



# Interventions to increase farm related hearing loss knowledge of selected rural Nebraska farmers and their families

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## Background

Noise-induced hearing loss (NIHL) is a significant problem in the agricultural community due to frequent exposure to loud noises from machinery, equipment, and large animals. NIHL often shows early onset in farmers and has unfortunately even begun appearing in older teens and young adults of farm families (McCullagh, Lusk, & Ronis, 2002). NIHL not only leads to increased risk for injury related to an inability to detect sounds indicating danger, but also causes poorer quality of life due to impaired communication and risk for social isolation (Sherman & Azulay Chertok, 2014). Because farms are often family run and employ less than ten non-family workers, they are exempt from the noise standards set forth by the Occupational Safety and Health Administration (OSHA) (Schiller, Donham, Anderson, Dingledein, & Strebel, 2010). This exemption, in combination with various identified barriers, typically leads to poor utilization of hearing protection devices such as earplugs. Numerous studies indicate that despite the known noise hazards on farms, rates of utilization of hearing protection devices remain very low in the farming community. Long days, nonconforming hours, and rural locations make reaching this population for preventative care, education, and intervention difficult. It is thought that by identifying ways to relate to farmers and making noise screening and protection less cumbersome, farmers and their families may be more willing to participate in hearing loss prevention (Ehlers & Graydon, 2011).

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## Intervention Focus

- Population:**
  - Rural Nebraskan farming families
  - Initially targeting families in Richardson, Pawnee, Johnson, Nemaha, Otoe, and Gage counties
  - Eventually expanding statewide
- Intervention Focus:**
  - Increase noise-induced hearing loss knowledge
  - Provide families with tools to identify high risk noise situations
  - Educate on proper use of hearing protective devices
  - Decrease future hearing loss through increased use of hearing protective devices

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## Theory Model

An individual and a community model were used as a multi-pronged approach.

### Health Promotion Model (revised)

- Benefits:** decrease in further or future hearing loss for self and family members
- Barriers:** a perceived barrier of lack of equipment or lack of understanding can be eliminated by providing noise level indicators (NLI's) and ear plugs
- Self-efficacy:** provide educational information to explain the need for hearing protection and instruction of proper use of ear plugs
- Activity-related affect:** use of NLI to identify areas of highest noise levels
- Interpersonal influences:** involving the entire family as well as the community may improve motivation
- Commitment to a plan of action:** signing up at the fair or through advisory member; completing surveys will propel the family to action

### Social Capital Theory

Using social support such as local radio programs and trusted publications as well as using an advisory board of local, trusted community members, this intervention incorporates aspects of this community model.

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## Barriers

Barriers specific to the rural farming family that could possibly hinder willingness to participate in this intervention include:

- Time out of the individuals day
- Recruitment of participants (Schiller, Donham, Anderson, Dingledein, & Strebel, 2010)
- Availability of hearing protection equipment (McCullagh, Ronis, & Lusk, 2010)
- Convenience of hearing protection equipment (McCullagh, Ronis, & Lusk, 2010)
- Farmers' attitudes towards the use of hearing protection equipment
- Farmers' individual ideology and perspective on the importance of using hearing protective equipment
- Family and friend support and influence on use of hearing protection equipment

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## Program Details

- Advisory Board:** Recruit members from Future Farmers of America, Farm Bureau, 4-H, and school boards from the targeted counties. Board members will be compensated \$50 for training and \$25 per farm family intervention.
- Training:** Training sessions arranged with each county advisory board to include:
  - Education regarding hearing loss in farming communities and importance of intervention
  - Administration of survey (to be administered pre- and post-intervention)
  - Proper use of ear plugs
  - Identification of high noise level areas using the Noise Level Indicator (NLI)
  - Provide suggested language guidelines to contact and enroll farm families
- Recruitment:**
  - Advertisement on the "Cup O' Joe" with Farm Bureau midday radio show (KNEB, KRNV, KTIC stations) as well as written advertisement in ag publications such as *Nebraska Farmer* and local newspapers
  - A booth will be available (manned by the Nurse Practitioner and advisory board members) at each of the county fairs (dates range from July - September 2014).
    - Farm families can sign up to participate
    - Educational material available (example seen below by the National Institute on Deafness)
    - Demonstration on use of NLI
    - Provide list of resources that provide hearing screening in the county
  - Advisory board members receive names of families that signed up; encouraged to recruit other families on their own.
- Intervention:** Will involve advisory board meeting family at their farm, administering survey at first meeting, demonstrating how to use NLI to identify areas of high noise, demonstration of proper use of earplugs, and provide ear plugs.
  - Four weeks later administer post-survey, pick up NLI, and return pre- and post-survey to Nurse Practitioner.

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The image shows several educational cards from the National Institute on Deafness and Other Communication Disorders (NIHDCD). The main card is titled "NIHDCD Fact Sheet: Noise-Induced Hearing Loss". It includes a diagram of the human ear with labels for the Outer Ear (Pinna, Ear Canal, Eardrum), Middle Ear (Hammer, Anvil, Stirrup), and Inner Ear (Cochlea, Vestibular Nerve, Auditory Nerve). Text on the cards explains that noise-induced hearing loss (NIHL) is caused by damage to the hair cells in the cochlea, which do not grow back in humans and other mammals. It lists common causes like loud music, power tools, and farm machinery. It also provides tips for prevention, such as using earplugs and limiting exposure to loud noise. Other cards discuss symptoms like ringing in the ears and difficulty hearing, and mention that NIHL is a permanent condition.

(USHS, et al. 2011) AMV

## Hearing Loss/Prevention Survey

For each question, please circle the number that corresponds with your answer  
To what extent do you agree with the following statements:

- It is likely I will develop hearing loss in the future.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- I am more likely than others to get hearing loss.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- If I had hearing loss I'd face financial hardship.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- If I had hearing loss it would affect my ability to work.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- If I had hearing loss it would interfere with my daily activities.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- If I had hearing loss it would cause serious stress on my family.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- Wearing hearing protection cause me discomfort.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- Hearing protection cost me too much to buy.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- Hearing protection is conveniently located at my worksite.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- Wearing hearing protection interferes with my ability to do my job.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- Wearing hearing protection take too much time.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- There is no good places to store my hearing protection at work.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- I don't know how to correctly use hearing protection.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)
- I don't know why I should use hearing protection.
 

0	1	2	3	4	5
(not applicable)	(not at all)	(slightly extent)	(moderate extent)	(great extent)	(very great extent)

Gates, D., & Jones, M. (2007). A pilot study to prevent hearing loss in farmers. *Public Health Nursing*, 24(6), 547-553

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## Evaluation and Outcomes

- Hearing loss prevention methods will be evaluated by the use of the same survey used prior to education four weeks after intervention is implemented.
- The survey will be distributed by the Nurse Practitioner via the advisory board members.
- As seen above, the survey will determine how well farm family participants have understood the information presented to them on NIHL, NLI, and proper use of earplugs.
- Farm families will also be asked to express their opinion on the ease of obtaining ear plugs.
- The Nurse Practitioner will accumulate and analyze the data from the survey and NLI and then distribute the results to the advisory board and farm families included in the project.
- The outcomes will give the Nurse Practitioner initial information about noise-induced hearing loss for farm families, which will be used to revamp this health promotion.
- This program and its data lead to a larger statewide promotion to help protect the hearing of all farm families.

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## Conclusion

Noise-induced hearing loss from frequent exposure to loud farming equipment, machinery, and large animals is a significant problem Nebraskan farming families face and can have numerous negative effects on these families. This program focuses on noise-induced hearing loss education and prevention to improve safety and quality of life for affected families. It is the hope that through these interventions, rural Nebraskan farming families' future health may be improved.

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