnitus)	Low-moderate	Annoyance/irritation - (tinnitus) Impacts on social interaction Safety implications –unable to localise sound source
<b>Barriers</b>	<p><i>(Prevention)</i> Image - high Lack of knowledge of higher order noise prevention solutions Fitment of hearing protection Cost of hearing protection</p> <p><i>(Screening / Services)</i> Cost of screening Acceptability with colleagues Time cost in accessing services Lack of timely / close services</p>	<p>Prevent loss – image don't be a bloody idiot theme Overall dB load on hearing function Hierarchy of control Always wear protection - prevention Cheap cost of PHP compared to high costs of hearing aids later Availability of PHP in-store &amp; on-farm</p> <p>Screening services cheap and available</p>	<p><i>(Prevention)</i> Image - moderate Lack of knowledge / application of higher order noise prevention solutions Fitment of hearing protection Cost of hearing protection</p> <p><i>(Screening / Services)</i> Cost of screening &amp; new aids if required Acceptability with colleagues Time cost in accessing services Lack of timely / close services</p>	<p>Maintain existing hearing – be smart theme Overall dB load on hearing function Hierarchy of control Always wear protection - prevention Value cost of PHP compared to loss (cheap)/cost of hearing aids and devices Availability of PHP in-store &amp; on-farm</p> <p>Screening services cheap and available Limited Health insurance coverage for new aids</p>
<b>Benefits</b>	Better hearing for all other activities – music, sport etc	Be healthy – stay young (link good hearing and health as cool)	No deafness in old age Improved socialisation Reduction in embarrassing incidents? Safer	Communication improved Less potential for embarrassment (mis-hearing / not hearing something)
<b>Self-efficacy</b>	Low-Moderate (little control over hierarchy of control if a young family member or employee)	Take control of your future (emphasize prevention)	Moderate-high	Action can maintain existing hearing and prevent further loss

## **Record of Media**

### **Casino**

*Radio:* ABC Oct 16<sup>th</sup> (Jan Mills), March 5<sup>th</sup> (Dr Warwick Williams)

*TV:* PRIME Feb 18<sup>th</sup> & NBN March 4<sup>th</sup> retailers seminar (Dr Warwick Williams)

*Print:* Express Examiner editorial (Oct 17<sup>th</sup>, dates); Northern Farmer editorial (March edition); Northern Star editorial (March 8th);

*Advertising:* Express Examiner advertising (March 5<sup>th</sup>, 12<sup>th</sup>, 19<sup>th</sup>, 26<sup>th</sup>, April 2<sup>nd</sup> and 9<sup>th</sup>); Northern Farmer advertising (March edition); Northern Star advertising (March 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 29<sup>th</sup>).

### **Tamworth**

*Radio:* Oct 10<sup>th</sup> (Kathy Challinor), Feb 14<sup>th</sup> (Dr Warwick Williams)

*TV:* PRIME Feb 18<sup>th</sup> & NBN Feb 14<sup>th</sup> retailers seminar (Dr Warwick Williams)

*Print:* North West Magazine editorial (Oct 9<sup>th</sup>); Country Leader editorial (Feb 18<sup>th</sup>); Walcha News editorial (Feb 14<sup>th</sup>, 28<sup>th</sup>, and March 13<sup>th</sup>); Walcha Advocate editorial (Feb 20<sup>th</sup>, 27<sup>th</sup> and March 12<sup>th</sup>)

*Advertising:* Northern Leader advertising (Feb 15<sup>th</sup>, 20<sup>th</sup>, 22<sup>nd</sup>, 25<sup>th</sup>, 29<sup>th</sup>, March 5<sup>th</sup>, 7<sup>th</sup>, 10<sup>th</sup>, 12<sup>th</sup> and 14th); Walcha News advertising (Feb 14<sup>th</sup>, 21<sup>st</sup>, 28<sup>th</sup>, March 6<sup>th</sup> and 13<sup>th</sup>); Walcha Advocate advertising (Feb 13<sup>th</sup>, 20<sup>th</sup>, 27<sup>th</sup>, March 5<sup>th</sup> and 12<sup>th</sup>).

### **Far West**

*Print:* Barrier Miner March 13<sup>th</sup>, Corner Post

## **Attachment 5 - Aim To Keep Your Hearing**

Included as separate attachment

## **Attachment 6 - Farm Noise and Hearing Loss**

Included as separate attachment

## **Attachment 7 - Rural Noise Injury Factsheet**

Included as separate attachment

**Attachment 8 - Project Evaluation Paper (Draft 1)**

**FIRST DRAFT – Not for circulation or reference**

Title: Bleeding from the ears - Improving hearing health for farming families

Authors: Lower, Tony  
Fragar, Lyn\*  
Depczynski, Julie  
Challinor, Kathy  
Mill, Jan  
Williams, Warwick

Address: Australian Centre for Agricultural Health and Safety,  
University of Sydney  
PO Box 256, Moree NSW 2400

Corresponding Author: PO Box 256, Moree NSW 2400  
Ph: 02 6752 8212  
Fax: 02 6752 6639  
Email: [lfragar@health.usyd.edu.au](mailto:lfragar@health.usyd.edu.au)

Author contribution: Lower, Tony  
Fragar, Lyn  
Depczynski, Julie  
Challinor, Kathy  
Mills, Jan  
Williams, Warwick

## **Abstract**

### **Introduction**

Due to occupational exposure, hearing health in the agricultural workforce is known to be compromised. This pilot study sought to implement local demonstration projects in three rural communities to identify lessons learned that could be applied more broadly across Australia to improve hearing health.

### **Methods**

Local advisory groups were established in three communities to guide project development and implementation. In two of the communities a social network analysis assessing the hearing networks was undertaken to identify information and service gaps. The advisory groups then developed local intervention approaches.

### **Results**

There was significant strengthening of the local hearing health networks including increased awareness of issues by farming families and the expansion of opportunities for farmers to access screening services. Previously unidentified methods to promote hearing health e.g. through agricultural retail outlets were identified and utilized.

### **Conclusions**

Integration of hearing health initiatives with other agencies already working with farming families, will be important to enhancing long-term outcomes.



## **Introduction**

Hearing health in the rural and remote farming communities has been identified as a major issue of concern by Farmsafe Australia and formed one of four priority goals and targets.<sup>1</sup> The levels of occupational hearing loss in agriculture are significant, with approximately two-thirds (60-70%) of Australian farmers having a measurable hearing loss, compared to 22-27% in the general Australian community.<sup>3,4</sup> This damage is not only restricted to older farmers, but has also been identified in younger farming cohorts 15-24 years.<sup>5</sup>

Occupational Health and Safety (OHS) legislation in Australia stipulates that exposure to noise levels above 85 decibels (dBA) poses an unacceptable risk. In the agricultural sector typical sources of noise exceeding this limit include tractors, chainsaws, workshop tools and firearms. In 2006, 240,000 individuals reported their principal occupational category as agriculture (ABS Census 2006, 2008). Furthermore, Australia has some 130,000 agricultural establishments, most of which are family owned and operated businesses (ABS 2005). Hence farmers, farm-workers, bystanders and farm families - including children, who may be assisting with farm tasks, are all potentially at risk of noise injury.

To address noise injury in the agricultural sector the Australian Department of Health and Ageing supported a 12-month pilot intervention. The Better Hearing for Farming Families Project sought to implement local demonstration programs in three communities with the specific objectives being to improve: (1) awareness of priority noise injury prevention and hearing health practices; (2) access to services providing hearing health advice, screening, assessment and management / devices for those in the farming community with a hearing loss; and (3) networking of services in local communities, to sustain the ongoing hearing health needs of farming families.

This paper reports on the interventions and its findings, with the long-term aim being to reduce the impact of noise injury on farm family members across rural Australia.

## **Method**

The three sites were purposively selected based on geographical considerations, population size, the nature of agricultural production and the level of locally available support. The sites were nominally defined as the Far-West, North Coast and New England regions of the state of New South Wales. Consequently, this selection entailed the involvement of a major regional centre (New England - population 50,000), a smaller rural township (North Coast - population 7,000) and a remote area (Far-West - population?).

To oversee the operations of the Project, a Reference Group was convened consisting of relevant stakeholders representing the Australian College of Audiometrists, NSW Farmers, NSW Health, National Acoustic Laboratories and the Commonwealth Department of Health. In addition, at each of the three Project sites small local advisory groups were convened to provide guidance on the local nuances that needed consideration in developing and implementing interventions and to ensure future sustainability.

In the New England and North Coast sites an initial phase focused on general awareness raising utilizing the local media and the distribution of existing noise injury resources through targeted mechanisms to farmers e.g. direct mail-outs from agricultural suppliers, New South Wales Farmers Association and Agricultural Show Societies was completed. Simultaneously, an assessment of the local hearing health networks was undertaken to determine the existing information links and referral pathways for farming families. Details included agency roles in relation to prevention and screening/provision of hearing services; links over recent times with other stakeholders related to the exchange of information; client referrals and co-operative solutions; perceived barriers and solutions for service providers to improve services; and perceived barriers for farmers in adopting hearing health measures and potential solutions. A full description of the SNA process and results are available elsewhere (ref). Results were then used to develop the second phase interventions with the local advisory

group and included an increased emphasis on agricultural retailers as an information conduit to farmers.

The second phase interventions included a training session for local agricultural retailers and other individuals that were important information links in their respective areas (as identified in the SNA). These sessions covered basic information pertaining to the extent of the problem in rural Australia, how noise injury can be prevented, how farmers can maintain the hearing they have and the type of local services available to assist them if they want further assessment. Resources for distribution at the shop front relating to noise injury and corflute signage listing the details of local hearing services were also provided. This was supported by media promotions including advertising for local services in the print media. Efforts to undertake on-farm audits in the North Coast were stymied by floods in the area. Additional audiometric screening capacity was defined as an important issue in the North Coast, resulting in the procurement of a mobile screening unit for use at local agricultural field days. In the New England a training session with Practice Nurses within the Division of General Practitioner's was undertaken and a new resource focusing on the impact of shooting on hearing health developed and distributed.

Process measures relating directly to the project objectives for all activities were maintained along with feedback from the local advisory groups and service utilization data in the North Coast and New England from Community Health Centres and private providers. In the New England site data were compared from 2007 to a matched period in 2008. While this was not feasible in the North Coast as the service had only recently commenced, all new clients were asked why they had come forward for an assessment. This was done to assist in identifying the impact of local advertising and promotion.

The SNA approach was not feasible within the vast catchment of the Far-West site. In this area it was suggested that audiometric screening be undertaken by visiting several remote agricultural properties (stations) and towns. This would include screening for farmers and those working in agricultural related services such as professional kangaroo shooters. Given the geographic area covered, a fly-around service using a small plane similar to the Royal Flying Doctor Service was recommended. Acknowledging the potentially socially isolating impact of hearing loss on mental health,(ref) a representative from the Health Department also accompanied the team that included an audiometrist and a farm safety specialist. To identify any potential trends data were analysed comparing the hearing profiles of subjects in the Far-West with those for the rest of the state over recent years.

## **Results**

In relation to the objectives of the project an improved awareness of priority noise injury prevention and hearing health practices including specific issues that place farm families at greater risk of hearing loss was demonstrated in several ways. Extensive local media coverage outlined the core issues relating to noise injury and has ensured wide coverage of this information in the target group. Additionally, the identified need and subsequent development of a new resource relating to hearing protection when shooting, reflected the projects responsiveness to local issues. Significantly, while this resource was developed by the New England group it has also been very well received by farming families in the other pilot areas, demonstrating widespread applicability. The use of distribution networks that are familiar to farmers and their families i.e. agricultural retailers, Agricultural Show Societies and NSW Farmers etc has been central to the effective promotion of noise injury prevention and related services.

Providers in the New England, reported an increase of 40% in service utilization by farmers, albeit this was off a low base. While direct cause and effect cannot be demonstrated, this approach does illustrate some potential for uptake of services. Providers from the North Coast

reported only one instance where a client had indicated that the local promotion had been central to them undertaking a hearing assessment. However in the longer term, the purchase of a mobile audiometry-screening booth for use at local agricultural field days and similar events, will significantly extend coverage.

In the Far-West 60 individuals from the seven stations/townships participated in the screening activities. Preliminary results suggest that firearm usage has a major negative impact on hearing profiles in the region. In tandem with the relatively good uptake by farmers and their families, this illustrates an unmet need in these remote areas where hearing services tend to focus almost solely on children.

The SNA has assisted the networking of services in local communities by defining specific relating to screening (including cost, staffing, role of women, convenience and integration with other health/farm business issues) that impact on service utilization. Greater involvement with other agencies also working with farmers (i.e. not just audiometry / audiology services) was also found to be crucial. For example integration with the Country Women's Association, LandCare and specific health services like Mental Health, need to be developed and maintained - so that hearing health becomes more of a package rather than trying to be promoted as a single issue.

In the North Coast and New England , local service providers have participated within the Project with the General Practice Divisions also making hard and electronic copies of resources for on-going use, available for their members. Meanwhile the Royal Flying Doctor Service has included the electronic resources in its portfolio of patient resources, enabling these to be downloaded at any location and provided to patients in remote locales. There has also been positive response to the information session designed specifically for agricultural retailers that has strengthened local networks.

## **Discussion**

The use of SNA in two centres was crucial to underpinning the design of locally relevant interventions. Areas wishing to work in hearing health should be encouraged to complete some kind of preliminary assessment using a formal SNA or even an informal assessment.

While hearing is an important health issue, many farmers were reportedly hesitant to take action by preventing further exposure and / or having a hearing assessment. Due to the slow progression and insidious nature of hearing loss, farmers frequently defer any action until significant damage and subsequent lifestyle deficits present. To engage farming families earlier in the process and alleviate this problem, including a greater focus on agricultural retailers as a source of respected information by farmers was important to enhance awareness of hearing health. This relationship could be at both national and local levels, with presentations relating to hearing health at the annual merchandising conferences for major agricultural retailers such as Landmark, Elders and Wesfarmers.

Integrating hearing health with other agencies/projects that are already working with farmers to “package” and distribute relevant information e.g. the Rural Divisions of General Practice Mental Health Drought Support program, Older Farmers program being rolled-out through Rotary, General Practice Farmer Health Tool Kits, State farmer conferences, mens and rural health gatherings is imperative.

Access to hearing screening at convenient locations and times was also a major barrier to the use of services. Consequently, steps to alleviate these disincentives through provision of services at suitable locations e.g. agricultural field days, is important. There may be potential to work with local service groups to examine potential sponsorship for the provision of mobile audiometry booths.

The Project demonstrated considerable hearing deficits in the far-west illustrating that there is an unmet need for adult hearing health information and screening in this remote area. The receptivity of the participants to the hearing health and particularly the preventative information relating to shooting and hearing protection, was very high. Steps to work with remote health service providers e.g. through the RFDS nationally should be undertaken.

#### *Strengths and weaknesses*

There were several limitations that impacted on the pilot assessment, including the relatively short timeframe (effectively 10 months). Furthermore, the prolonged drought through vast areas of NSW relegated issues such as hearing to a low priority for farming families. The outbreak of Equine Influenza also negatively impacted on the conduct of several locally planned initiatives in the New England and North Coast, while major flooding in the North Coast later in the project timeframe also impeded activities.

From a methodological viewpoint there were issues with the SNA in terms of measuring the strength of links between agencies, as has been reported elsewhere (ref). However, the SNA did prove highly valuable in identifying the way in which local networks for prevention information and clinical/screening referrals function. Subsequent interventions were specific to the local nuances but the impact of promotions on hearing screening utilization proved difficult to assess. Future service evaluations should include a reply-paid survey for all new clients to complete.

This pilot has been the first to concentrate solely on hearing health in the farming sector in Australia. Importantly, the results suggest that hearing health is best integrated with other issues and the work of existing agencies, rather than being delivered as a stand-alone program of work.

### *Policy and Clinical Implications*

From a policy perspective there may be latitude to examine the potential of introducing incentives to farming families for noise reduction initiatives and screening through insurance companies. Similarly, steps to simplify the warning system building on work already underway in the construction industry relating to noise exposure control and the use of hearing protection, should be further explored by farmer agencies and the Heads of Workplace Safety Authorities

In relation to accessible screening services, the availability of mobile hearing screening is not a universal panacea. It is crucial that suitably trained staff are available, willing to use this equipment (often outside of conventional working hours e.g. weekend agricultural field days) and supported by their employing agency in this role. Responsibility for the provision of publicly funded hearing screening in NSW rests predominantly with Nurse Audiometrists working for NSW Health. Throughout Australia there are different state-based arrangements for the integration of publicly funded hearing screening with the respective State/Territory health systems i.e. not all have Nurse Audiometrists. Notwithstanding this variation between states, there is a need to re-assess the availability and role of Nurse Audiometrists within NSW Health (and relevant public providers in other states), in relation to assisting with the implementation of hearing health initiatives for farming families.

Given the vastness of rural and remote Australia, providing mobile audiometric testing for all farming families while encouraged, is untenable. Additionally, there may be some farming family members that will not subject themselves to hearing assessment for a range of reasons including confidentiality. Consequently, as a first step it would be useful to increase promotion of Telscreen II as an initial self-check hearing assessment. Telscreen is an initiative of Australian Hearing that provides a very basic assessment of hearing function and can be conducted confidentially over the phone (1800 826 500).



## **Conclusion**

This Project has illustrated that locally based hearing health initiatives for farming families can increase general awareness and strengthen local networks. Several of the findings will require continued action at a national level, however the findings also highlight the potential for integration with existing locally based programs that would be likely to enhance hearing health.

## **Acknowledgements**

The Better Hearing for Farming Families project has been funded by the Commonwealth Department of Health. We wish to thank all participants and the local advisory groups for their various inputs.