Program Profile

• An ongoing public health campaign to reduce the incidence of noise-induced hearing loss (NIHL) and tinnitus since 1999.

• Multiple years of grant funding and program development formative and summative evaluation approaches

• Research outcomes have guided and substantiated the effectiveness of the program

• Originally developed for the K-12 age group using inquiry-based learning but reaching all age groups

• Successful in engaging parents, teachers, professionals, management, employees and military officers/personnel
Dangerous Decibels Team

Left to right – Billy Martin, Genna Martin, Judy Sobel, Deanna Meinke, Susan Griest, Linda Howarth, Ga-lo Vann
The Problem

• ~ 26 million Americans between the ages of 20 and 69 have high-frequency hearing loss.

• > 30 million Americans are exposed to dangerous levels of noise on a regular basis.

• Henderson (2006) indicated that 16.7% of 12-18 year olds had hearing loss consistent with noise-induced threshold shifts.

• Tinnitus has been reported in up to 59% of children. 19.6% indicating it as a cause of suffering (Coelho et al., 2007).
World Health Organization report on noise exposure to North American children:

“…they may receive more noise at school than workers from an 8-hour workday at a factory.”
The Solution

• Change knowledge, attitudes, and behaviors
• Teach prevention strategies
• Health Communication Theory = implement change…
  ✓ Provide message early and often
  ✓ Use different modalities
  ✓ “Involve me and I understand”
• Partnerships and collaborations are essential
What makes Dangerous Decibels unique?

Developed and evaluated a variety of interventions and applied them to a wide range of settings and populations.

Combined education, exhibits and research with common educational messages.

Adopted nationally and internationally.
What makes Dangerous Decibels unique?

**Partnerships and Collaborations**

- Basic science researchers
- Hearing scientists
- Hearing conservation experts
- Health communication experts
- Science museum educators & exhibit builders
- School teachers
- Students
- Civic leaders
- Volunteers
- Business leaders
What makes Dangerous Decibels unique?

Partnership based -

Other Affiliates/Collaborators/Funders
International affiliates – New Zealand and Australia

Te Kaporeihana Āwhina Hunga Whara

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

PIN DROP Foundation
Giving sound to silence

National Acoustic Laboratories
A division of Australian Hearing
What makes Dangerous Decibels unique?

Learning to protect hearing is a complex health behavior change. Dangerous Decibels interventions are based on the principles of health communication research to increase their effectiveness.

- Health Belief Model
- Theory of Reasoned Action & Planned Behavior
- Social Cognitive Theory

What makes Dangerous Decibels unique?

Uses three underlying educational messages throughout the program

- What are sources of dangerous sounds?
- What are consequences of exposure to dangerous sounds?
- How do I protect myself from dangerous sounds?
What makes Dangerous Decibels unique?

- Education
- Exhibits
- Research
Dangerous Decibels Activities

Innovative training materials and techniques impacting large numbers of people

Exhibits
- Science museum exhibition
- Health and science fairs
- Virtual Exhibit online
- Website resources

Education
- K-12 classroom program
- Educator training
- Jolene

Research
- Effectiveness studies
- Public health research
Science Museum Exhibition

Open June 1, 2002 to May 5, 2011

• First exhibition in the world dedicated to reducing noise-induced hearing loss and tinnitus

• 12 exhibit components – 2,000 ft² / 186 m²

• Over 5,000,000 visitors
Dangerous Decibels Activities

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Exhibits

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How Loud is Too Loud

Whaddya Know?

Save Your Ears
Exhibits: Health and Science Fairs

Interactive Displays
We go to many fairs throughout the year and take along tabletop units for participants to interact with and learn.
The Virtual Exhibit is an online version of the OMSI museum exhibit. A set of eight interactive games. The Virtual Exhibit is available to everyone with internet access. A CD of the Virtual Exhibit is also available.
Canadian colleagues from the University of Ottawa helped us translate the Virtual Exhibit into French.
Virtual Exhibit is used in the classroom and at hearing health promotion events.
Exhibits: Internet Resources

Information Center
Resources and guides on various aspects of hearing loss and hearing loss prevention.

How Loud is Too Loud?
A guide to how long you can be exposed to different types of sounds before possible hearing damage can occur.

How to Protect Your Hearing.
Three ways to protect your hearing.

How We Hear
An overview of how the ear functions.

Hearing Loss
There are many different kinds of hearing loss. Here we have information about...

Noise Induced Hearing Loss
NHL is probably the most common occupational hazard today. It affects 30 million Americans exposed to potentially harmful sounds at work. Danger Induced hearing loss.

NIHL and Veterans

Classroom Materials and Resources
- Dangerous Decibels Educator Kit
  - The Dangerous Decibels Educator Kit is a supplement to the Educator Training Workshop.
  - The kit provides many of the supplies you might need when you develop your own program in prevention of noise-induced hearing loss.

- Coloring Sheets
  - This set of three coloring sheets work well for the younger kids. We use them at home, because they are less likely to be damaged.

- Educator Resource Guide
  - The guide is an illustrated, spiral-bound paperback (9.5 x 11 and 100 pages) K-8 classroom supplement with hands-on activities, background information, and experiments.

- Educator Resource DVD
  - The DVD is a multi-layered introduction to show how we hear, what decibels are, types of hearing loss, how to protect your ears, and more. Includes demonstrations of classroom activities that can be done.

- Virtual Exhibit CD
  - Dangerous Decibels Virtual Exhibit is now available as a stand-alone CD.
Education

Dangerous Decibels “Classroom” Program

- 50-minute program
- K-12 and beyond
- Easily adapted to industrial and military settings
- Evidenced based effectiveness
Education

Educator Training Workshops

- Formalized 2-day training program teaches anyone to easily and effectively tell children and adults about protecting hearing.

- Training and certifying the participants to present the classroom program

- Open to all professional & educational backgrounds.

- Open to ANYONE interested in teaching an effective program about NIHL prevention
<table>
<thead>
<tr>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Museum educators</td>
</tr>
<tr>
<td>High school students</td>
</tr>
<tr>
<td>Audiologists</td>
</tr>
<tr>
<td>Speech pathologists</td>
</tr>
<tr>
<td>School nurses</td>
</tr>
<tr>
<td>Basic scientists</td>
</tr>
<tr>
<td>Physicians</td>
</tr>
<tr>
<td>Administrators</td>
</tr>
<tr>
<td>Industrial hygienists</td>
</tr>
<tr>
<td>School teachers</td>
</tr>
<tr>
<td>Corporate staff</td>
</tr>
<tr>
<td>Hearing therapists</td>
</tr>
<tr>
<td>Exhibit makers</td>
</tr>
<tr>
<td>Health &amp; safety advisors</td>
</tr>
<tr>
<td>Office managers</td>
</tr>
<tr>
<td>Military health staff</td>
</tr>
<tr>
<td>Research assistants</td>
</tr>
<tr>
<td>Social workers</td>
</tr>
<tr>
<td>University professors</td>
</tr>
<tr>
<td>Writers</td>
</tr>
<tr>
<td>Undergrad &amp; grad students</td>
</tr>
<tr>
<td>School hearing screening technicians</td>
</tr>
<tr>
<td>Occupational health nurses</td>
</tr>
<tr>
<td>Agricultural safety educators</td>
</tr>
</tbody>
</table>
International Expansion

Workshop participants in New Zealand

– The New Zealand government agency, Accident Compensation Commission (ACC), has adopted the Dangerous Decibels program and now has a group of Dangerous Decibels-trained educator trainers who are presenting their own workshops in New Zealand.

– The goal of ACC is to place the program in every school in the country and reach 70,000 school children in the next two years.
The Dangerous Decibels program is easily adapted to adults in industry & military settings. The program is now presented to all new recruits in the NZ Defense Forces, NZ police force, to NZ railway workers, to those in the dairy industry and dozens of other industrial settings.
Crossover to occupational settings

NZ: National program for NIHL/tinnitus prevention
Crossover to occupational settings

US corporate and military representatives attending Dangerous Decibels educator training workshops

Program presented to employees and their children in Nevada mining community

Program applicable to manufacturing, service, construction, mining, agriculture, transportation, healthcare, oil and gas industries among others
Educator Workshop participants from around the world.
Jolene is a mannequin with a sound level meter connected to her ear. She is used for education and research regarding personal music system listener beliefs and practices.

Jolene accurately measures sound pressure generated by devices.
The Jolene Cookbook is a step-by-step instruction manual showing how to make your own Jolene. A free download from the website.

So far it has been downloaded in 50 states, 4 territories, and 35 countries.

Some of Jolene's siblings:
Award winning
In 2010 the Association of University Technology Managers selected Jolene as one of the top 30 innovations in the world having a positive impact on quality of life.
Dangerous Decibels Activities

Innovative training materials and techniques impacting large numbers of people

Research

- Intervention effectiveness
- Epidemiology of NIHL
- Native American communities

Funded by NIH – NIDCD & CDC
R25 RR15634
R25 DC006431
R21 CDC IU48DP001937-02
## Dangerous Decibels
### Program Evaluations

<table>
<thead>
<tr>
<th>Year</th>
<th>Intervention Type</th>
<th>Classroom Setting</th>
<th>N</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Classroom formative</td>
<td></td>
<td>297</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2002</td>
<td>Classroom formative</td>
<td></td>
<td>400</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4&lt;sup&gt;th&lt;/sup&gt; 7&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2003*</td>
<td>Classroom summative</td>
<td></td>
<td>1630</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; 4&lt;sup&gt;th&lt;/sup&gt; 7&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2004-05</td>
<td>Four interventions summative</td>
<td></td>
<td>1118</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2005-06</td>
<td>Paired interventions summative</td>
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<td>889</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>4334 students</strong></td>
</tr>
</tbody>
</table>
Research Outcomes

Recommendations

– Implement hearing health education in schools

– Use interpersonal communication methods whenever possible.

– Use more than one intervention modality, over time
Science Museum Exhibit & Public Health Research

Listen Up!
A computer game that includes a hearing test (4kHZ) plus a survey asking about the visitors sound exposure for the last year.

Data, from those who agreed to be part of a research study, was sent to the Oregon Hearing Research Center for analysis.

94,000 visitors participated in research June 2002 – May 2011
### Science Museum Exhibit & Public Health Research

Percent of 13 year olds self-reported exposures

<table>
<thead>
<tr>
<th>Activity</th>
<th>Male (%)</th>
<th>Female (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used stereo headphones</td>
<td>84%</td>
<td>90%</td>
</tr>
<tr>
<td>Been in a car with a loud stereo</td>
<td>69%</td>
<td>88%</td>
</tr>
<tr>
<td>Used a lawn mower, leaf blower</td>
<td>68%</td>
<td>40%</td>
</tr>
<tr>
<td>Fired a gun</td>
<td>41%</td>
<td>20%</td>
</tr>
<tr>
<td>Played in a band</td>
<td>31%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Sample of Research Data from the Listen Up hearing testing booth.
Sample results from the Listen Up testing booth.

Percent of 12-19 year olds with hearing thresholds greater than 20 dBHL at 4000 Hz in at least one ear.

Research results can be seen on the Dangerous Decibels website. The results can be displayed using several variables, such as gender and age differences.
Current Research
Community based NIHL and tinnitus prevention

How do we engage a community and change the local culture to promote hearing loss prevention for a specific target group?

Funded by CDC through the Prevention Research Center at OHSU - Center for Healthy Communities #1U48DP001937-02
What’s next for Dangerous Decibels?

Train more educators

Continue to increase degree and duration of improvements

Adapt for a wider range of audiences

Figure out how to get the US to embrace prevention

Continue global dissemination
Lessons learned along the way – What can others learn from our program?

1. You don’t have to re-invent the wheel – use what is already available
2. You won’t get much done on your own – find good partners
3. Define your educational messages early – they will guide the way
4. Plan your evaluation strategy from the beginning – evaluation is your best friend
5. Have fun
Innovation Award

TV, radio, mass media

Public outreach – exhibitions, malls, fairs

Web-based virtual exhibit

Family/community outreach

School assemblies

Educator training

Classroom program

1 to 1

Number of people reached

Raise awareness

Change behaviors

Degree of life changing influence
Significance of the Award

We are honored to be recognized by the National authority on NIHL prevention

Affirmation that we are headed in the right direction

Reminds us of our place in the prevention Universe

Gives visibility and credibility that will open doors

Motivates us to live up to this standard of greatness
Contact

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