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sjenkins @ agrisafe.org

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# Prevention of Hearing Loss in Agriculture

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The results reported in this presentation represent the opinions of the authors and do not necessarily represent the policies of the National Institute for Occupational Safety and Health.



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# WHAT WE WILL TALK ABOUT?

Damage to Hearing including:

Hearing Loss

Tinnitus

How to Prevent the Damage

Teacher Hints and Resources.



# **Occupational Safety and Health Act Of 1970**

- **OSHA - U.S. Department of Labor**
  - Develop and enforce workplace safety and health regulations.
- **NIOSH - U.S. Department of Health and Human Services**
  - Provide research, information, education, and training in the field of occupational safety and health.

# Noise-Induced Hearing Loss

- An acquired hearing loss
- Begins at the higher frequencies (3,000 to 6,000 Hz)
- Develops gradually as a result of chronic exposure to continuous noise
  - Generator Running, Engine Noise, etc.
- Develops suddenly as a result of a single impulsive noise exposure.
  - Gunfire, Nail Guns, Fireworks, etc.

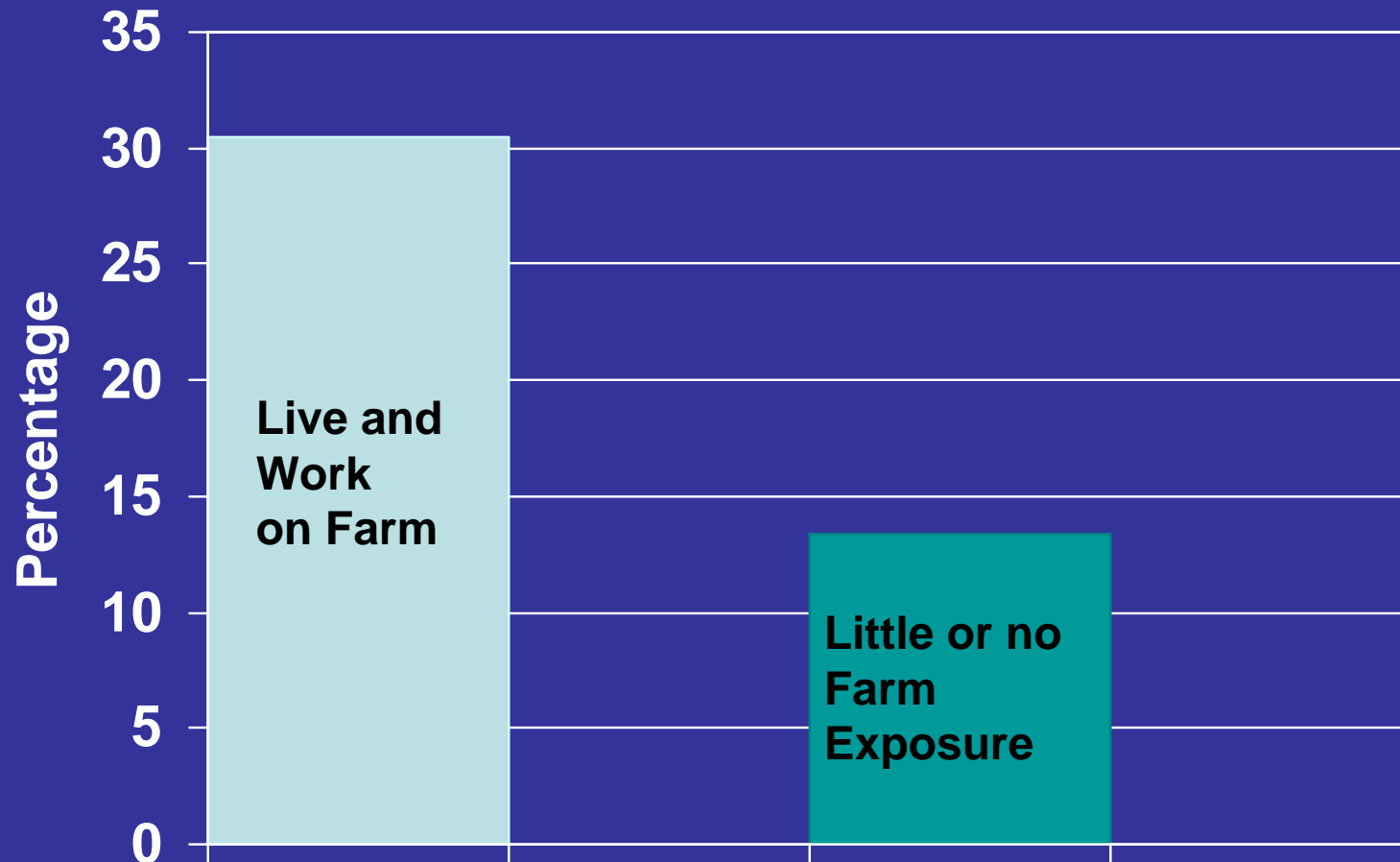
# Who is at Risk?

**33% of all people who are exposed to hazardous noise at work will develop Noise-Induced Hearing Loss.**

**Even young people are at risk:**

**12-15% of people between 6 and 19 years old show signs of Hearing Loss.**

## Bilateral Noise-Induced Hearing Loss in 872 Wisconsin High School Students



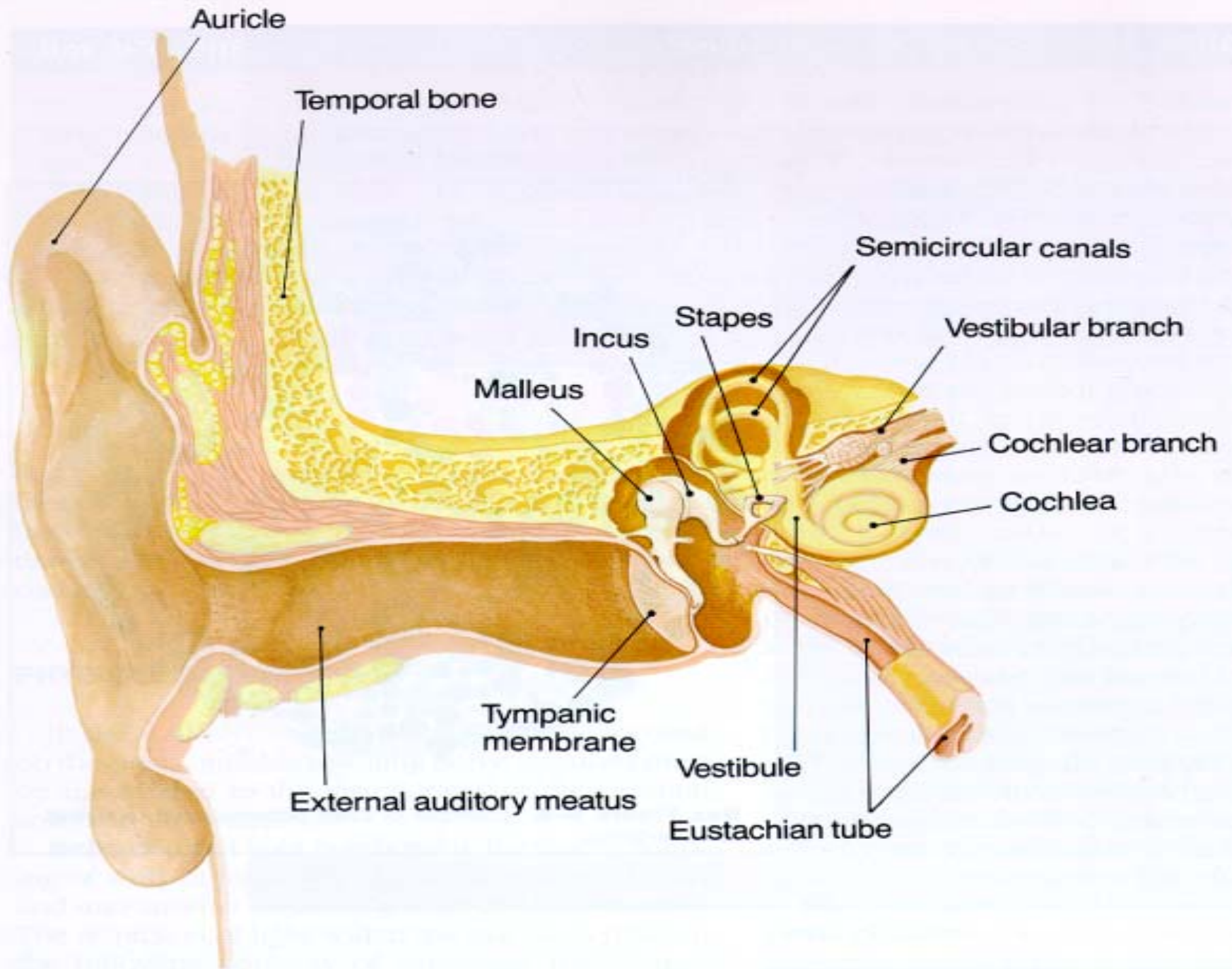
# You need to know -

Noise-induced hearing loss is:

- PAINLESS
- PROGRESSIVE
- PERMANENT

...but it is also **PREVENTABLE**

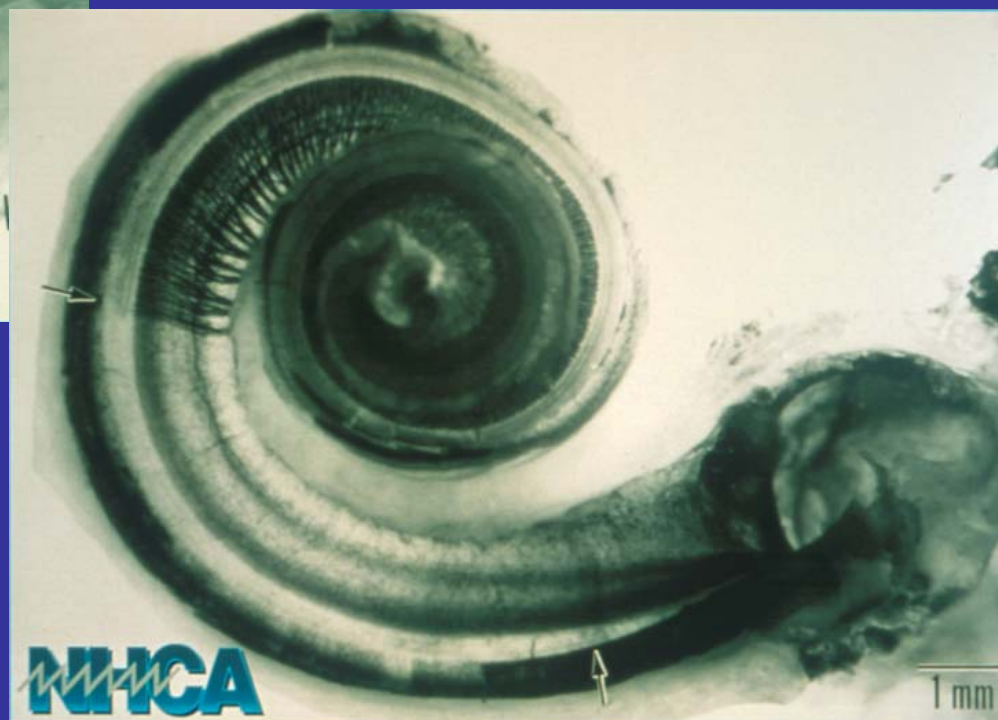
# How Does Noise Damage Hearing?



# Healthy Cochlea

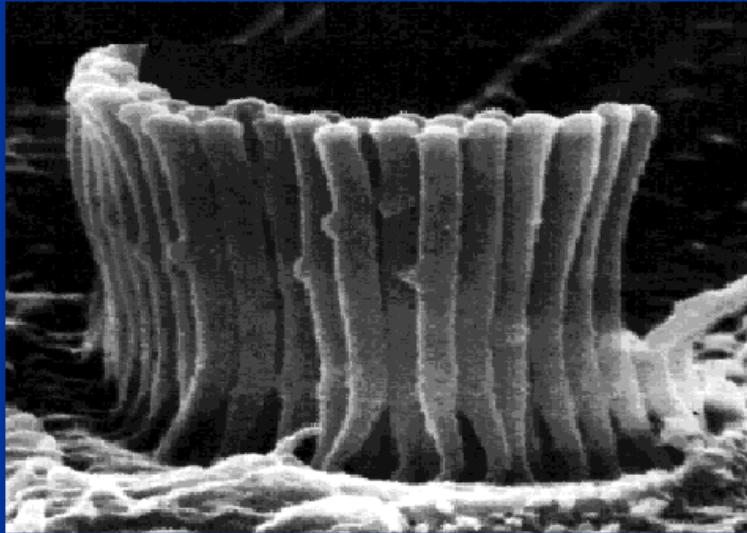


# Damaged Cochlea

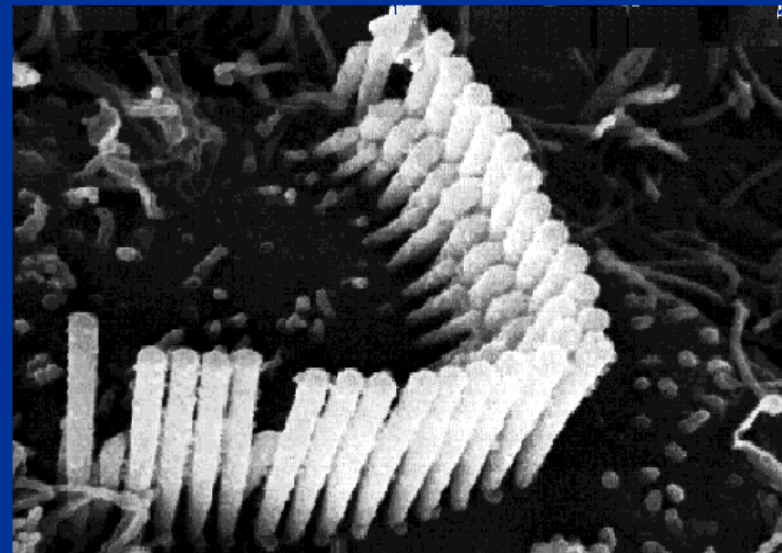


# Healthy Hair Cells

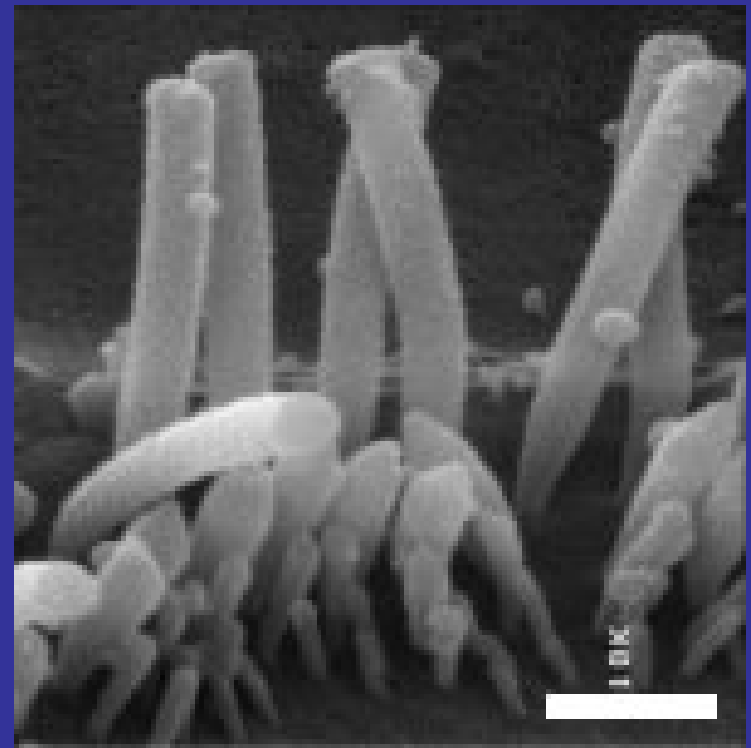
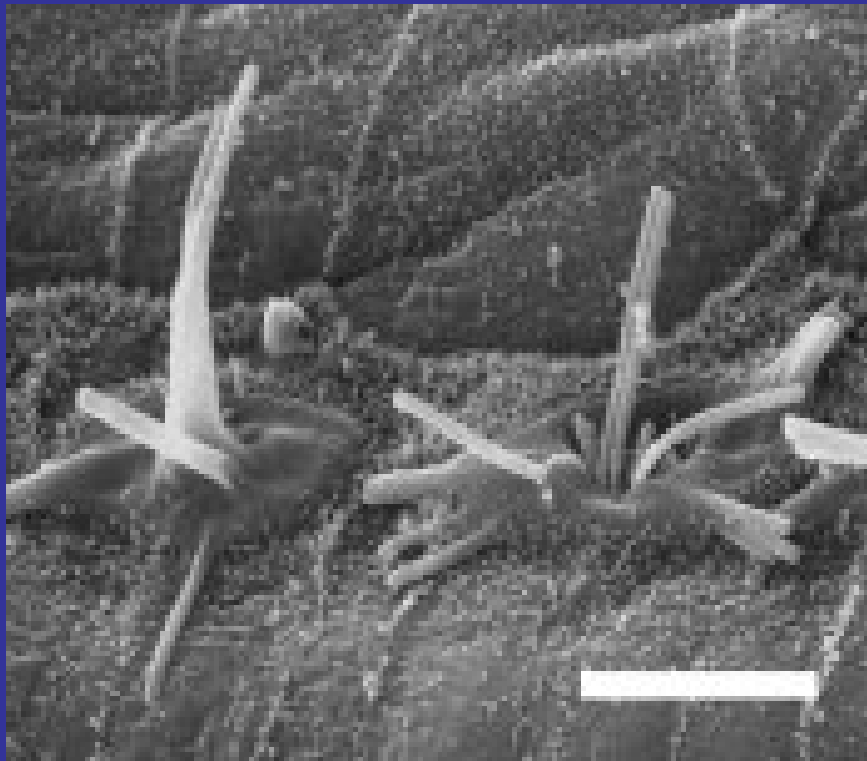
Inner Ear  
*Inner Hair Cell Stereocilia*



Inner Ear  
*Outer Hair Cell Stereocilia*



# Damaged Hair Cells



**You Have Killed the Hair Cells  
Associated With the Nerve  
Fibers So They Have Died.**

**NOW WHAT???**

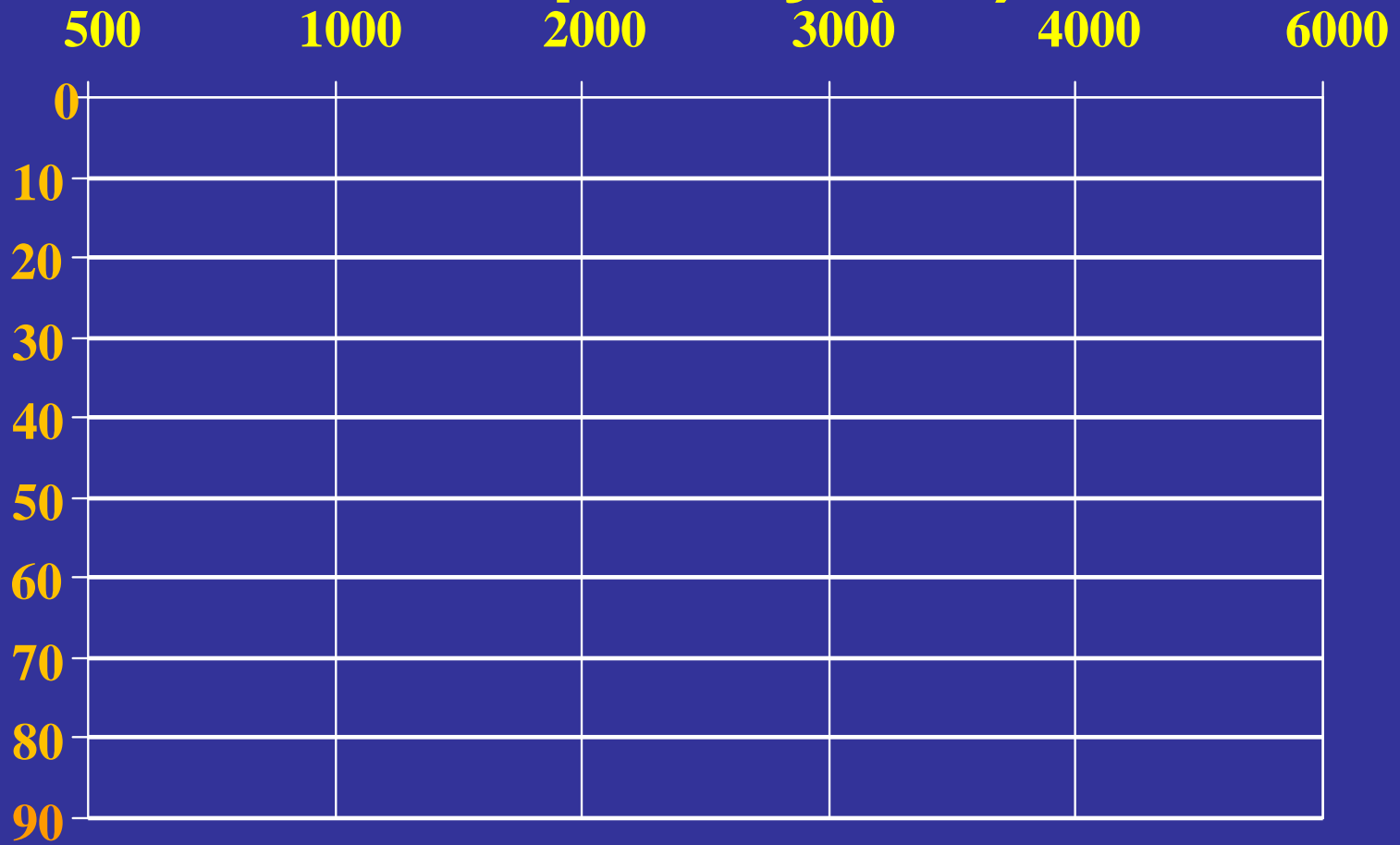
# How Do We Measure Sound?

Decibels (dB) = How loud it is

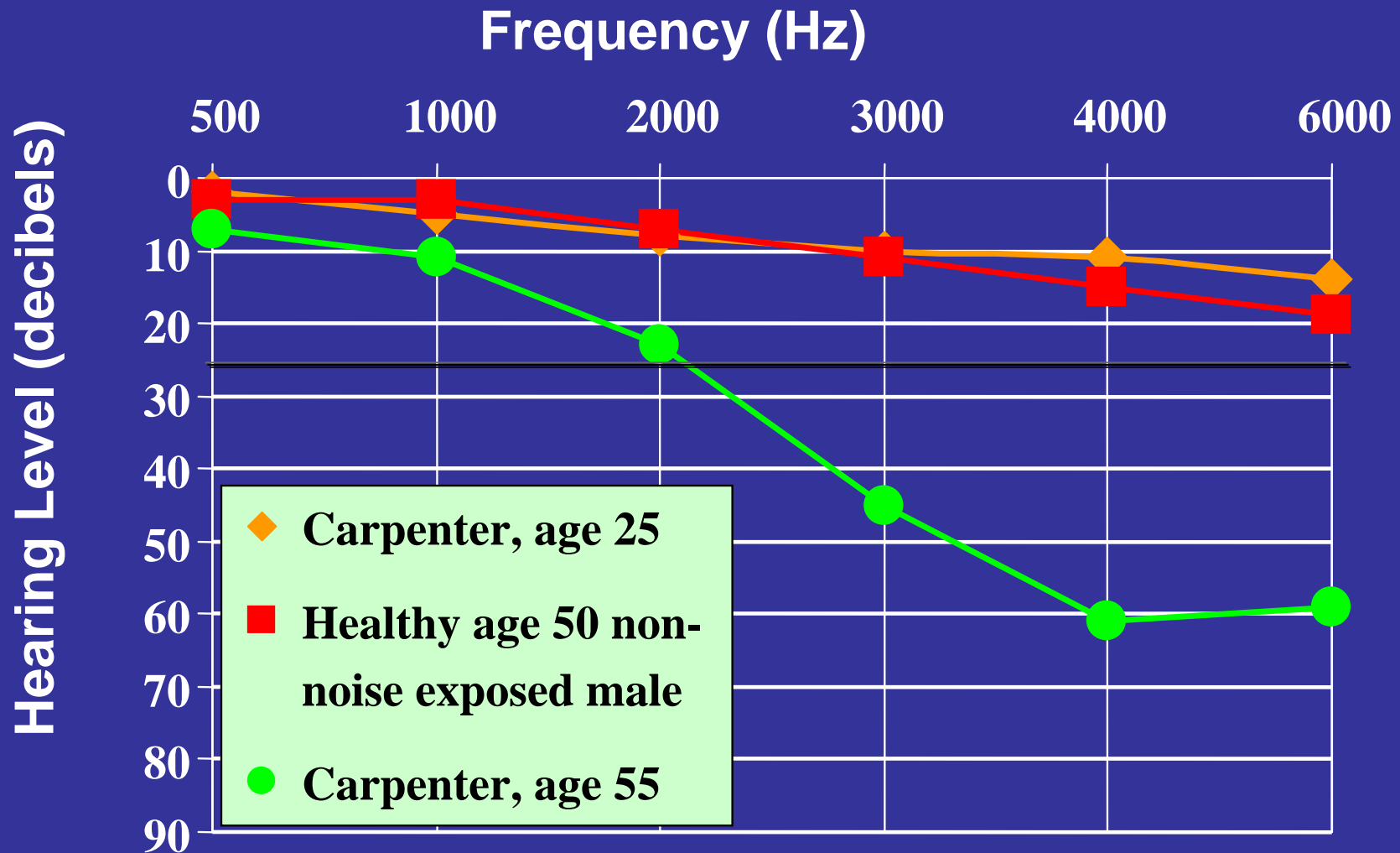
Frequency = High pitch vs. low pitch

# Frequency (Hz)

Hearing Level (decibels)



# By age 25, the average carpenter or millwright has 50-year old ears!



You do not have to lose your hearing as you get older.

# Tinnitus

- One form of damage results in tinnitus
- A ringing, buzzing, whistling, clicking, hissing, chirping or other noise,
  - heard in the ear in the absence of environmental noise.

# Tinnitus: What does it mean when you have it?



# Symptoms of Tinnitus

ringing

whistling

hissing

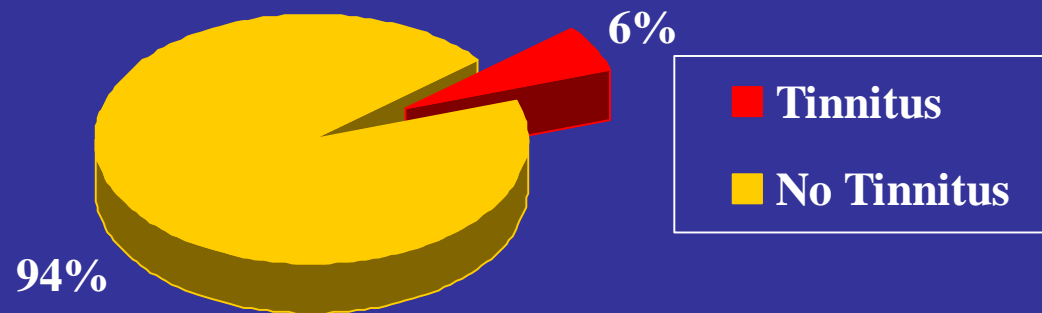
buzzing

clicking

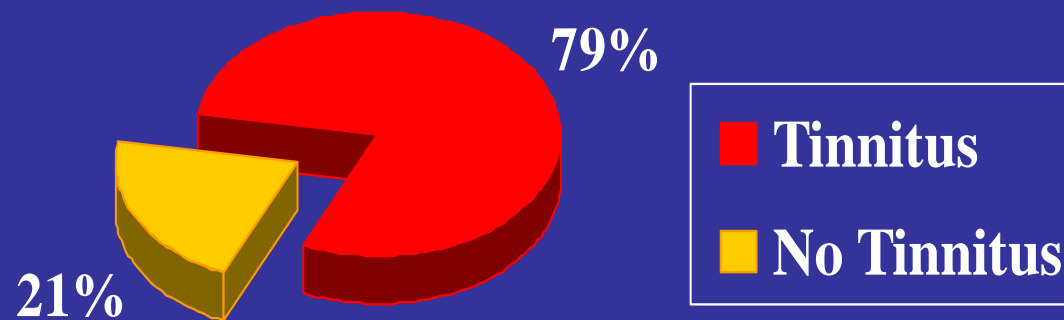
chirping

These can be continuous, intermittent, or pulsating.

# Percent of People With Tinnitus



## Non-Noise Exposed Workers



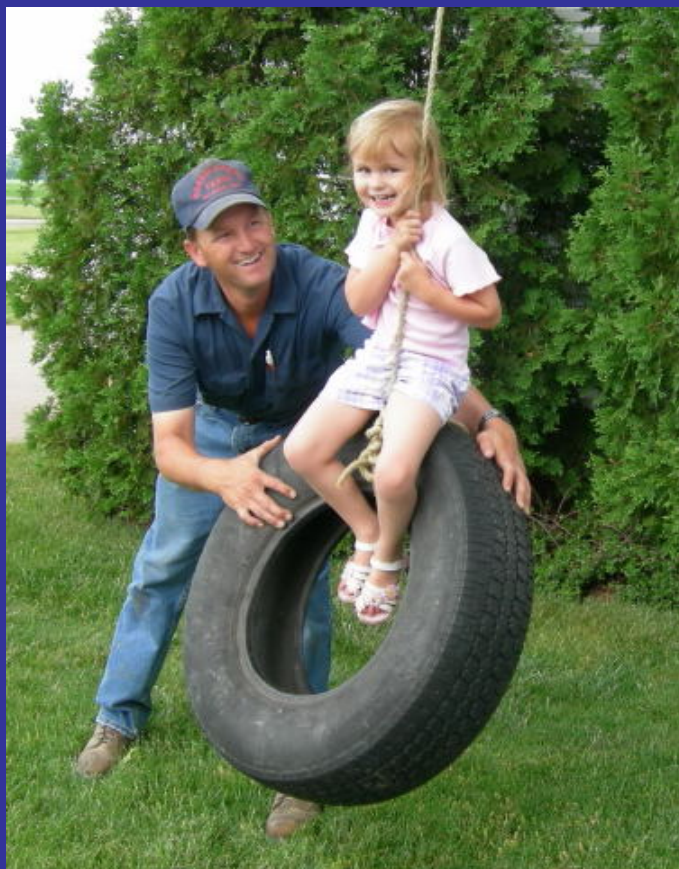
## Noise Exposed Workers

# Hearing Loss Does Not Mean Everything Is Just Quiet



“I thought if I lost my hearing, it would be quiet. But that constant ringing keeps me awake at night and I can’t hear my friends very well on my cell phone.”

# Hearing Loss Impacts All Aspects of Life



“My little girl doesn’t understand why I can’t hear what she is whispering in my ear. she says . . . Mommy hears me when I whisper.”

**How Can You Protect  
Yourself and Your Students  
From Damaging Hearing?**

# What You Should Do To Prevent Hearing Damage

Hierarchy of Controls:

**Remove the Noise**  
**(Engineering controls)**

**Remove the Worker**  
**(Administrative controls)**

**Protect the Worker**  
**(Hearing Protection Devices)**

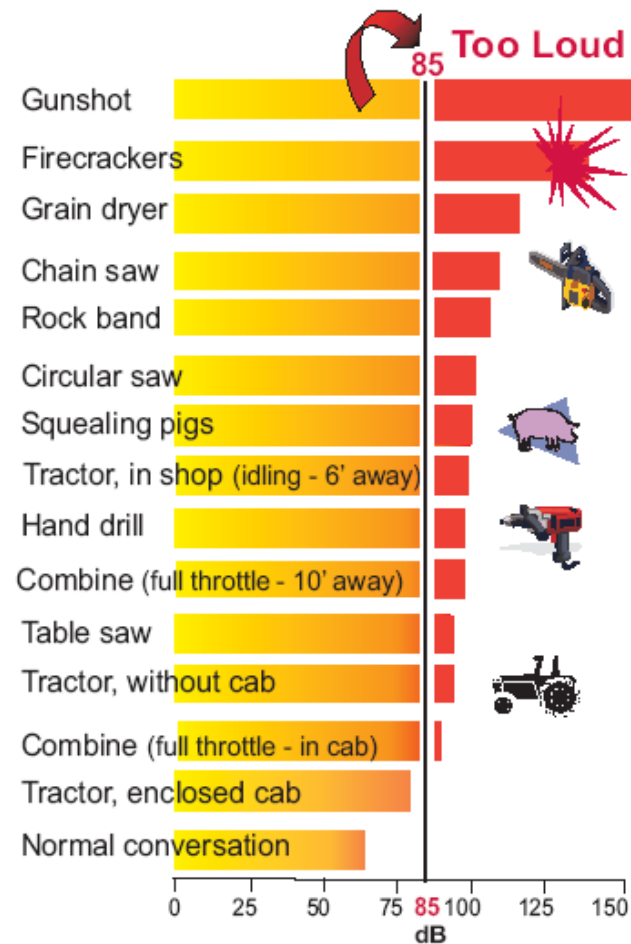


# Warning Signs of Too Much Noise

- Raise your voice to be heard at arms length
- Feeling of “fullness” in ears
- Ringing in ears
- Huh? What?
- Blasting radio/TV
- Raised Blood Pressure
- Tired, Stressed

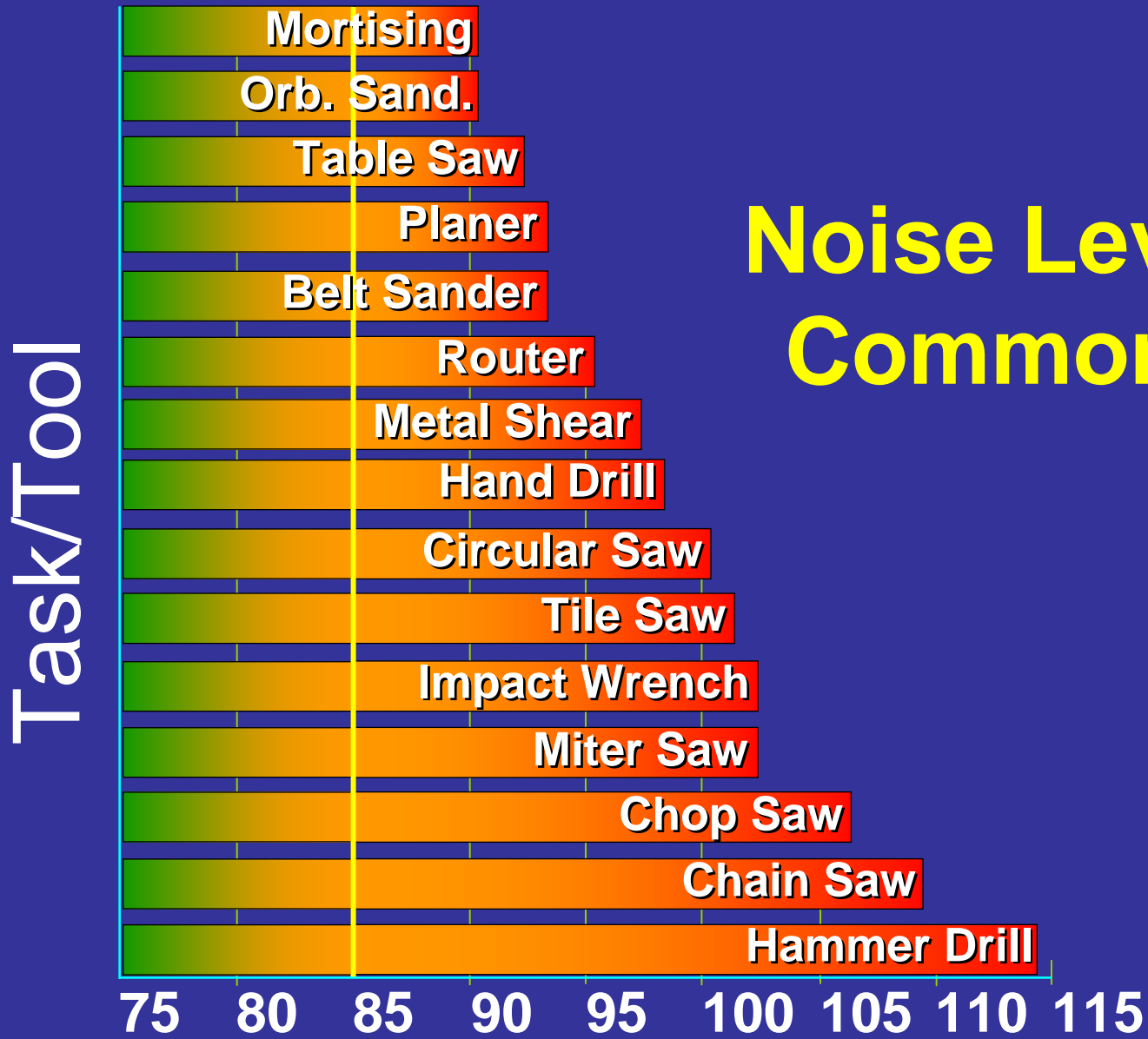
# Common Noise Levels

Exposure to noise above 85 dB can cause hearing loss and tinnitus.



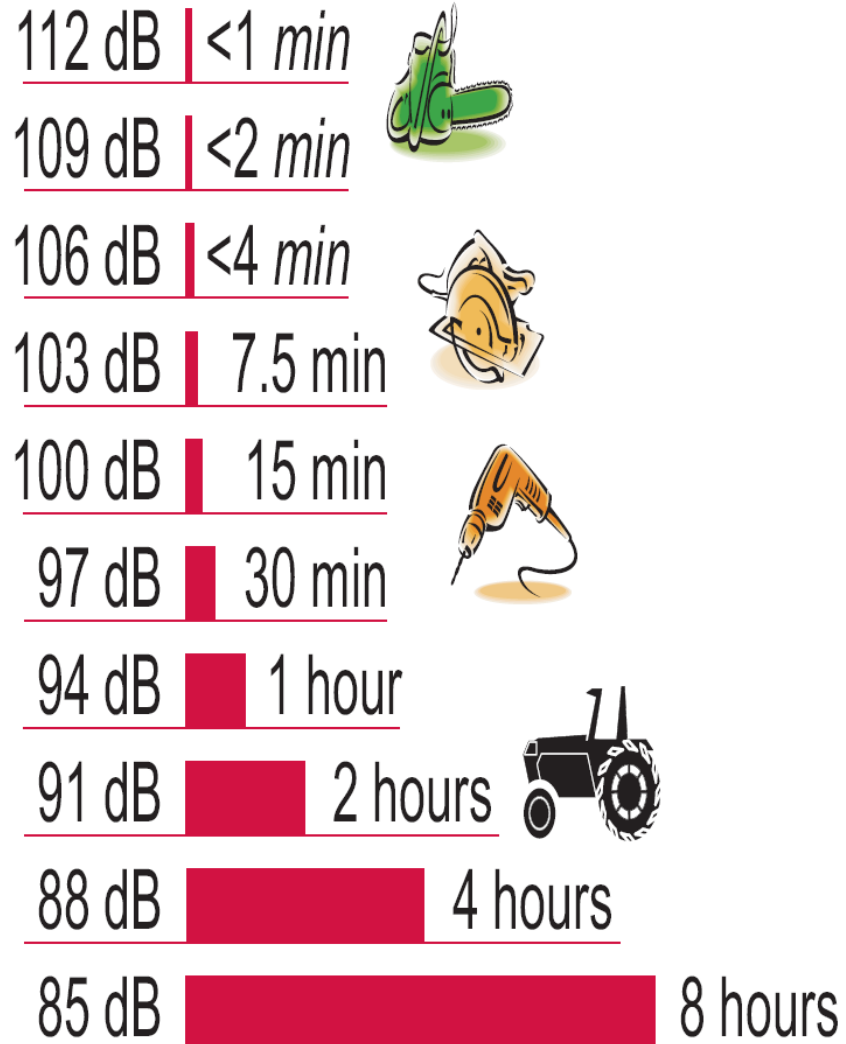
A "decibel" is the unit used to measure the loudness of sound. Decibel levels for each item shown in the graph may vary.

# Noise Levels for Common Tools



# How Long Is Too Long?

The red bar below shows how long it takes for a particular sound level to become dangerous to the human ear. For example, a chain saw has a sound intensity of about 109dB. Without proper hearing protection, running a chain saw for only 2 minutes can cause hearing loss!



# Hearing Protection Devices

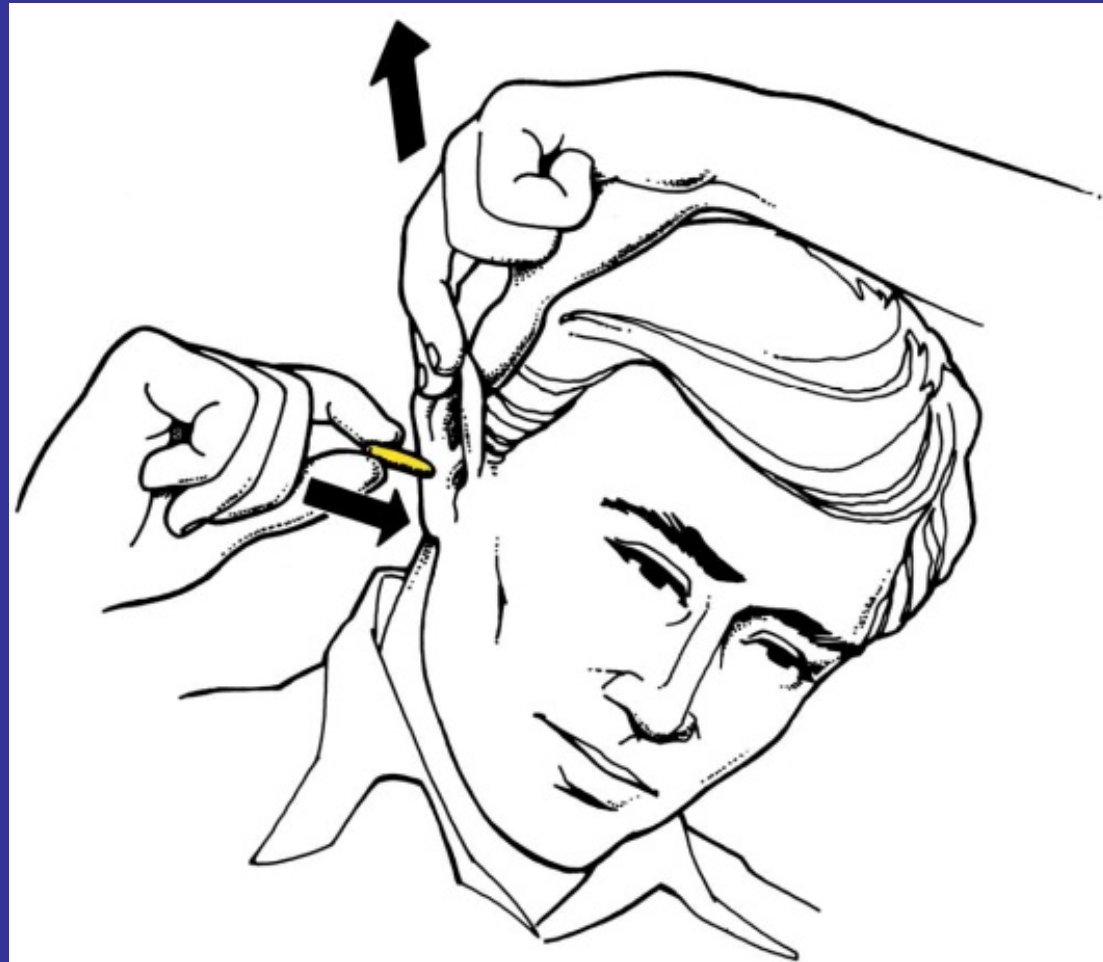
- How many are available
  - Over 300 types available
- How to select
  - NIOSH Hearing Protector Device Compendium
- Where to find them
  - Hardware, discount, or sporting good stores
- Proper techniques for fitting
  - See the handouts

# The Best Hearing Protector:

The one that is worn when needed.



How to properly insert ear plugs –  
Lift the ear to straighten the canal



# Pods

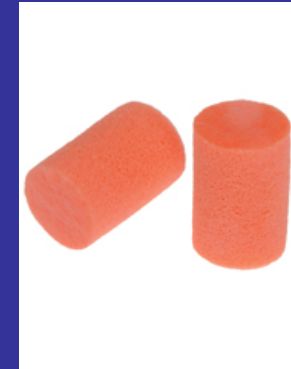


# Formable Earplugs



Roll down slowly.

Make sure you don't get creases.



Reach over your head to straighten the ear canal.

Insert and hold for about 10 seconds.



Perform the hand over the ears test to determine if you have a good fit.

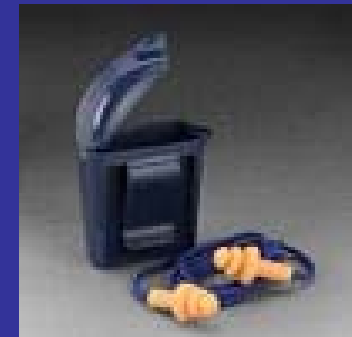


# Premolded Earplugs



Hold the stem of the plug.

Reach over you head to straighten the ear canal.



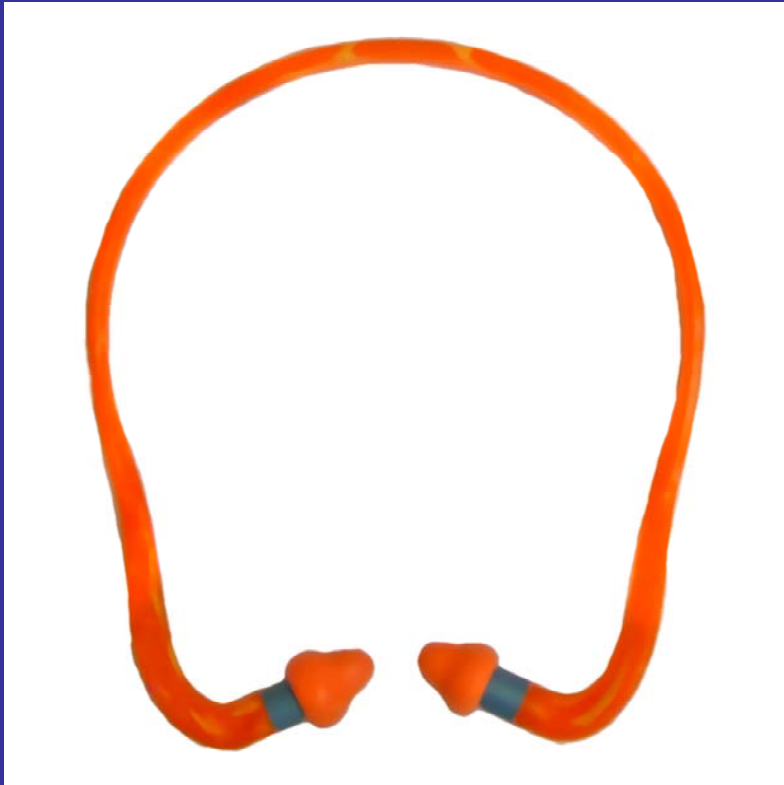
Insert so that all flanges are inside the ear canal.



Perform the tug test to determine if you have a good fit.



# Bands

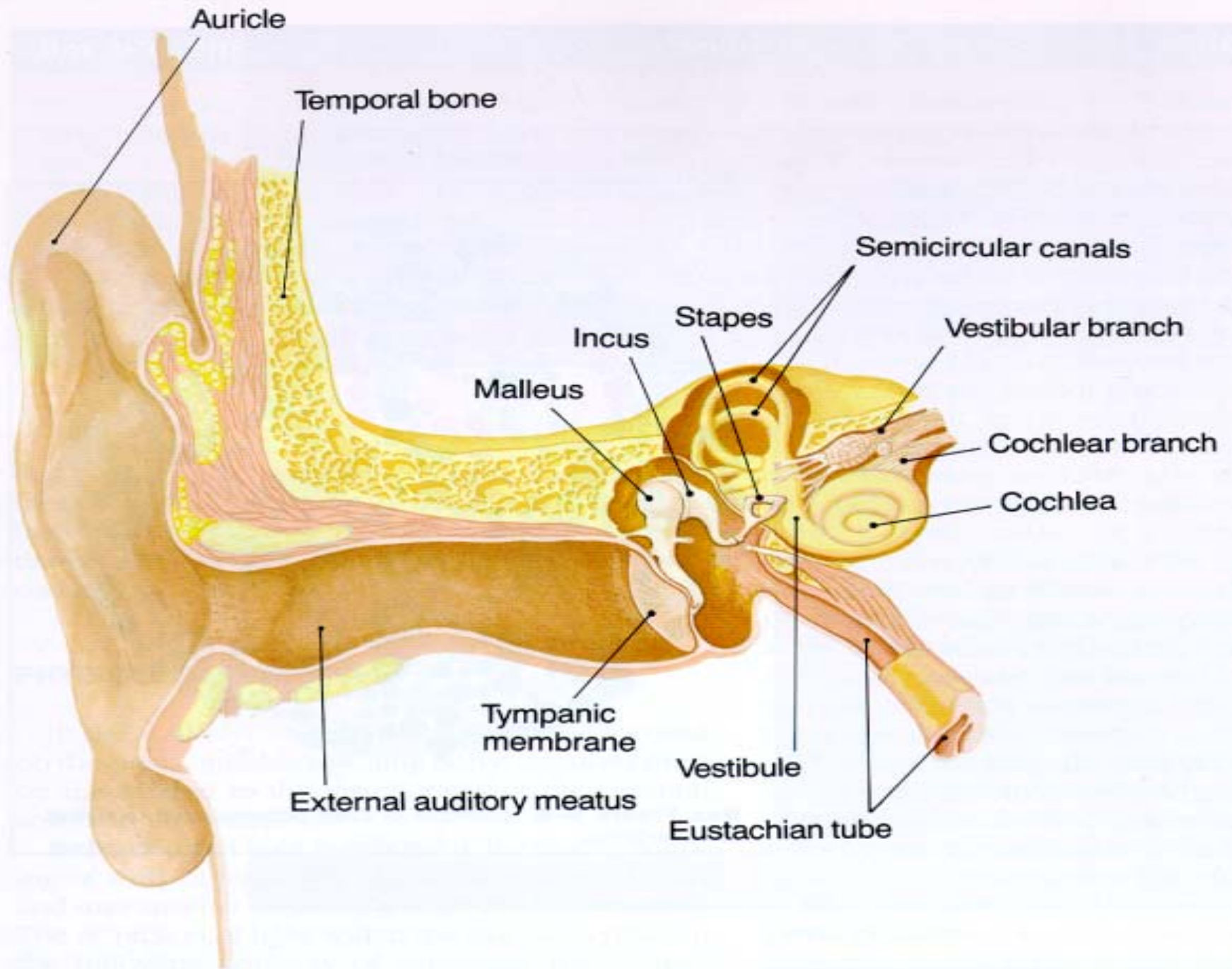


- Can be labeled with student's name
- Teachers can see if they are wearing
- Hang around neck when not needed and put on quickly

# Muffs



**Why do people say they do not wear hearing protection?**



# Comfort

## NO EXCUSE

- Over 300 types available
- Different sizes available for different size ears
- Can be custom fit

# Cost

## NO EXCUSE

- Disposable plugs available for \$0.18
- Custom plugs can cost hundreds of dollars but last for years and are tailored to different exposures

# Convenience

## NO EXCUSE

- Easily removed and hung around the neck until needed
- Kept on belt or hard hat
- Left in the workers' toolbox
- Available at each machine that is excessively noisy

# Communication

## NO EXCUSE

- Electronic devices can make communication easier
- Temporary threshold shifts impair hearing more than hearing protection devices might

# Culture – Peer Pressure

## NO EXCUSE

- As teachers **you can eliminate** this aspect by **requiring** hearing protection use in your classes and **modeling** the appropriate use of hearing protection yourself.

# Other Sources Of Hearing Damage

- Pesticides
- Organic solvents
- Carbon Monoxide
- Medications
- Smoking
- Leisure activities

# How loud are you listening? Nick tells you

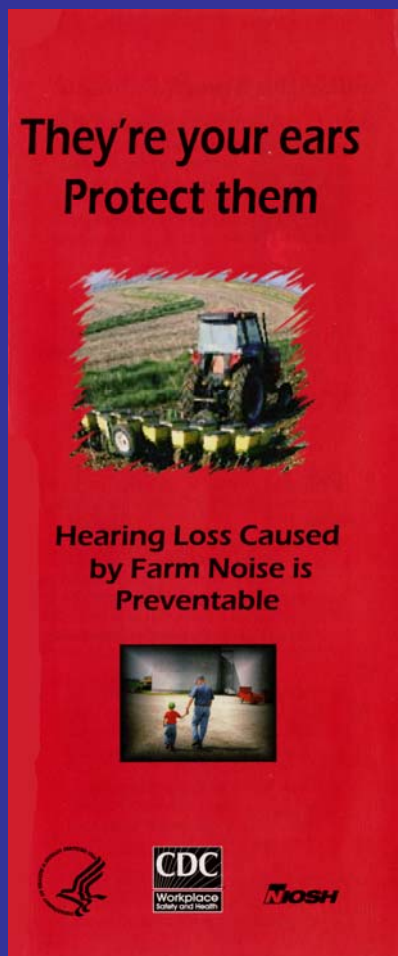


Instructions available at  
[dangerousdecibels.org](http://dangerousdecibels.org)

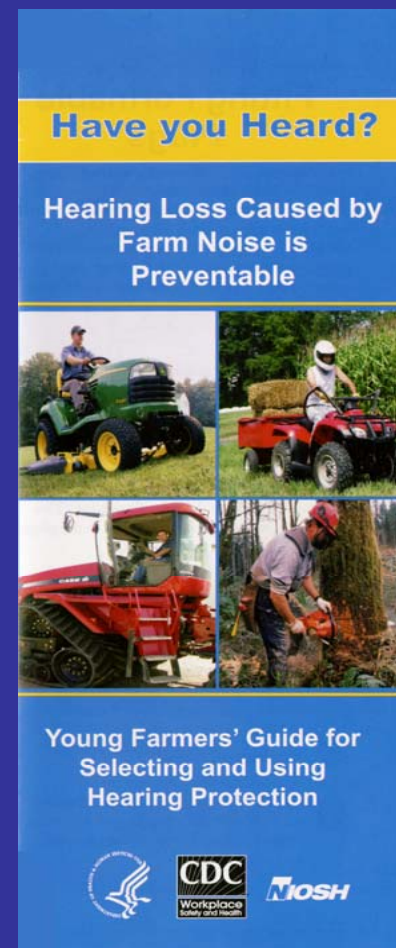
# Personal Music Players



# Free Brochures



**NIOSH Publication  
No. 2007-175**



**NIOSH Publication  
No. 2007-176**

# Free NIOSH Companion Brochures

- ***They're Your Ears – Protect Them***

(Pub. #2007-175; red)

- ***Have You Heard?***

(Pub. #2007-176; blue)

- **Access online at:**

[www.cdc.gov/niosh/topics/noise/pubs/no\\_pubs.html](http://www.cdc.gov/niosh/topics/noise/pubs/no_pubs.html)

- **Order in bulk via [farm.noise@cdc.gov](mailto:farm.noise@cdc.gov)**

Provide complete mailing address and phone number

# Teacher Hints and Resources

Handout of our slides

Brochures (Hard copy or electronically)

Posters

List of Websites

Dangerous Decibels Teacher Kit

Your Local Community

## WHAT WE TALKED ABOUT!

Hearing Loss and Tinnitus

Noise

Hearing Protection

Teacher Hints and Resources.



# It's Really Pretty Simple. . .

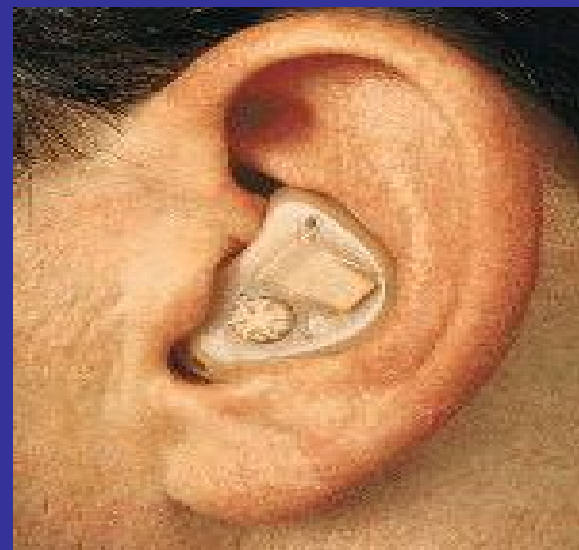
Wear This Now. . . Or Wear This Later!



Per Pair

Standard issue \$0.18-\$7

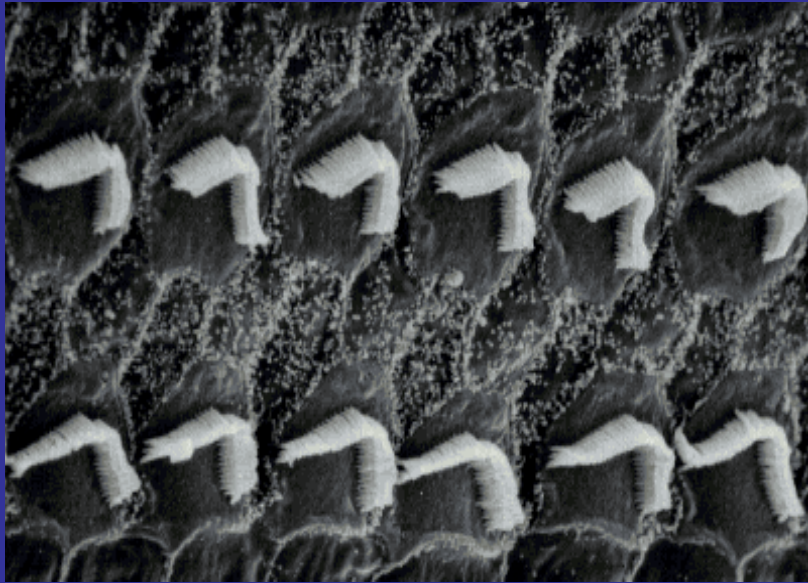
Newest Technology ~\$250



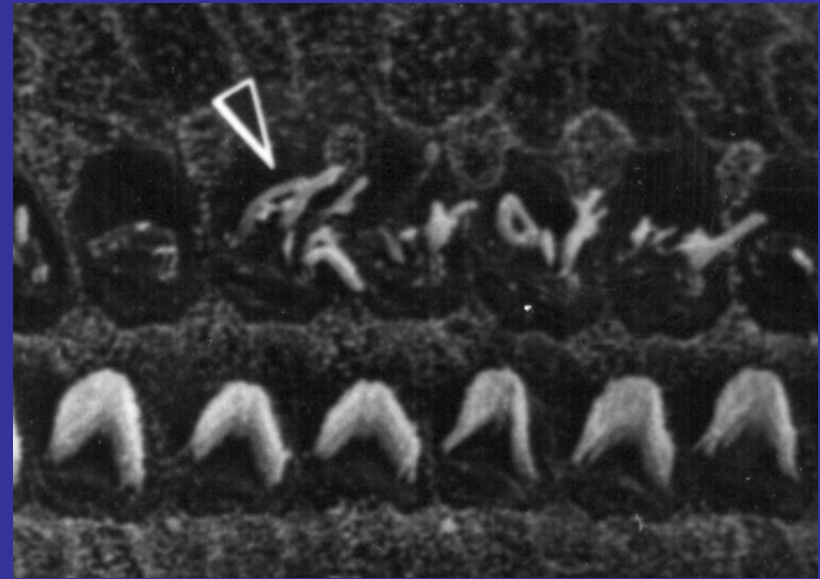
Each Ear

Standard issue ~\$300-\$600

Newest Technology ~\$3500-\$5000



**This is your ear.**



**This is your ear on noise.**

**Any questions?**

[www.cdc.gov/niosh](http://www.cdc.gov/niosh)

[www.cdc.gov/niosh/topics/noise](http://www.cdc.gov/niosh/topics/noise)

[www.cdc.gov/niosh/topics/youth](http://www.cdc.gov/niosh/topics/youth)

[www.cdc.gov/nasd](http://www.cdc.gov/nasd)

**Janet Ehlers, RN, MSN:  
jehlers@cdc.gov**

# Thank You

