DOCUMENT RESUME

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ABSTRACT

This in-service training package is designed to assist disability services staff, faculty, and staff members of postsecondary institutions in serving students with hearing impairments. It explains hearing loss and its effects on a student's education, demonstrates assistive technologies, and offers communication strategies. The package includes: (1) presenter's notes, which contain in the text representations of an accompanying packet of overhead transparencies; (2) a Microsoft PowerPoint program for use on a personal computer; (3) an audiocassette, "Sound Hearing or...Hearing What You Miss," which is accompanied by an annotated guide; (4) questions for a student panel; (5) a list of centers that loan assistive listening devices for demonstrations; and (5) a list of Self Help for Hard of Hearing People, Inc. (SHHH) chapters. Materials are also provided for participants, including participants' handouts with spaces for an individual's personal notes as each slide is presented, a copy of an answer sheet to be used with spelling test sensitivity training, a brochure about cochlear implants, and teacher tip sheets. The following articles written by SHHH are included: "The Hearing Aid Myth," "Unreasonable...But Not Unusual," "Meeting the Needs of Hard-of-Hearing Students," "Responsive Teachers Make a Difference!," "Communication Access in the Classroom," and "Communication Access on Campus for Students Who Are Hard of Hearing." (CR)

ACCESS:

How Best to *Serve Postsecondary Students*

Who Are *Hard of Hearing*

PRESENTER'S NOTES

SHHH Self Help for Hard of Hearing People, Inc.
NETAC Northeast Technical Assistance Center

TRAINING OBJECTIVES

- Hearing loss and education
- ADA requirements
- Accommodations information
- Assistive technology accommodations
- Communication strategies

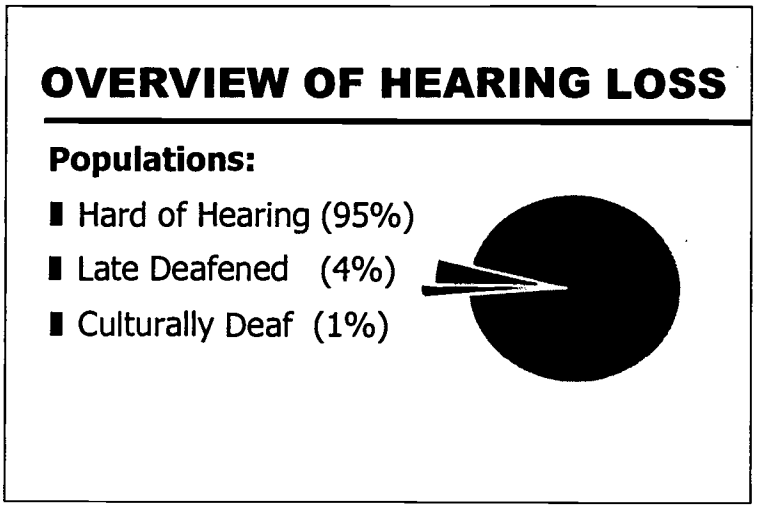
☐**Increase understanding about hearing loss and its effects on a student's education**

☐**Review Americans with Disabilities Act (ADA) requirements for postsecondary settings**

☐**Provide information about accommodations that are available to increase communication access in postsecondary settings**

☐**Demonstrate different assistive technology accommodations and provide participants with hands-on training**

☐**Share communication strategies that can be used to increase the effectiveness of assistive technology and other accommodations**



Populations of people with hearing loss explained – Deaf/Hard of Hearing/Late Deafened:

Hard of Hearing 94.8% Prelingually/Culturally Deaf 1.4% Late Deafened 3.8%

Demographics of hard of hearing people

Hearing loss is the largest disability and growing – 28 million nationally

4% between ages 18 and 25 have some level of hearing loss

79% start to lose hearing at 19 years or older

6 million use hearing aids

Population with Hearing Loss

Statistics compiled by the Rehabilitation Research and Training Center for Persons who are Hard of Hearing and Late Deafened, the California School of Professional Psychology, San Diego, 1993.

Numbers and proportions of persons are approximate based on several nationally conducted demographic surveys, including the National Center for Health Statistics (NCHS), Data from the National Health Survey, Series 10, No. 188, 1994; and Schein, J.D. & Delk, M.T. (1974). The Deaf Population of the United States, Silver Spring, MD; National Association of the Deaf.

Ranges for the different groups vary according to the type of study conducted and the sample surveyed. Based on several studies, the number of people who are hard of hearing ranges from 20 million – 28 million; the number of people who are late deafened ranges from 800 thousand – 1 million, 500 thousand; and the number of people who are culturally deaf ranges from 300,000-500,000.

Demographics Data from:

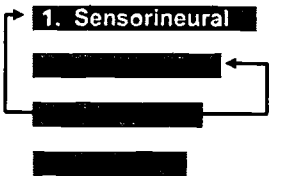
National Institute on Deafness and Other Communication Disorders, 1992

National Center for Health Statistics, National Health Survey, 1990

Hearing Industries Association, 1996

Handout: NIDCD Fact Sheet

TYPES OF HEARING LOSS



Sensorineural Hearing Loss

- Most common type of hearing loss
- Damage to the sensory cells and/or nerve fibers of the inner ear
- Often called nerve loss though hair cells are damaged not the nerve
- Difficulty differentiating sounds
- Hard to hear speech in background noise
- Increasing the volume does not clarify the speech sounds

Common Causes of Sensorineural Hearing Loss

Genetic defect | Noise exposure | Virus or fever from other diseases | Otoxic drugs | Presbycusis
Metabolic Diseases (Diabetes, Elevated Cholesterol, Nicotine/Caffeine Effect) | Unknown causes

Noise and presbycusis (hearing loss in aging) account for most hearing loss. Incidence of hearing loss goes up with age. One in three people over the age of 65 and one in two over the age of 80 have some degree of hearing loss versus one in nine of the general population.

Sensorineural hearing loss is the type of hearing loss that is not amenable to surgical or medical treatment. It is the kind most doctors tell their patients that they just "have to live with" and that nothing can be done. This is inaccurate as much can be done to "manage" sensorineural hearing loss through hearing aids/cochlear implants/technology and rehabilitation.

Many people with sensorineural hearing loss lose hearing in the upper ranges first, therefore they have more difficulty with the higher voices of women and children than men. They will have difficulty differentiating sounds such as "f"and "s" and cannot understand anyone in a noisy environment.

Conductive Hearing Loss

Problem in the outer or middle ear

Sound is not effectively conducted to the inner ear

Individuals with conductive loss may feel as if they are wearing ear muffs

Increasing the volume of sound usually improves the clarity of hearing

Common Causes of Conductive Hearing Loss

Wax in the ear canal

Punctured eardrum

Otitis media – middle ear infection. Common in children

Otosclerosis – growth of tissue that hampers movement of the middle ear bones

Common Causes of Conductive Hearing Loss

- Otitis media (or middle ear infection) is very common in children and can have a negative impact on their performance in class.
- Both otosclerosis and perforated eardrum can be treated surgically with good results.

Mixed Hearing Loss

Has components of both sensorineural and conductive

Conductive component may be treatable medically surgically

Tinnitus

Internal ringing or buzzing sound in the ears or head

Affects 35 million Americans

May be a minor annoyance or overwhelming problem

Common Causes of Tinnitus

Often accompanies hearing loss

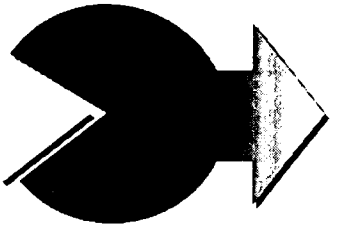
Loud noise

Other possible causes allergy medications stress too much alcohol or caffeine inadequate circulation

If no medical cause is found then a program of management can bring successful relief with use of hearing aids, tinnitus maskers, cutting down on caffeine, and making lifestyle changes. The impact of tinnitus is often underestimated.

NUMBER OF HARD OF HEARING PEOPLE

HEARING LOSS OF HARD OF HEARING PERSONS



1. Involves both ears
2. Is permanent
3. Allows benefit from hearing aids

CHARACTERISTICS OF HARD OF HEARING PEOPLE

- No separate culture
- Want to use residual hearing
- Hearing loss: mild to profound
- English is first language
- Fewer than 5% use sign language
- Six million use hearing aids
- Use technology

No Separate Culture

-- From all walks of life
-- May not know anyone else with hearing loss
-- Dispersed among general population
-- Friends and family are most likely hearing

Want To Use Residual Hearing

-- Most have grown up hearing
-- Grieve the loss of their hearing
-- Want to maximize use of residual hearing

English is First Language

-- Able to speak and want to use speech
-- Grew up using the voice phone network
-- Because Hard of Hearing individuals speak well, many people assume the individual doesn't need help communicating

Less Than 5% Use Sign Language

-- May learn some sign language as another skill
-- Do not consider it a primary means to communicate
-- Social contacts and family probably do not use sign language

Use Technology With or Without Hearing Aid

-- Personal listening devices for one-on-one and small groups
-- Devices for TV and telephone
-- Portable/installed devices in public places such as churches, theaters
-- TTYs
-- Alerting devices for safety (fire alarm, door knock, phone ring, baby cry)

Characteristics of Hard of Hearing People – No Separate Culture

Though the numbers of culturally deaf people are relatively small, they are a very visible group that garners media attention because of their language and cultural identity. The larger group of hard of hearing people, on the other hand, have no separate culture, are harder to identify, and perhaps are less interesting to the media. As a result, people are often surprised how big a group they are. Students can be "invisible" in their classes and socially while in college, and may never get the accommodations they need because they are reluctant to disclose that they have a hearing loss and may not even wear a hearing aid.

POSTSECONDARY STUDENTS WHO ARE HARD OF HEARING

- Probably come from mainstream setting
- View hearing loss as stigma
- May hide hearing loss
- Appear to be doing "just fine"
- May not know about VR resources

Educational Experience

- May have been the only hard of hearing child in class or even the entire school
- May have had audiological and other support services
- Probably was not provided the appropriate accommodations in classroom
- Probably missed a lot educationally and socially
- May not have received VR services in school
- May be unaware of financial help available for technology, including hearing aids

Societal Experience

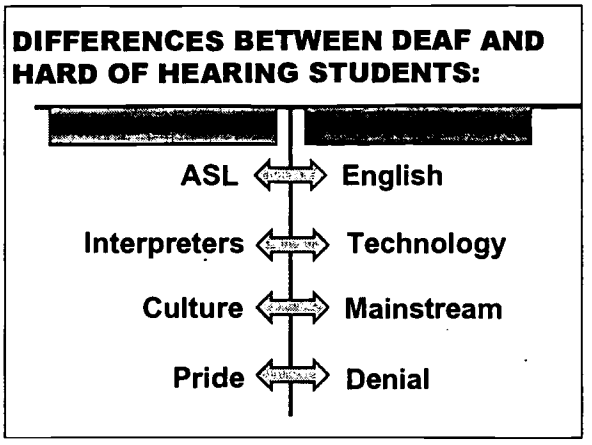
- Still a stigma in society about hearing loss
- Associated with aging and reduced mental functioning
- Teachers' and parents' expectations may have been low
- Student's expectations for self may also have been and still be low
- Embarrassment causes student to deny hearing loss
- May use bluffing
- May not wear hearing aids nor use Assistive Listening Devices (ALDs)
- May be conflicted about disclosing hearing loss

Tips to Educators

- Giving inappropriate responses
- Speaking in an unusually loud/soft voice
- Not hearing when someone speaks from behind
- Appearing to pay attention but not actively participating in class discussions
- Asking for repeats often
- Responding with smiles and nods but no further comments

Characteristics of Students Who Are Hard of Hearing

Because hard of hearing students often have good speech, and like to use their own voices, they are seen as being able to hear. There is a lot of misunderstanding about the impact of being hard of hearing. Personnel do not understand what accommodations hard of hearing students need in the classroom and the appropriate technology is often not available. It is common to assume that both hard of hearing and deaf students need sign language interpreters as an accommodation of choice.



DIFFERENCE BETWEEN DEAF and HARD OF HEARING STUDENTS AND THEIR DIFFERING NEEDS

Language	**(ASL/English)**
Accommodations	**(Interpreters/Technology)**
Support	**(Culture/Mainstream)**
Identity	**(Pride/Denial)**

MYTHS ABOUT HEARING LOSS

- ✗ Everyone can speechread
- ✗ Hearing aids are the solution
- ✗ Speechreading gives 100% understanding
- ✗ Everyone knows sign language
- ✗ "You can hear when you want to"

Hearing Aids Are the Solution

- ❑Do not *correct* hearing to normal
- ❑Perform well one-on-one in quiet
- ❑Perform less well at a distance from the speaker, in noise, or in poor acoustic environment
- ❑Need to be "stretched" with other technology and strategies
- ❑Cost is not covered by most medical insurances
- ❑Need aural rehabilitation for maximum benefit

Speechreading Gives 100% Understanding

- ❑Only 30% of the English language visible on the lips
- ❑Speechreading alone is very tiring and ineffective
- ❑Is effective when used in combination with other strategies and technology

Everyone With Hearing Loss Uses Sign Language

- ❑Fewer than 2 million people use sign language as their primary mode of communication
- ❑Fewer than 5% of the 26 million Hard of Hearing people use sign language
- ❑Most Hard of Hearing people in the U.S. grow up using English as their primary language

"You Can Hear When You Want To"

- ❑Can hear in some situations (quiet) and not in others (noise)
- ❑Can hear some voices (men's) and not others (women's)
- ❑Can hear face-to-face but not from behind
- ❑Can speechread clean-shaven speaker but not someone with beard

SENSITIVITY TRAINING ACTIVITY

SHOW:

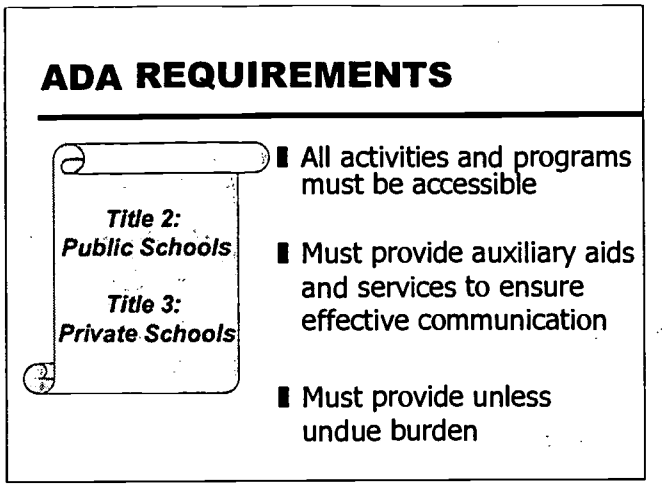
- What it is like to hear partially
- Different degrees of hearing
- Hearing but not understanding
- Hearing loss and intelligibility
- Effect of poor acoustics

The purpose of the Sensitivity Training is for workshop participants to:

- ❑Experience what it is like to hear partially
- ❑Understand there are many different degrees of hearing from not hearing at all to hearing a bit to hearing almost everything
- ❑Realize it is possible to hear but not understand
- ❑Learn how intelligibility is affected by hearing loss
- ❑Show the effects of poor acoustics on being able to hear

Exercise:

- ❑Participants will be given ear plugs to wear to simulate a mild hearing loss
- ❑Background noise will be introduced
- ❑Participants will take a spelling test



- Public schools are covered by Title 2, private schools by Title 3 of the ADA
- All activities and programs must be accessible to students with hearing loss
- Must provide auxiliary aids and services to ensure effective communication

  -Examples: CART, telephone amplifiers, assistive listening systems, captioned videos, qualified interpreters, notetakers, TTYs
- Must provide unless an undue burden or a fundamental alteration in the nature of the services
- Assistive listening devices and other auxiliary aids must be provided free of charge

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Americans with Disabilities Act Requirements

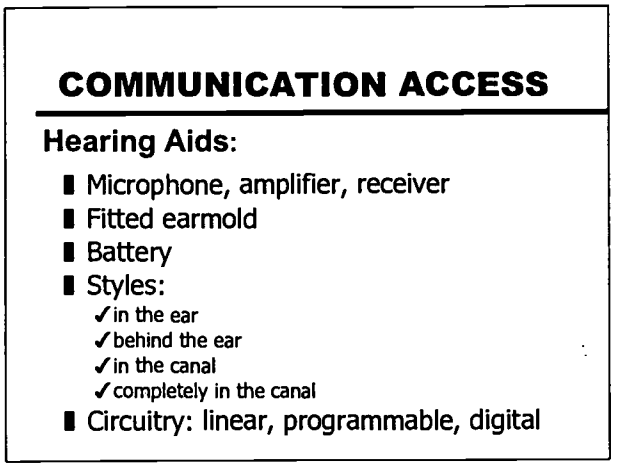
Public schools are covered by Title 2 of the ADA that covers state and local governments. Private schools are covered by Title 3, public accommodations.

Auxiliary aids and services have to be provided unless it would result in an undue burden or fundamental alteration of the goods or services provided by the school. However, the school is not relieved from the duty to furnish an alternative auxiliary aid, if available, that would not result in a fundamental alteration or undue burden.

Undue burden means significant difficulty or expense. Fundamental alteration means, for example, that it would not be discriminatory for a physician specialist who treats only burn patients to refer a deaf individual to another physician for treatment of a broken limb or respiratory ailment. To require a physician to accept patients outside of his or her specialty would fundamentally alter the nature of the medical practice. Both the undue burden and fundamental alteration standards are evaluated on a case-by-case basis.

The types of auxiliary aids and services in a postsecondary setting might include assistive listening devices in classrooms and auditoriums; notetaking; CART; oral interpreters; volume control telephones; TTYs; and alerting devices in dorms for fire alarms.

COMMUNICATION ACCESS



Hearing Aids

Each individual needs to get a thorough hearing evaluation by a qualified professional to determine the most appropriate hearing aid to match the particular hearing loss configuration.

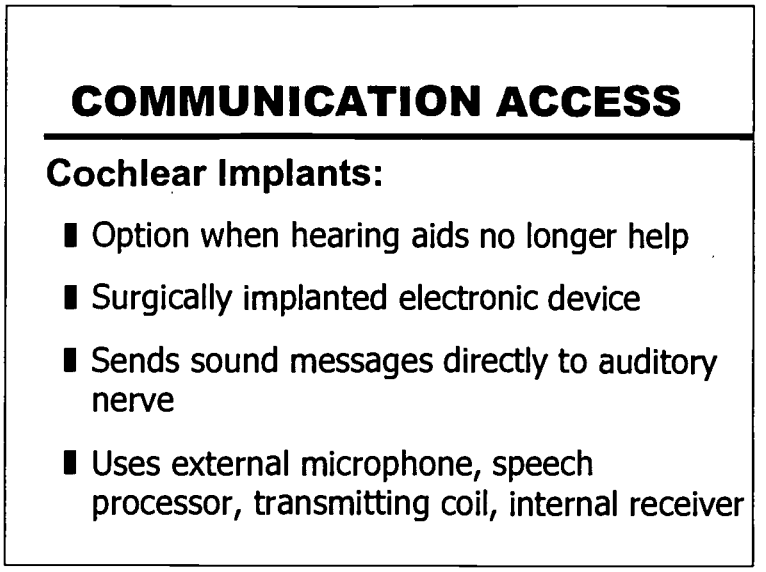
Hearing aids today still have the same basic elements but are becoming increasingly sophisticated. With the increasing use of directional microphones, the problem of hearing in noisy situations is being eased.

Linear - Conventional hearing aids use "linear" sound processing. This technology amplifies soft and loud sounds to the same degree and clips the sound waves that are too loud. The user can control the volume.

Compression – More aids are using compression circuitry. These aids automatically adjust the volume to accommodate loud and soft sounds.

Programmable – These aids are more expensive but have features that can be beneficial for people with difficult patterns of hearing loss. They can be fine-tuned by computer in a dispenser's office and this can result in more comfortable sound and better discrimination than conventional models. Several programmable aids have multiple memories offering various settings. For example, one for conversation in a quiet place, another for use in noisy places such as restaurants. Adjustments may be made directly on the aid or via remote control.

Digital – Digital aids are the newest and most expensive of all aids. These two factors tend to make people believe they are going to provide more benefit than linear or programmable aids. If considering a digital aid, an individual should use the trial period to see if the digital aid does perform better and is worth the extra cost.



Cochlear Implants

- ❑An option when hearing aids no longer help
- ❑Surgically implanted electronic device
- ❑Sends sound messages directly to the auditory nerve
- ❑External microphone, speech processor, transmitting coil, internal receiver

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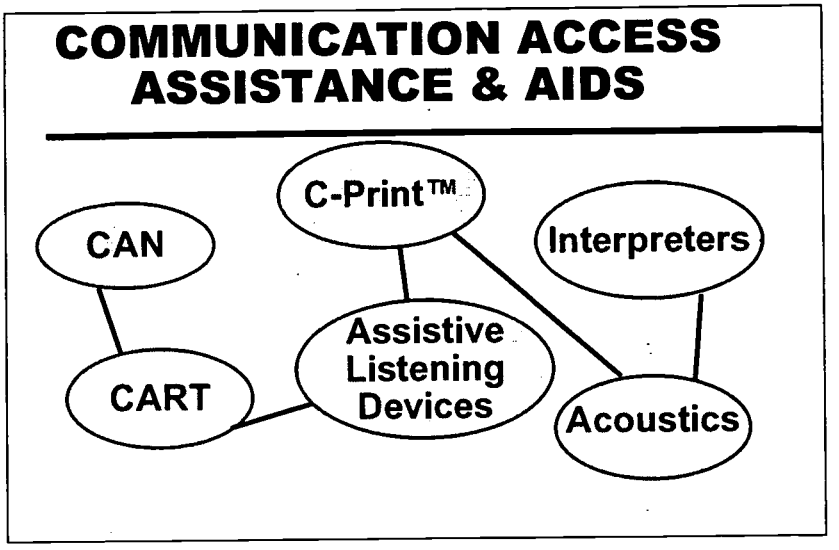
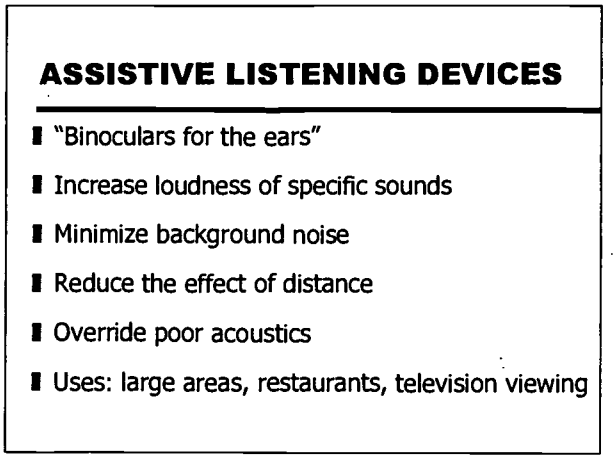
Cochlear Implants

Cochlear implants are controversial among deaf people, especially for use in children. SHHH believes individuals have the right to make decisions for themselves and for their children about their hearing care. Cochlear implant technology is improving all the time. Cochlear implants have been shown to help both adults and children with appropriate rehabilitation. Some people have dramatic results – they can even use the telephone.


COMMUNICATION ACCESS ASSISTANCE & AIDS
C-Print™
CAN
Interpreters
Assistive Listening Devices
CART
Acoustics



- "Binoculars for the ears"
- Increase the loudness of only specific sounds
- Minimize background noise
- Reduce the effect of distance between hard of hearing person and sound source
- Override poor acoustics
- Used in large areas, one-to-one, restaurants, for television viewing

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Assistive Listening Devices - What Are They?

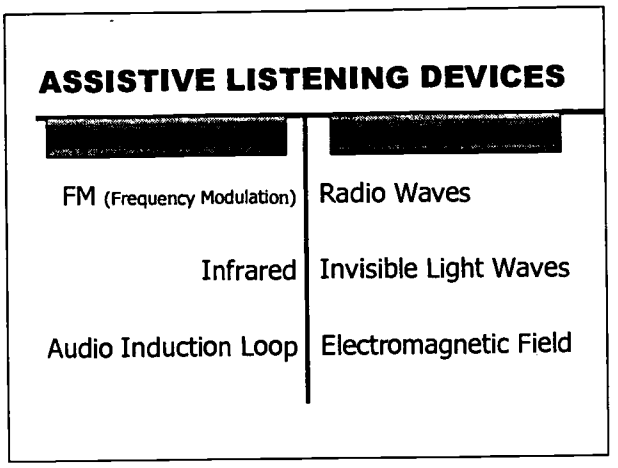
They are not public address systems with the sound turned up. They increase the signal-to-noise ratio (SNR). This is important as SNR has to be higher for people with hearing loss than people with normal hearing in order for them to be able to hear speech over background noise.

There are three types of ALDs (audioloop, FM and Infrared) and if they are working properly and well maintained they all provide excellent access. As a result of the ADA many large public performance spaces are now equipped with one of these systems and must provide supporting equipment for consumers who want to use them, with or without a hearing aid.

Systems in college auditoriums and lecture halls not only provide access for students, but also for the public when the school has public functions and for parents, grandparents, friends, and alumni at graduation ceremonies and other special events.

Handouts: *"Why Use Assistive Listening Devices?" Cynthia Compton. Hearing Loss: the Journal of Self Help for Hard of Hearing People, Inc. Jan/Feb 1993.*

NETAC "Teacher Tipsheet" on Assistive Listening Devices



- Audio Induction Loop transmits electromagnetic field
- Infrared broadcasts signal by invisible light waves
- FM (Frequency Modulation) broadcasts signal by radio waves

General Comments About All Systems

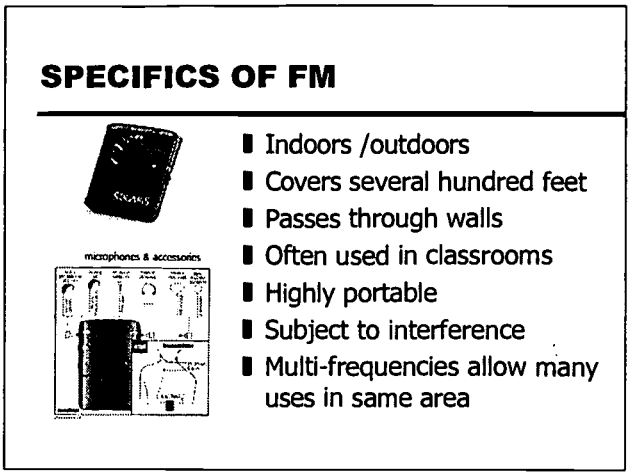
- All three work well
- All three are wireless
- Each can be used with or without hearing aids
- Each can be used with an array of receiver attachments for consumers with varying needs and preferences: neckloops, silhouette inductors, headphones, and other linkages.

Microphones

- Effective placement
- Sufficient quantity
- Use properly for maximum benefit of ALDs

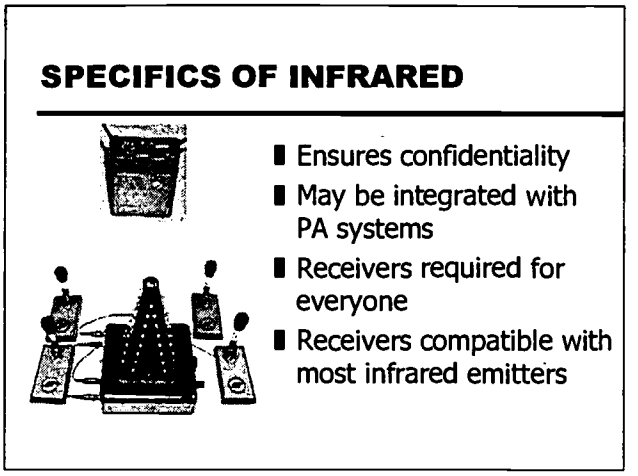
Microphones The type of microphone and how it is used makes a big difference in how well an ALD works. School personnel have to be trained to hold the "mike" still and talk right into it without covering their mouth, which prevents speechreading. Lapel mikes should be clipped close enough to the speaker's mouth for a strong signal pick up. The teacher needs a microphone and there also need to be microphones for use by other students in the class so that the individual with hearing loss can hear questions and comments from the class. For meetings around a table there should be one microphone for every two people. Directional microphones are preferred over omnidirectional as they cut down on the amount of background noise that is picked up and that can interfere with hearing the speaker.

Handout: "Why Use Assistive Listening Devices?"Cynthia Compton.
Hearing Loss: the Journal of Self Help for Hard of Hearing People, Inc. Jan/Feb.



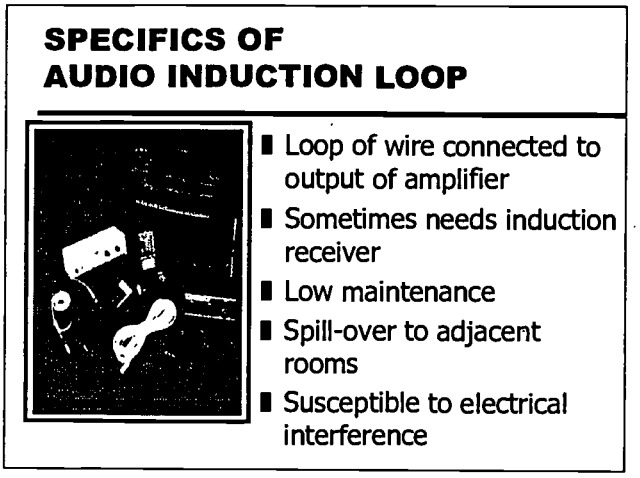
Specifics of FM

- ❑Can be used indoors and outdoors
- ❑Covers several hundred feet
- ❑Passes through physical obstructions such as walls
- ❑Often used in classrooms
- ❑Highly portable when used with belt-clip style transmitter
- ❑May be subjected to outside interference
- ❑Multi-frequencies allow for use by different groups within same area



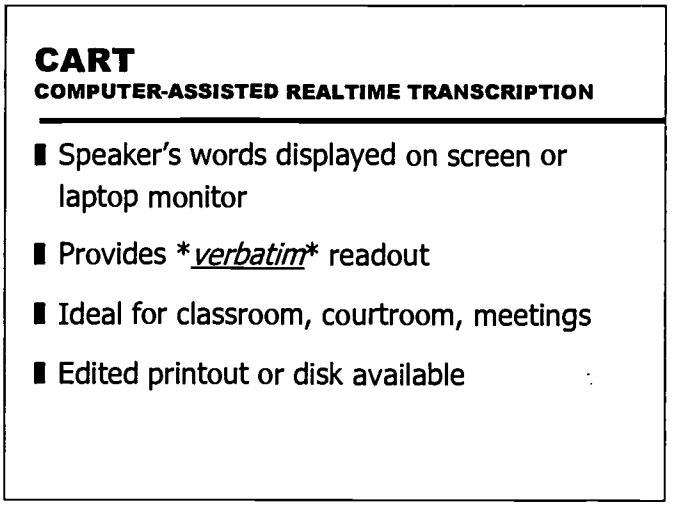
Specifics of Infrared

- ❑ Ensures confidentiality as does not travel through solid surfaces
- ❑ May be integrated with existing PA systems
- ❑ Receivers required for everyone
- ❑ Receivers compatible with most infrared emitters



Specifics of Audio Loop

- ❑ Loop of wire encircling an area connected to the output of an audio power amplifier
- ❑ Induction receiver needed if no hearing aid or telecoil
- ❑ No receiver needed with telecoil equipped hearing aids
- ❑ Low maintenance
- ❑ Induction receivers compatible with all loop systems
- ❑ Spill-over to adjacent rooms
- ❑ Susceptible to electrical interference



Computer-Assisted Realtime Transcription (CART)

- ❑ Visual display of the speaker's words
- ❑ A trained court reporter types on a stenographic keyboard
- ❑ Gives **verbatim** readout as stenographic typist can keep up with pace of speech
- ❑ Words are displayed on a monitor or projection screen
- ❑ Suitable for individual or group
- ❑ Ideal for classroom, courtroom, business and union meeting
- ❑ Edited printout or disk of proceedings can be made available
- ❑ Several software packages available to maximize readability

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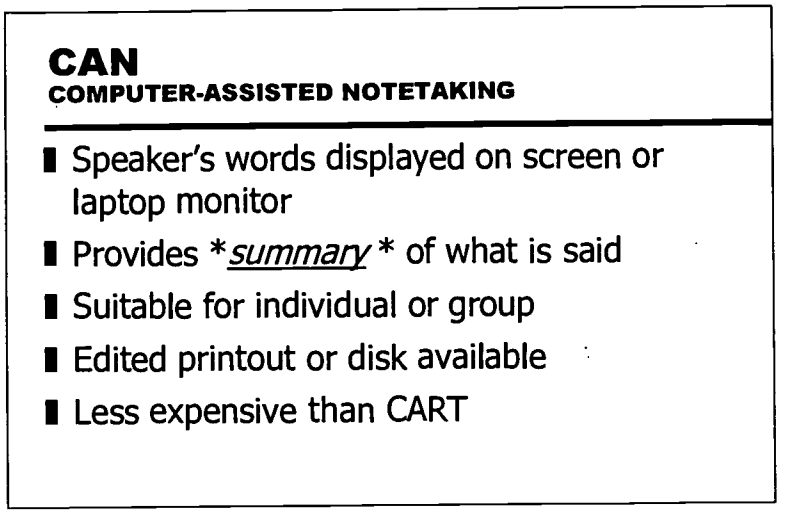
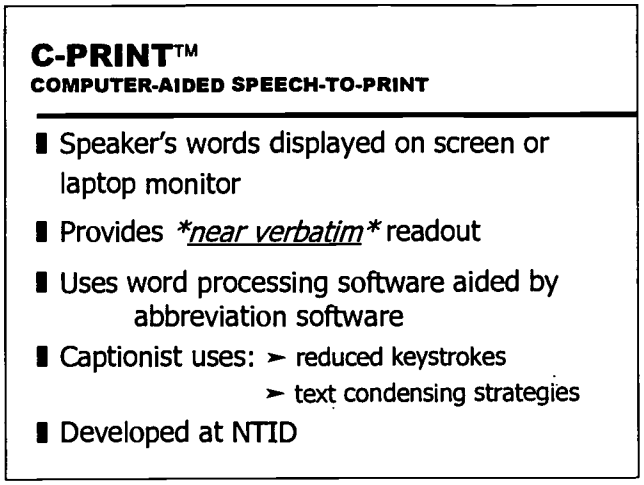
Computer-Assisted Realtime Transcription

CART is probably the preferred method of access for hard of hearing students in postsecondary settings. It is done by skilled stenographers. There is a need to find creative ways of financing this type of accommodation that is becoming increasingly popular and in demand as more and more hard of hearing students enroll in mainstream colleges. CART has the advantage of a disk or printout being available, but some schools will not allow dissemination of the transcript due to publishing concerns of faculty. Arrangements may be made to provide the student with a printout after signing a release form.



Computer-Assisted Notetaking (CAN)

- ❑ Visual display of the speaker's words
- ❑ Notetaker types on a standard computer keyboard
- ❑ Provides a **summary** of what is being said
- ❑ Best done by a fast, accurate typist who can also summarize material well
- ❑ Notes are displayed on a projection screen or laptop computer monitor
- ❑ Suitable for individual or group
- ❑ May not be satisfactory in all situations, because only a summary
- ❑ Edited printout or disk of proceedings can be made available
- ❑ Less expensive than CART



C-Print™

- ❑ Computer-aided speech-to-print transcription system
- ❑ Developed at the National Technical Institute for the Deaf (NTID)
- ❑ Uses word processing software aided by abbreviation software
- ❑ Captionist uses reduced key strokes and text condensing strategies
- ❑ More complete than summary notes
- ❑ Captionist salaries range between professional notetaker and interpreter

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C-Print ™

C-Print™ is a new alternative to CART and CAN. It is a summary of what is being said in class and therefore more appropriate for liberal arts subjects than math and science. Few people in the U.S. are trained to do C-Print™ yet. NTID can arrange for training of personnel. Initial training takes one week. Proficiency increases over a period of one year.

Handout: NETAC "Teacher Tipsheet" on C-Print™: A Notetaking System.

INTERPRETERS

Oral

American Sign Language

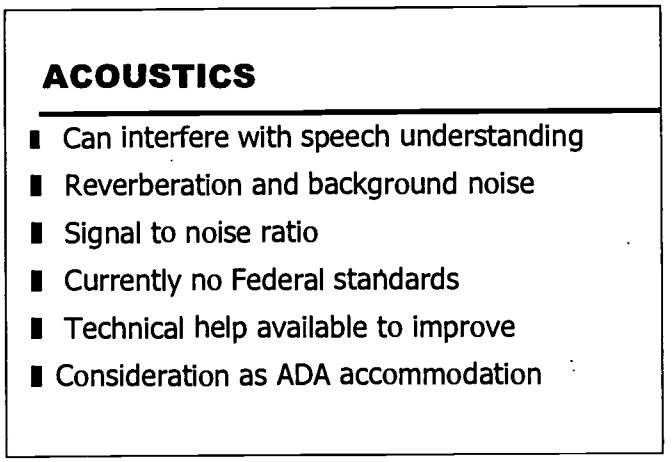
Sign Language Transliteration

Cued Speech

- **Oral**:
  - -Interpreter silently mouths the words of the speaker so they are visible on the lips
  - -Facilitates speechreading to understand what is being said
- **American Sign Language**
  - -A visual-gestural language with its own linguistic features
- **Sign Language Transliteration**
  - -Sign language and mouth movements using elements of ASL and English
- **Cued Speech:**
  - -A sound-based visual communication system
  - -Uses eight handshapes in four different locations ("cues")
  - -Combines with natural mouth movements of speech
  - -Makes all the sounds of spoken language look different
  - -Facilitates speechreading

Interpreters

Most hard of hearing students do not use interpreters but prefer ALDs to allow them to use their residual hearing or CART services. Very few hard of hearing people would choose oral interpreting as a method of choice in a classroom setting as it does not provide enough accurate information.



Acoustics

- ❑ Poor acoustics interfere with speech understanding for people with hearing loss
- ❑ Reverberation and background noise greatly affect acoustics
- ❑ Reverberation is the persistence of reflected sound energy or the echo effect
- ❑ Background noise blocks the speech signal
- ❑ Signal-to-noise ratio is the comparison of speech signal to noise.
- ❑ Currently no Federal standards for good acoustics in buildings
- ❑ Technical information on how to achieve good acoustics is known and available
- ❑ Under consideration now as an ADA-required accommodation

Acoustics

The impact of poor acoustics on hearing has been documented for a long time. Only recently has the U.S. Architectural and Transportation Barriers Compliance Board agreed to consider developing guidelines for acoustics as a required accommodation under the ADA.

STRATEGIES TO ENHANCE CLASSROOM ACCOMMODATION

- Teaching styles
- Speaking characteristics
- Reducing/eliminating background noise
- Seating and lighting
- Cooperation of faculty/other students
- Importance of visual information
- Using microphones effectively

❑ **Teaching styles**

-- Teaching style affects a student's ability to hear even though using technology

-- Good communication techniques are essential

-- Classroom services reinforce textually/visually what is being said

(written announcements, captioned videos, written instead of oral test)

-- Awareness of what to do and willingness to help student participate fully

-- Communicating with student outside of class using TTY/relay

❑ **Speaking characteristics**

-- Strategies can enhance ability to speechread

-- Speak naturally at a moderate pace

-- Speak facing class - not looking down at notes or while writing on blackboard

-- Do not cover mouth with hands, or cups, and do not chew gum

❑ **Reducing/eliminating background noise**

❑ **Seating and lighting**

❑ **Cooperation of faculty and other students**

❑ **Importance of visual information – outlines, text of lectures**

❑ **Using microphones effectively – single and multiple**

Teaching Styles:

It is vital that staff and faculty members understand the differing needs of students with disabilities. Their level of awareness and receptiveness to a particular student's needs will have a major impact on that student's ability to succeed.

Handouts: *NETAC "Teacher Tipsheet" on Teaching Students Who Are Hard of Hearing*

"College-Bound Students". SHHH Publication.

"NETAC Networks" (various articles)

RESOURCES

Northeast Technical Assistance Center Rochester, NY	716-475-6433 (V/TTY)
Self Help for Hard of Hearing People, Inc. Bethesda, MD	301-657-2248 (V) 301-657-2249 (TTY)
RESNA Technical Assistance Project Arlington, VA	703-524-6686 (V) 703-524-6639 (TTY)
HEATH Resource Center Washington, DC	202-939-9320 (V/TTY)
Rehabilitation Research and Training for Persons Who are Hard of Hearing or Late Deafened San Diego, CA	619-554-1540 (V/TTY) 800-432-7619

Northeast Technical Assistance Center (NETAC) Rochester, New York
716-475-6433 (V/TTY)

The Northeast Technical Assistance Center, located at Rochester Institute of Technology, is one of four centers making up the Postsecondary Education Programs Network (PEPNet). PEPNet, through its four centers, creates effective and efficient technical assistance to postsecondary educational institutions, thereby providing access and accommodations to individuals who are deaf and hard of hearing.

Self Help for Hard of Hearing People, Inc. (SHHH) Bethesda, MD
301-657-2248 (V) 301-657-2249 (TTY)

SHHH promotes awareness and provides information about hearing loss, communication skills, assistive technology, and hearing aids through publications, exhibits, and training. SHHH works on a national level to affect public policy and legislation, and has local chapters nationwide.

RESNA Technical Assistance Project Arlington, VA
Rehabilitation Engineering and Assistive Technology Society of North America 703-524-6686 (V) 703-524-6639 (TTY)

A federally funded endeavor that provides information and technical assistance on technology, related services, and devices for individuals with disabilities.

HEATH Resource Center Washington, D.C
National Clearinghouse on Postsecondary Education for Individuals with Disabilities 202-939-9320 (V,TTY)
American Council on Education (ACE)

HEATH disseminates information nationally about disability issues in postsecondary education.

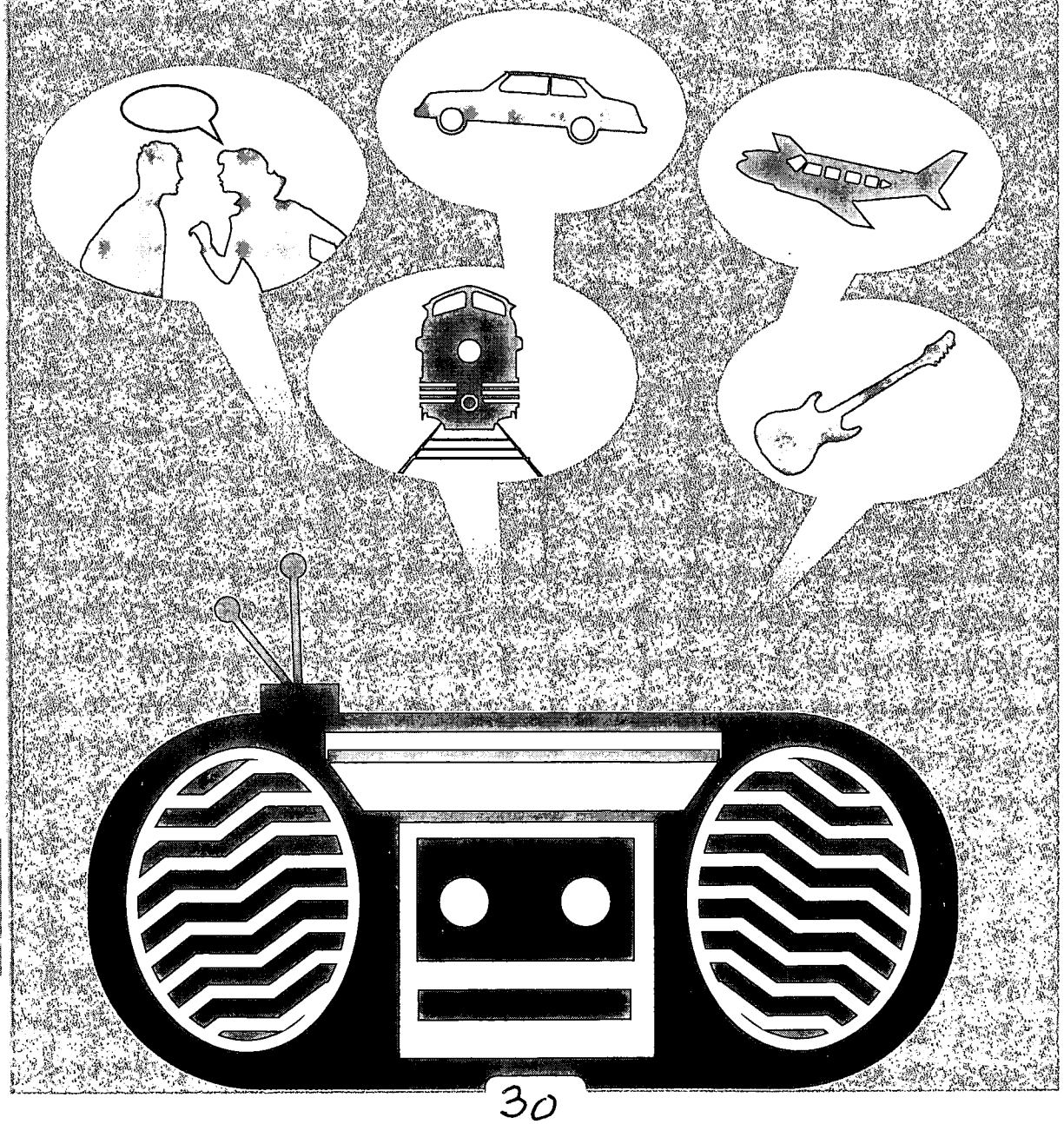
Rehabilitation Research and Training for Persons Who are Hard of Hearing or Late Deafened San Diego, CA
619-554-1540 (V,TTY)
800-432-7619

This organization conducts research and develops training programs related to employment and personal adjustment of individuals who are hard of hearing or late deafened.

SHHH Self Help for Hard of Hearing People, Inc.
NETAC Northeast Technical Assistance Center

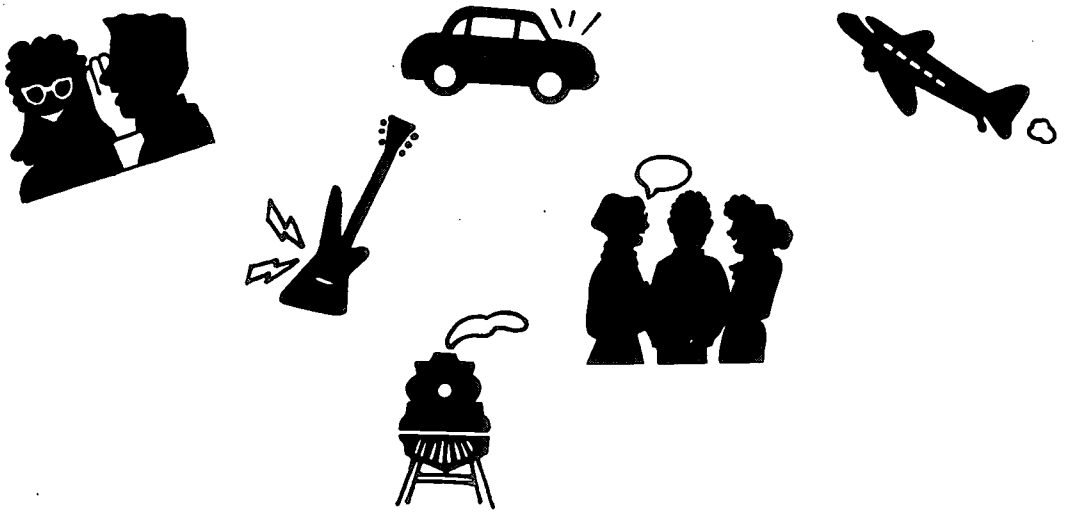
SOUND HEARING

Or . . . Hearing What You Miss



SOUND HEARING

Or... Hearing What You Miss



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TAPE CONTENTS

SIDE ONE

SIDE TWO

PREFACE TO TAPE AND GUIDE

Sound Hearing was prepared to provide you with an understanding, through audible examples, of sound and hearing loss. This booklet is your guide to the accompanying tape. It provides the exact dialogue, as well as annotations of importance.

The examples used in the tape have some limitations. The dynamic range of cassette tapes is not equal to the dynamic range of the human ear. Cassette tapes cannot reproduce exactly what the ear is capable of discerning.

To compensate for the limitations of tapes, we have had to approximate certain sound levels. The greatest difference between tape capabilities and actual audible sound occurs when we simulate hearing loss. Tapes cannot reproduce certain sound range reductions with total accuracy. We have adjusted to provide a consistent representation for sound reductions in the examples used.

In the instances of mild, moderate, severe, and profound hearing loss simulations, the actual loss is greater than the capabilities of tapes to reproduce. In other words, the actual loss is more severe than our representations.

The tape can be stopped at any point for discussion. And it may be appropriately stopped to prepare for the next band or to provide further response time -as for the participation exercises on Side 2.

Side One
8:01

Band 1- Introduction

0:31

Hello, and welcome to *SOUND HEARING.* This tape has been prepared to give you an understanding about sound, hearing, and hearing loss.

Part 1 of our presentation will acquaint you with sound and how we understand its frequencies and loudness.

Part 2 will help you to understand what a hearing loss is like.

By the end of this tape, we hope you will better understand how we hear and what influences our hearing. We also hope you will have a good understanding of what a hearing loss is like.

We want you to be a part of this tape. So you will not only need to be a good listener, but a good participant.

Now, let's begin Part 1.

Side One

1:48 **Band 2- Puretones**

Puretone
Sound at a precise frequency

In order for us to hear, there must be sound. Sound is made when something vibrates. That vibration could be from our vocal cords as speech, from a stringed instrument like a guitar as music, or from the striking of a drum.

When sound is made, vibrations are created. These vibrations travel in waves. Some sound waves are short and some are long. It all depends on the type of sound made. Let's listen to some puretone sounds. Each will be a single, clear puretone.

250 Hz. First, Let's hear a puretone sound that has a long wave length.

1000 Hz. You can tell that sound from any other sound because the wave vibrations are different from, for example, this sound.

3000 Hz. Now, here's a third puretone sound. It has a shorter wave length than the other two puretones.

Have you realized that as wave lengths get shorter, we hear a higher pitched sound?

6000 Hz. Here is a fourth sound with the shortest wave length yet.

Let's listen to all four puretone sounds in order from longest wave length vibration, which gives us the lowest puretone sound, to the shortest wave length vibration, which gives us the highest puretone sound.

Side One

Band 3- Common Sounds: Identifying Frequencies

1:36

To talk about individual sounds, we can use the word *frequency*. Frequency is just an easy way to describe a sound wave's vibrations. Some frequencies are low sounding and some are high sounding. That is, some frequencies have long wave lengths as in the case of low frequency sounds; and some have short wave lengths as in the case of high frequency sounds.

Frequency
How fast or slow something vibrates

Let's listen to three common, everyday sounds that should be familar to you. Here they are:

frog, horn, telephone

You probably recognized them as a bullfrog, a car horn, and a telephone.

While these sounds mix several frequencies together, the overall sound will have a high frequency sound, a low frequency sound, or an in-between middle frequency sound.

Which was the lowest frequency sound? Right, the bullfrog.

Which was the highest frequency sound? Right, the telephone.

And which was in between? Uh huh, the car horn.

Here are three more common sounds. See if you can identify them and tell which is the highest frequency sound, which is the lowest frequency sound, and which would be in between.

whistle, motorcycle, dog bark

9.

Side One

1:17

Band 4- Human Hearing Range: Frequency

Hertz
Vibrations per second that a sound makes

Did you identify the high frequency sound as a whistle; the low frequency sound as a motorcycle; and, the in between sound as a dog bark?

We can measure sound frequencies with a unit called a *hertz*. The hertz measurement merely allows us to give a number to the vibrations per second that a sound wave makes.

All creatures have a hearing range. That is, they hear sounds only within certain frequency ranges. Humans have a hearing range of about 20 Hz, a very low sound, to 20,000 Hz, a very high sound.

Puretones
(approximately)
75 Hz.
165 Hz
360 Hz.
750 Hz.
1500 Hz.
3000 Hz.
6000 Hz.
12,000 Hz.

We want you to know what this sound range is like for humans. But we can only approximate the range as an example on this tape. Here is a spectrum of puretones which increases in frequency beginning at about 75 Hz and stopping at about 12,000 Hz.

Sounds above 12 or 13,000 Hz are very difficult to hear without a very quiet setting.

Band 5- Decibels

2:21

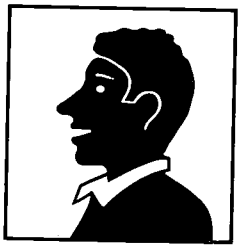
Familar sounds in our everyday world like traffic, music, or speech are a combination of frequencies. More than one frequency combines to give us a familar dog bark, a person talking, or an airplane taking off.

Decibels
A measurement of loudness.

Besides frequencies, we can also measure sound by its intensity. That is, how loud it is. Loudness measures how strong or weak a sound frequency is, and it's measured in *decibels*.

Most humans can hear sounds at about 0 decibels. When sound reaches about 140 decibels, sounds are painful to our ear.

Let's give you a quick idea of sounds and loudness in our everyday environment.



Step outside with me for a short walk.

It's a windy fall day. Let's move through the fallen leaves... can you hear them rustling? that's at about 20 decibels... and out to the street. I see a group of people down the block, standing and waiting for a bus.

Rustling Leaves
20 dB.

Whispering
30 dB.

At this distance, their talk sounds like whispering, at 30 decibels.

As we get closer, we can understand their conversation more clearly, because its loudness is about 60 decibels.

Conversation
60dB.

11.

Side One

Rock Music
110 dB.
Jet
125 dB.

Further down the block, you can hear a band practicing. Their music can reach 110 decibels.

And, can you hear me? Because, we are near the airport. A jet taking off can reach 125 decibels.

Woo, in just a short distance from our doorstep, we can hear a wide range of sounds. Some sounds are quiet, like the wind and leaves or like quiet conversation, and some noise is very loud like the music or the jet taking off.

0:28

Band 6- Summary: Side 1

At this point, you should be familar with sounds, the waves they produce, that we can measure sound frequencies in hertz, and that we can measure the loudness of sounds in decibels. Now that you know the basics of sound, you are prepared to move on and to find out what a hearing loss is like when sound frequency and sound loudness are changed.

Please turn the tape over and rewind it to the beginning to learn more about hearing loss.

Side Two
17:42

Band 7- Degrees of Hearing Loss

2:55

Welcome to Side 2..... So far you've learned the basics of hearing. Now you will discover what a hearing loss is like.

The simplest hearing loss is like turning down the volume of a radio, or the loudness of this tape. When we reduce the loudness in this way, all frequencies of sound are harder to hear.

There are four terms that are used to describe hearing losses. They are *mild, moderate, severe,* and *profound.*

Note: Consult the Preface about tape and sound reproduction.

Let's listen to a short musical piece to demonstrate these categories of reduced hearing.

First, we will hear music as a person with normal hearing would. When you hear this sound (example sound), the loudness will change to simulate a mild hearing loss.

Normal Hearing
Mild Hearing Loss

Ready, here we go... (music)

Did you hear the difference? That was how a person with a mild hearing loss in all frequencies might have heard this music.

Let's listen to the music again. It will begin normally, then a mild hearing loss will occur, and then a moderate hearing loss. Listen for the changes. (music)

Normal Hearing
Mild Hearing Loss
Moderate Hearing Loss

Could you distinguish the differences?

Normal Hearing
Mild Loss
Moderate Loss
Severe Loss
Profound Loss

One last time. This time we will go in four steps: we will begin with normal hearing, quickly move to a mild loss, then to a moderate loss, then to a severe loss, and finally to a profound loss. Remember, we are lowering loudness equally for all sound frequencies. (music)

Side Two

3:54

Band 8- Frequency Loss

We have learned that hearing losses can be described as mild, moderate, severe, or profound. We have also heard what those decibel losses are like. But, there is one further complication we need to talk about if we are to thoroughly understand hearing loss.

A hearing loss is often not as simple as lowering the volume like you would on a radio or as we did in our musical examples. A hearing loss often affects only certain types of sound: that is, only a certain frequency of sound.

You may want a piece of paper for this next part to write down some simple sentences which will help you better to understand frequency loss.

Do you have your paper?

40-60 dB. loss
2000 Hz. loss
(approximately)

Listen to these sentences. They have been mechanically filtered to approximate the hearing capability of a person with a moderate hearing loss in the high frequency ranges. You will notice that the sounds *ch*, *s*, *sh*, *f*, *th* characteristic of high frequency sounds are difficult to distinguish.

Sentences

14.

Sentence 1. It is tough to pass a calm pool on a hot day.

2. Please sell me a nice book with white pages.

Side Two

3. Walk back and knock on the ranch house door.

4. Your wife bought a fine chair after a long search.

Band 9- High Frequency Loss: Mild, Moderate, Severe, Profound

4:28

You know that a hearing loss can affect certain frequencies of sound and can affect loudness too. Let's illustrate decibel and frequency loss with a story.

I'm going to read a short story. At intervals you will hear this sound (sound). And each time the loudness of what you will hear will change.

I will begin reading so all can hear. The first loudness change will approximate what a person with a mild high frequency hearing loss might hear.

The second change will approximate a moderate high frequency loss.

The third change will approximate a severe high frequency hearing loss. The fourth change will approximate a profound high frequency hearing loss. And the fifth and final change will bring us back to a mild high frequency loss.

Your task is to listen closely and to understand as much of the story as possible. It will be difficult. Not only will the loudness change

each time, but certain sounds common to the high frequency range will be influenced each time.

Side Two

Here we go. Remember, we are trying to simulate a mild, a moderate, a severe, and a profound high frequency hearing loss.

Normal Hearing

During the early 1900's, the bustling city of Mobile, Alabama, was experiencing its first automobiles. Auto drivers were terrible. They demanded to drive as they pleased. Their only concern was for their destination and getting there as quickly and as precisely as possible.

It was not uncommon to see an auto drive through someone's backyard, or through a vacant lot just to get somewhere faster. Drivers commanded the roads as they pleased and at the speeds they pleased. Collisions were frequent and damage to property was tremendous.

Mild Hearing Loss

The City Fathers of Mobile became very concerned. They tried countless safety precautions, all without the slightest success.

If it hadn't been for Random Persons, a citizen of Mobile, the automobile problems would quite likely never have ended. And it all happened as the result of an unlikely string of events.

Random Persons was a salesman. He had spent a long, hot, and tiring day making sales calls far to the south. As he drove home, his mind constantly wandered from his driving. As he neared the edge of the city, he recalled later, he hit a series of bumps that startled him.

Moderate Hearing Loss

The next morning Random called the County Road Crew to report those road bumps of the night before. When the Road Crew arrived at the

section of road reported by Random, they beheld a curious sight and smell. There in the exact center of the road and exactly five feet apart were a dozen white stripes.

Side Two

It didn't take the Crew Boss long to see that the stripes were skunks which had been flattened and merged into the freshly oiled road.

Severe Hearing Loss

It looked as though a family of skunks had been partaking in a familar game of Follow-the-Leader, strolling down the highway only to be flattened into the road surface by Random's inattentive driving.

Profound Hearing Loss

The scent from the flattened skunks easily persuaded the Road Crew to leave them be. As a consequence, motorists driving that stretch of road were forced to stay to the extreme sides of the road to avoid the strong odor.

Mild Hearing Loss

The City Fathers were quick to see, and smell, the safety implications of the entire mishap. They were quick to observe that the white stripes divided the road and kept opposing traffic apart. The odor also kept everyone awake and moving along.

The City Fathers knew that they couldn't divide every road with skunks. Soon skunks would become extinct. So they simply painted white stripes in the middle of all Mobile roads. And it worked.

Soon an entire nation followed the Mobile example, dividing roads with painted white lines.

Side Two

6:02

Band 10- High Frequency Loss: Spelling Test

Let's complete your understanding of hearing loss by having you take a simple spelling test. It's so easy, you'll have three chances to spell each word.

Make three columns on a piece of paper. Number from 1 to 10. For each test, use a different column. You may want to stop the tape at this point and begin it again when you're ready.

The first time through we will mechanically simulate a severe high frequency hearing loss; the second time through a moderate high frequency loss; and, the third time through a mild high frequency loss. Each time through, the words should become clearer.

Spelling Words

Severe Hearing Loss

Word Number 1. bath 6. wheat

2. pearl 7. vine

3. sour 8. tape

4. mouse 9. hedge

5. learn 10. mood

How many of the ten words did you get?' Well, here's a second chance, this time we'll simulate a moderate high frequency hearing loss.

Word Number 1. bath 6. wheat

2. pearl 7. vine

3. sour 8. tape

4. mouse 9. hedge

5. learn 10. mood

Side Two
Moderate Hearing Loss

You should have gotten more words this time. You could probably hear and understand more.

Here's the last test, a simulation of a mild high frequency hearing loss.

Mild Hearing Loss

Word Number 1. bath 6. wheat

2. pearl 7. vine

3. sour 8. tape

4. mouse 9. hedge

5. learn 10. mood

0:23

Band 11- Tape Summary

This ends our tape. We hope you have a better understanding of sound, hearing, and hearing loss.

You have learned that hearing is influenced by sound frequency and by sound loudness. When either is changed, our ability to hear properly is also changed.

Thanks for being such a good listener.

19.

A Breath of Fresh Air

GarlicPress

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What is hearing loss like? Find out!

- Distinguish levels of sound
- Distinguish degrees of hearing loss
- Take an impaired spelling test
- Listen to a story that simulates hearing loss
- and more...

Tape and annotated guide:

Side 1:

- Understanding sound
- Pure tones
- Identifying frequencies
- Human hearing range
- Decibels

Side 2:

- Degrees of hearing loss
- Frequency loss
- High frequency loss
- Hearing spelling test

A Breath of Fresh Air

Garlic Press

ISBN 0-931993-26-1
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Questions for the student panel

- Tell us about your experiences, being a student who is hard of hearing in a mainstream postsecondary institution.

- What equipment and services did you use for communication access in the classroom and on the campus?

- Who provided it?

- Did you know before you were admitted what was available to you as a hard of hearing student?

- Were faculty members generally supportive of your needs?

- What advice do you have for high school seniors who are hard of hearing applying to postsecondary institutions?

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Phone: (800) 479-8665 (In-State)

TDD: (404) 657-3085
FAX: (404) 657-3086
E-mail: joykniskern@mindspring.com
Homepage: http://www.gatfl.org

GUAM SYSTEM FOR ASSISTIVE TECHNOLOGY (GSAT) (1994)
University Affiliated Program-Developmental Disabilities
303 University Drive
University of Guam, UOG Station
Mangilao, Guam 96923
Principal Investigator: Heidi E. Farra-San Nicolas, Ph.D.
Project Director: Ben Servino
Phone: (671) 735-2490-3
TDD: (671) 734-8378
FAX: (671) 734-5709
E-mail: gsat@ite.net
Homepage: http://uog2.uog.edu/uap/gsat.html

HAWAII ASSISTIVE TECHNOLOGY TRAINING AND SERVICES (HATTS) (1991)
414 Kuwili Street, Suite 104
Honolulu, HI 96817
Information and Resource: Judith Clark
Project Director: Barbara Fischlowitz-Leong
Phone: (808) 532-7110 (V/TDD)
Phone: (800) 645-3007 (V/TDD, In-State)
FAX: (808) 532-7120
E-mail: hats@hats.org
Homepage: http://www.hatts.org

IDAHO ASSISTIVE TECHNOLOGY PROJECT (1992)
129 W. Third Street
Moscow, ID 83844-4401
Information and Referral: Michelle Doty, (208) 885-3630
Project Director: Ron Seiler
Phone: (208) 885-3559 (V/TDD)
FAX: (208) 885-3628
E-mail: seile861@uidaho.edu
Homepage:
http://www.ets.uidaho.edu/cdhd/idahoat

ILLINOIS ASSISTIVE TECHNOLOGY PROJECT (1989)
1 W. Old State Capitol Plaza
Suite 100
Springfield, IL 62701
Project Director: Wilhelmina Gunther
Phone: (217) 522-7985
TDD: (217) 522-9966
FAX: (217) 522-8067
E-mail: gunther @midwest.net
Homepage: http://www.iltech.org

INDIANA ATTAIN (ACCESSING TECHNOLOGY THROUGH AWARENESS IN INDIANA) PROJECT (1990)
1002 North First
Vincennes University,
Social Sciences Building, Room 312
Vincennes, IN 47591
Project Manager: Cris Fulford
Phone: (317) 921-8766
Phone: (800) 528-8246 (In-State)
TDD: (800) 743-3333 (National)
FAX: (317) 921-8774
E-mail: cfulford@indian.vinu.edu

IOWA PROGRAM FOR ASSISTIVE TECHNOLOGY (1990)
Iowa University Affiliated Program
University Hospital School
100 Hawkins Drive
Iowa City, IA 52242-1011
Information and Referral: Amy Hanna; (319) 356-1514
Co-Directors: Mary Quigley, (319) 356-4402
Jane Gay, (319) 356-4463
Phone: (800) 331-3027 (V/TDD; National)
FAX: (319) 356-8284
E-mail: mary-quigley@uiowa.edu
jane-gay@uiowa.edu
Homepage: http://www.uiowa.edu/infotech

ASSISTIVE TECHNOLOGY FOR KANSANS PROJECT (1993)
2601 Gabriel
P.O. Box 738
Parsons, KS 67357
Project Director: Charles R. Spellman
Phone: (316) 421-6550 ext. 1890
E-mail: chuck@parsons.lsi.ukans.edu
Co-Director: Sara Sack
Project Coordinator: Sheila Simmons
Phone: (316) 421-8367
Phone: (800) KAN DO IT
FAX/TDD: (316) 421-0954
E-mail: ssack@parsons.lsi.ukans.edu
Homepage: http://www.atk.lsi.ukans.edu

KENTUCKY ASSISTIVE TECHNOLOGY SERVICES NETWORK (1989)
Charles McDowell Rehabilitation Center
8412 Westport Road
Louisville, KY 40242
Information and Referral: Jim Syme
Project Director: J. Chase Forrester
Phone: (502) 327-0022
Phone: (800) 327-5287 (V/TDD, In-State)
FAX: (502) 327-9974
TDD: (502) 327-9855
E-mail: katsnet@iglou.com
Homepage: http://www.katsnet.org

LOUISIANA ASSISTIVE TECHNOLOGY ACCESS NETWORK (1991)
P.O. Box 14115
Baton Rouge, LA 70898-4115
Executive Director: Julie Nesbit
Phone: (504) 925-9500 (V/TDD)
Phone: (800) 270-6185 (V/TDD)
FAX: (504) 925-9560
E-mail: latanstate@aol.com
Homepage: http://www.latan.org

MAINE CONSUMER INFORMATION AND TECHNOLOGY TRAINING EXCHANGE (MAINE CITE) (1989)
Maine CITE Coordinating Center
UMS Network for Ed. & Tech. Services
46 University Drive
Augusta, ME 04330
Project Director: Kathy Powers
Phone: (207) 621-3195 (V/TDD)
FAX: (207) 621-3193
E-mail: kpowers@maine.caps.maine.edu
Homepage:
http://www.mecite.doe.k12.me.us

MARYLAND TECHNOLOGY ASSISTANCE PROGRAM (1989)
Governor's Office for Individuals with Disabilities
2301 Argonne Drive
Baltimore, MD 21218
Information Specialist :Patrick McCurdy
Project Director: Paul Rasinski
Phone: (410) 333-4975 (V/TDD)
FAX: (410) 333-6674
E-mail: rasinski@clark.net
Homepage: http://www.mdtap.org

MASSACHUSETTS ASSISTIVE TECHNOLOGY PARTNERSHIP (1990)
MATP Center
Children's Hospital
1295 Boylston Street, Suite 310
Boston, MA 02115
Information and Referral: Patricia Hill
Project Director: Marylyn Howe;
(617) 355-7167 (TDD)
Phone: (800) 848-8867 (V/TDD, In-State)
Phone: (617) 355-7153
TDD: (617) 355-7301
FAX: (617) 355-6345
E-mail: howe_m@a1.tch.harvard.edu
Homepage: http://www.matp.org

MICHIGAN TECH 2000 (1992)
Michigan Assistive Technology Project
740 W. Lake Lansing Rd., Suite 400
East Lansing, MI 48823
Project Director: Sheryl Avery-Meints
Project Manager: Roanne Chaney
Phone: (517) 333-2477 (V/TDD)
Phone: (800) 760-4600 (In-State)
FAX: (517) 333-2677
E-mail: roanne@match.org
Homepage:
http://www.discoalition.org/tech2000home.htm

MINNESOTA STAR PROGRAM (1989)
300 Centennial Building
658 Cedar Street
St. Paul, MN 55155
Acting Director: Ronna Linroth
(800) 657-3862 (V) (In-State)
Phone: (800) 657-3895 (TDD) (In-State)
Phone: (651) 296-2771
TDD: (651) 296-9478
FAX: (651) 282-6671
E-mail: Ronna.Linroth@state.mn.us
Homepage:
http://www.state.mn.us/ebranch/admin/assistivetechnology/index.html

MISSISSIPPI PROJECT START (1990)
P.O. Box 1698
Jackson, MS 39215-1000
Information and Referral: Albert Newsome;
(601) 987-4872
Project Director: Stephen Power;
(601 987-4872
Phone: (800) 852-8328 (V/TDD; In-State)
FAX: (601) 364-2349
E-mail: spower@netdoor.com

MISSOURI ASSISTIVE TECHNOLOGY PROJECT (1991)
4731 South Cochise, Suite 114
Independence, MO 64055-6975
Project Director: Diane Golden, Ph.D.
Phone: (800) 647-8557 (In-State)
Phone: (816) 373-5193
TDD: (816) 373-9315
FAX: (816) 373-9314
E-mail: matpmo@qni.com
Homepage:
http://www.dolir.state.mo.us/matp/

MONTECH (1991)
Rural Institute on Disabilities
The University of Montana
634 Eddy Avenue
Missoula, MT 59812
Project Director: Gail McGregor
Phone: (406) 243-5676
TDD: (800) 732-0323 (National)
FAX: (406) 243-4730
E-mail: montech@selway.umt.edu
Homepage: http://ruralinstitute.umt.edu/

NEBRASKA ASSISTIVE TECHNOLOGY PARTNERSHIP (1989)
5143 South 48th Street
Suite C
Lincoln, NE 68516-2204
Information and Referral: Kathryn Kruse
Project Director: Mark Schultz;
(402) 471-0735 (V/TDD)
Phone: (402) 471-0734 (V/TDD)
Phone: (888) 806-6287 (In-State)
FAX: (402) 471-6052
E-mail: mschultz@nde4.nde.state.ne.us
Homepage: http://www.nde.state.ne.us/ATP/TECHome.html

NEVADA ASSISTIVE TECHNOLOGY COLLABORATIVE (1990)
Rehabilitation Division
Community Based Services
711 South Stewart Street
Carson City, NV 89710
Project Administrator: Donny Loux
Phone: (702) 687-4452
TDD: (702) 687-3388
FAX: (702) 687-3292
E-mail: pgowins@govmail.state.nv.us
Homepage: http://www.state.nv.us/detr/rehab/reh_bda.htm

NEW HAMPSHIRE TECHNOLOGY PARTNERSHIP PROJECT (1991)
Institute on Disability/UAP
#14 Ten Ferry Street
The Concord Center
Concord, NH 03301
Project Director: Jan Nisbet, (603) 862-4320
Co-Project Director: Therese Willkomm, (603) 528-3060
Project Coordinator: Marion Pawlek
Phone: (603) 224-0630 (V/TDD)
Phone: (800) 427-3338 (V/TDD) (In-State)
FAX: (603) 226-0389
E-mail: mjpawlek@christa.unh.edu
Homepage:
http://www.iod.unh.edu/projects/spd.htm

NEW JERSEY TECHNOLOGY ASSISTIVE RESOURCE PROGRAM (TARP) (1992)
New Jersey Protection and Advocacy, Inc.
210 South Broad Street, 3rd Floor
Trenton, NJ 08608
Project Director: Ellen Lence; (609) 777-0945
Program Manager: Tim Montagano; (609) 292-7498
Lav42prg@concentric.net
Phone: (800) 342-5832 (In-State)
TDD: (609) 633-7106
FAX: (609) 777-0187
E-mail: elence@njpanda.org
Homepage: http://www.njpanda.org

NEW MEXICO TECHNOLOGY ASSISTANCE PROGRAM (1990)
435 St. Michael's Drive, Building D
Santa Fe, NM 87505
Information and Referral: Carol Cadena
Project Director: Alan Klaus
Phone: (800) 866- 2253
Phone/TDD: (505) 954-8539
FAX: (505) 954-8562
E-mail: aklaus@state.nm.us
Homepage: http://www.nmtap.com

NEW YORK STATE TRAID PROJECT (1990)
Office of Advocate for Persons with Disabilities
One Empire State Plaza, Suite 1001
Albany, NY 12223-1150
Project Director: Deborah Buck; (518) 474-2825
Phone: (800) 522-4369 (V/TDD; In-State)
TDD: (518) 473-4231
FAX: (518) 473-6005
E-mail: leffingw@emi.com
Homepage:
http://www.state.ny.us/disabledAdvocate/technlog.htm

NORTH CAROLINA ASSISTIVE TECHNOLOGY PROJECT (1990)
Department of Health and Human Services
Division of Vocational Rehabilitation Services
1110 Navaho Drive, Suite 101
Raleigh, NC 27609-7322
Project Director: Ricki Cook
Phone: (919) 850-2787 (V/TDD)
FAX: (919) 850-2792
E-mail: rickic@mindspring.com
Homepage:
http://www.mindspring.com/~ncatp

NORTH DAKOTA INTERAGENCY PROGRAM FOR ASSISTIVE TECHNOLOGY (IPAT) (1993)
P.O. Box 743
Cavalier, ND 58220
Director: Judie Lee
Phone: (701) 265-4807 (V/TDD)
FAX: (701) 265-3150
E-mail: lee@pioneer.state.nd.us
Homepage: http://www.ndipat.org

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS ASSISTIVE TECHNOLOGY PROJECT (1994)
Governor's Developmental Disabilities Council, Systems of Technology-Related Assistance for Individuals with Disabilities
P.O. Box 2565 CK
Saipan, MP 96950
Project Director: Thomas J. Camacho
PHONE: (670) 322-3014(V/TDD)
FAX: (670) 322-4168
E-mail: gddc@cnmiddcouncil.org
Homepage: http://www.cnmiddcouncil.org/atstraid/atflash.htm

OHIO TRAIN (1992)
Ohio Super Computer Center
1224 Kinnear Road
Columbus, OH 43212
Executive Director: Douglas Huntt
Phone: (614) 292-2426 (V/TDD)
Phone (800) 784-3425 (V/TDD, In-State)
TDD: (614) 292-3162
FAX: (614) 292-5866
E-mail: huntt.1@osc.edu
Homepage: http://www.train.state.oh.us

OKLAHOMA ABLE TECH (1992)
Oklahoma State University Wellness Center
1514 W. Hall of Fame Road
Stillwater, OK 74078-2026
Project Manager: Linda Jaco; (405) 744-9864
Phone: (405) 744-9748
Phone: (800) 257-1705 (V/TDD)
FAX: (405) 744-2487
E-mail: mljwell@okway.ok.state.edu
Homepage:
http://www.okstate.edu/wellness/at-home.htm

OREGON TECHNOLOGY ACCESS FOR LIFE NEEDS PROJECT (TALN) (1990)
c/o Access Technologies Inc.
3070 Lancaster Drive NE
Salem, OR 97305-1396
Project Director: Byron McNaught
Phone: (503) 361-1201 (V/TDD)
Phone: (800) 677-7512 (In-State)
FAX: (503) 370-4530
E-mail: ati@orednet.org

PENNSYLVANIA'S INITIATIVE ON ASSISTIVE TECHNOLOGY (1992)
Institute on Disabilities/UAP
Ritter Annex 423
Philadelphia, PA 19122-6090
Project Director: Amy Goldman
Phone: (800) 204-PIAT (7428)
TDD: (800) 750-PIAT (TT)
FAX: (215) 204-9371
E-mail: piat@astro.ocis.temple.edu
Homepage:
http://www.temple.edu/inst_disabilities

PUERTO RICO ASSISTIVE TECHNOLOGY PROJECT (1993)
University of Puerto Rico
Medical Sciences Campus
College of Related Health Professions
Office of Project Investigation and Development, Box 365067
San Juan, PR 00936-5067
Project Director: Maria I. Miranda, B.A.
Phone: (800) 496-6035 (National)
Phone: (800) 981-6033 (In PR)
Phone: (787) 758-2525 x4413
TDD/FAX: (787) 754-8034
E-mail: pratp@coqui.net

RHODE ISLAND ASSISTIVE TECHNOLOGY ACCESS PARTNERSHIP (1993)
Office of Rehabilitation Services
40 Fountain Street
Providence, RI 02903
Project Director: Susan Olson
Phone: (401) 421-7005 x310
Phone: (800) 752-8088 x2608 (In-State)
TDD: (401) 421-7016; FAX: (401) 421-9259
E-mail: solson@atap.state.ri.us
Homepage: http://www.atap.state.ri.us/

SOUTH CAROLINA ASSISTIVE TECHNOLOGY PROGRAM (1991)
USC School of Medicine
Center for Developmental Disabilities
Columbia, SC 29208
Project Director: Evelyn Evans;
(803) 935-5263
Phone: (803) 935-5263 (V/TDD)
FAX: (803) 935-5342
E-mail: eveylne@cdd.sc.edu
Homepage: http://www.scsn.net/users/scatp

SOUTH DAKOTA ASSISTIVE TECHNOLOGY PROJECT (DAKOTALINK) (1992)
221 S. Central
Pierre, SD 57501
Project Director: Dave Vogel
Phone: (605) 224-5314
Phone: (800) 645-0673 (V/TDD, In-State)
FAX: (605) 224-8320
E-mail: dvogel@mail.tie.net
Homepage: http://www.tie.net/dakotalink

TENNESSEE TECHNOLOGY ACCESS PROJECT (TTAP) (1990)
Cordell Hull Building, 5th Floor
425 5th Avenue North
Nashville, TN 37247-4751
Project Director: Jacque Cundall
PHONE: (615) 741-0310
FAX: (615) 741-1063
EMAIL: jcundall@mail.state.tn.us
Homepage:
http://www.state.tn.us/mental/ttap.html

TEXAS ASSISTIVE TECHNOLOGY PARTNERSHIP (1992)
University of Texas at Austin
Texas Univ. Affiliated Program
SZB252-D5100
Austin, TX 78712-1290
Information and Referral: John Moore;
(800) 828-7839
Project Director: Susanne Elrod
(512) 471-7621
TDD: (512) 471-1844
FAX: (512) 471-7549
E-mail: s.elrod@mail.utexas.edu
Homepage:
http://tatp.edb.utexas.edu/tatp.html

U.S. VIRGIN ISLAND TECHNOLOGY-RELATED ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES (TRAID) (1995)
University of the Virgin Islands/UAP
#2 John Brewers Bay
St. Thomas, VI 00801-0990
Executive Director: Dr. Yegin Habtes
Phone: (340) 693-1323
FAX: (340) 693-1325
E-mail: yhabtey@ uvi.edu

UTAH ASSISTIVE TECHNOLOGY PROGRAM (1989)
Center for Persons with Disabilities
6588 Old Main Hill
Logan, UT 84322-6588
Project Director: Marvin Fifield, Ed.D.;
(435) 797-1982
Project Coordinator: Martin Blair,
(435) 797-3886
Phone: (435) 797-1981 (V/TDD)
FAX: (435) 797-2355
E-mail: marv@cpd2.usu.edu
Homepage: http://www.uatp.usu.edu

VERMONT ASSISTIVE TECHNOLOGY PROJECT (1990)
103 South Main Street
Weeks Building, First Floor
Waterbury, VT 05671-2305
Project Director: Lynne Cleveland
Phone: (802) 241-2620 (V/TDD)
FAX: (802) 241-2174
E-mail: lynnec@dad.state.vt.us
Homepage: http://www.dad.state.vt.us/atp

VIRGINIA ASSISTIVE TECHNOLOGY SYSTEM (1990)
8004 Franklin Farms Drive
Richmond, VA 23288-0300
Information and Referral: (800) 435-8490
Project Director: Kenneth Knorr
Phone: (804) 662-7000
Phone: (804) 662-9040 (V/TDD)
FAX: (804) 662-9532
E-mail: vatskhk@aol.com
Homepage: http://www.vats.org

WASHINGTON ASSISTIVE TECHNOLOGY ALLIANCE (1993)
DSHS/DVR
AT Resource Center
Univ. of Washington
Box 357920
Seattle, WA 98195-7920
Project Director: Debbie Cook
(206) 685-4181
Phone: (206) 685-4181
TDD: (206) 616-1396
FAX: (206) 543-4779
E-mail: uwat@u.washington.edu
Homepage: http://wata.org

WEST VIRGINIA ASSISTIVE TECHNOLOGY SYSTEM (1992)
University Affiliated Center for Developmental Disabilities
Airport Research and Office Park
955 Hartman Run Road
Morgantown, WV 26505
Project Manager: Jack Stewart
Phone: (304) 293-4692 (V/TDD)
Phone: (800) 841-8436 (In-State)
FAX: (304) 293-7294
E-mail: stewiat@wvnvm.wvnet.edu
Homepage: http://www.wvu.edu/~uacdd/wvats/wvat.htm

WISTECH (1990)
Wisconsin Assistive Technology Program
Division of Supportive Living
P.O. Box 7852
2917 International Lane, 3rd Floor
Madison, WI 53707
Project Director: Judi Trampf;
PHONE/TDD: (608) 243-5674
FAX: (608) 243-5681
E-mail: trampju@dwd.state.wi.us
Homepage: http://www.dhfs.state.wi.us/Aging/wistech/wistech.htm

WYOMING'S NEW OPTIONS IN TECHNOLOGY (WYNOT) (1993)
University of Wyoming
1465 North 4th Street, Suite 111
Laramie, WY 82072
Project Director: Rich Gannon
(307) 766-2095
Phone: (307) 766-2084 (V/TDD)
FAX: (307) 721-2084
E-mail: wynot.uw@uwyo.edu
Homepage: http:// wind.uwyo.edu/wynot/wynot.htm

The date in parentheses is the date in which the project was funded through a grant by the U.S. Department of Education, National Institute on Disability and Rehabilitation Research under the Technology-Related Assistance for Individuals with Disabilities Act of 1988, as Amended (P.L. 103-218).

SHHH NEW ENGLAND REGION: Contact the persons listed below for information about local meetings. If there are none in your area you are interested in starting one, write to SHHH for more information. A * indicates a primary orientation towards senior citizens. (Apr-1999)

....ABOUT SHHH AFFILIATES

There are 250 SHHH affiliates in 48 states across the United States. Many more are in the planning stages. Chapters and groups are organized by hard of hearing SHHH National members often with help from local members and the professional community. The National office provides guidance material. Monthly meetings are a combination of speakers and discussion. In a communicatively accessible setting, members of all ages and degrees of hearing loss, along with their families, learn about hearing loss and self help practices.

SHHH affiliates actively support the SHHH mission and are catalysts that make mainstream society more accessible to people who are hard of hearing through education, advocacy, and self help. If there is an SHHH affiliate in your area, they will welcome your membership. If you are interested in starting a group, contact the Chapter Development office of SHHH National at (301) 657-2248 V/TTY. PLEASE NOTE: Your membership in SHHH National does not include membership in a local group or chapter. Conversely, local membership does not include National membership.

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Western Massachusetts Group
Earline Midura
64 Grattan Street
Chicopee, MA 01020

Worcester Group
Curtis Dickinson
75 Townsend Street
1 Left
Worcester, MA 01609

North of Boston Group
Joe & Terri Scavo
8 Michigan Ave., Apt.# 2
Lynn, MA 01902

Greater Boston Chapter
Karen Rockow
15 Waverly Street
Apt. 160
Brighton, MA 02135

South Shore Group
Mallori George
33 Steton Street
Apt. #2
Whitman, MA 02382

Cape Cod Group
Lenore Hill
195 Falmouth Rd.
Mashpee, MA 02649

Attleboro Group
Diana Y. Berberian
139 Melody Drive
Attleboro, MA 02703

Hamilton House Chapter*
Beatrice Dulgarian
276 Angell Street
Providence, RI 02906

Sargent Chapter
Beth Wilson
54 Griffith Ave.
Riverside, RI 02915

SHHH-NH Group
Don Varley
P.O. Box 3040
Nashua, NH 03061

NH Lakes Region Group
Jennifer Cotton
80 Highland Street
Laconia, NH 03246

Burlington Group
Ann Owen
38 Cannon Point Rd
Charlotte, VT 05445

Rutland Group
Joyce Hawley
R.R.# 3, Box 4943
Post Road
Rutland, VT 05701-9249

Central Connecticut Chapter
Mary Anne Maffucci
163 Clearfield Road
Wethersfield, CT 06109

Quiet Corner Group
Harriet Johnson
P.O. Box 360
Putnam, CT 06260

CT Connect-SHHHion Group
Robert Carabetta
83 Barberry Lane
Meridan, CT 06451

Carol F. VanDerlip
CT State Coordinator
75 Highgate Road
Apt. A-5
Newington, CT 06111

HHH NORTH ATLANTIC REGION: Contact the persons listed below for information about local meetings. If there are none in your area ou are interested in starting one, write to SHHH for more information. A * indicates a primary orientation towards senior citizens. (Apr-1999)

....ABOUT SHHH AFFILIATES

There are 250 SHHH affiliates in 48 states across the United States. Many more are in the planning stages. Chapters and groups are organized by hard of hearing SHHH National members often with help from local members and the professional community. The National office provides guidance material. Monthly meetings are a combination of speakers and discussion. In a communicatively accessible setting, members of all ages and degrees of hearing loss, along with their families, learn about hearing loss and self help practices.

SHHH affiliates actively support the SHHH mission and are catalysts that make mainstream society more accessible to people who are hard of hearing through education, advocacy, and self help. If there is an SHHH affiliate in your area, they will welcome your membership. If you are interested in starting a group, contact the Chapter Development office of SHHH National at (301) 657-2248 V/TTY. PLEASE NOTE: Your membership in SHHH National does not include membership in a local group or chapter. Conversely, local membership does not include National membership.

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Bergen County Group
Jack Mulligan
539 Sagamore Avenue
Teaneck, NJ 07666

Northwest New Jersey Group
Paul Arabas
12 Douglas Drive
Long Valley, NJ 07853

Madison Group
John Pickin
1 Woodside Rd.
Madison, NJ 07940

South Jersey Chapter
Wayne Roorda
127 Franklin Dr.
Voorhees, NJ 08043-2117

Leisure Village East Group*
Dominick Bongiorno
1063-D Fife Court
Lakewood, NJ 08701

Central NJ Chapter
Russell Green
74 Jensen Street
East Brunswick, NJ 08816

Middlesex County Group
Marie Nordling
56 Orchard Street
South Amboy, NJ 08879

Westchester Chapter
Ronnie Armel
2321 Wickham Ave.
Bronx, NY 10469

North Shore Group
Sal Sturiale
80-38 212th Street
Queens Village, NY 11427

Brooklyn Chapter
Fred Camin
18 Leach Street
Lynbrook, NY 11563

South Nassau Chapter
Myra Sonnenfeld
P.O. Box 533
Oceanside, NY 11572

Manhattan Eye/Ear Chapter
Lois O'Neill
174 8th Avenue
Apt. 4A
Sea Cliff, NY 11579

Huntington Chapter
Vilma Brodsky
9 Suzane Lane
Bethpage, NY 11714

H.E.A.R./ Albany Chapter
Lisa Vincent
122 Maple Lane
Stillwater, NY 12170

Mid-Hudson Chapter
Linda Kennedy
18 Beatty Road
Wappingers Falls, NY 12590

Salt City Chapter
Stephen Hart
815 Woods Road
Syracuse, NY 13209

Utica Chapter
Roger MacCasland
19 Slusser Avenue
New Hartford, NY 13413

Western NY Chapter
Don Van Auken
442 Orchard Drive
Buffalo, NY 14223

Rochester Chapter
Mary Chizuk
41 Cecelia Terrace
Rochester, NY 14622

Rochester Day Group
Fred Altrieth
185 Valiant Drive
Rochester, NY 14623

tauqua Hear Group
o Miraglia
oward Ave., W.E.
Jamestown, NY 14701

Corning/Painted Post Chapter
Suzanne Aul Jeffrey
10887 West Caton Road
Corning, NY 14830

Pittsburgh Chapter #1
A. Wayne Benson
5800 Elgin Street
Pittsburgh, PA 15206

Squirrel Hill Group
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HHH MID ATLANTIC REGION: Contact the persons listed below for information about local meetings. If there are none in your area ou are interested in starting one, write to SHHH for more information. A * indicates a primary orientation towards senior citizens. (Apr-1999)

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HH PACIFIC SOUTH REGION: Contact the persons listed below for information about local meetings. If there are none in your area u are interested in starting one, write to SHHH for more information. A * indicates a primary orientation towards senior citizens. (Apr-1999)

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(* State Newsletter)

ACCESS:

How Best to *Serve Postsecondary Students*

Who Are *Hard of Hearing*

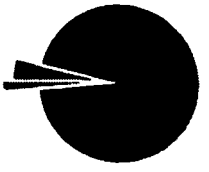
TRAINING OBJECTIVES

- Hearing loss and education
- ADA requirements
- Accommodations information
- Assistive technology accommodations
- Communication strategies

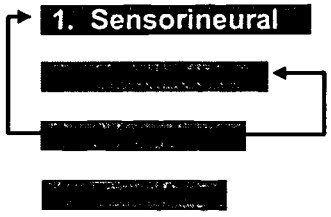
OVERVIEW OF HEARING LOSS

Populations:

- Hard of Hearing (95%)
- Late Deafened (4%)
- Culturally Deaf (1%)



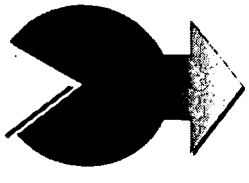
TYPES OF HEARING LOSS



NUMBER OF HARD OF HEARING PEOPLE

26 Million People are Hard of Hearing

HEARING LOSS OF HARD OF HEARING PERSONS



1. Involves both ears
2. Is permanent
3. Allows benefit from hearing aids

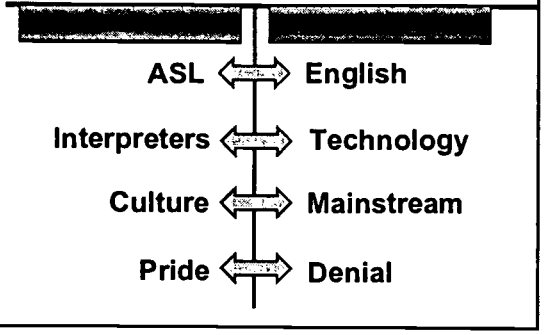
CHARACTERISTICS OF HARD OF HEARING PEOPLE

- No separate culture
- Want to use residual hearing
- Hearing loss: mild to profound
- English is first language
- Fewer than 5% use sign language
- Six million use hearing aids
- Use technology

POSTSECONDARY STUDENTS WHO ARE HARD OF HEARING

- Probably come from mainstream setting
- View hearing loss as stigma
- May hide hearing loss
- Appear to be doing "just fine"
- May not know about VR resources

DIFFERENCES BETWEEN DEAF AND HARD OF HEARING STUDENTS:



MYTHS ABOUT HEARING LOSS

- ✗ **Everyone can speechread**
- ✗ **Hearing aids are the solution**
- ✗ **Speechreading gives 100% understanding**
- ✗ **Everyone knows sign language**
- ✗ **"You can hear when you want to"**

SENSITIVITY TRAINING ACTIVITY

SHOW:

- What it is like to hear partially
- Different degrees of hearing
- Hearing but not understanding
- Hearing loss and intelligibility
- Effect of poor acoustics

ADA REQUIREMENTS

Title 2:
Public Schools

Title 3:
Private Schools

- All activities and programs must be accessible
- Must provide auxiliary aids and services to ensure effective communication
- Must provide unless undue burden

COMMUNICATION ACCESS

COMMUNICATION ACCESS

Hearing Aids:

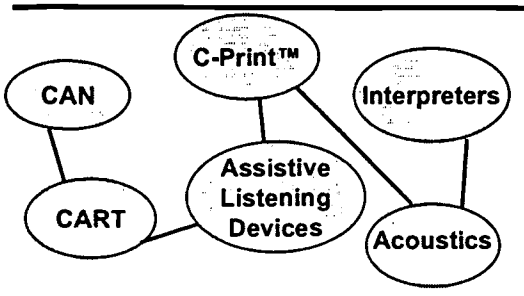
- Microphone, amplifier, receiver
- Fitted earmold
- Battery
- Styles:
  - ✓in the ear
  - ✓behind the ear
  - ✓in the canal
  - ✓completely in the canal
- Circuitry: linear, programmable, digital

COMMUNICATION ACCESS

Cochlear Implants:

- Option when hearing aids no longer help
- Surgically implanted electronic device
- Sends sound messages directly to auditory nerve
- Uses external microphone, speech processor, transmitting coil, internal receiver

COMMUNICATION ACCESS ASSISTANCE & AIDS



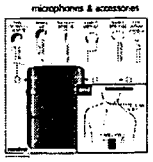
ASSISTIVE LISTENING DEVICES

- "Binoculars for the ears"
- Increase loudness of specific sounds
- Minimize background noise
- Reduce the effect of distance
- Override poor acoustics
- Uses: large areas, restaurants, television viewing

ASSISTIVE LISTENING DEVICES

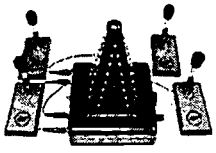
FM (Frequency Modulation)	Radio Waves
Infrared	Invisible Light Waves
Audio Induction Loop	Electromagnetic Field

SPECIFICS OF FM



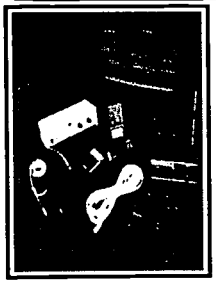
- Indoors /outdoors
- Covers several hundred feet
- Passes through walls
- Often used in classrooms
- Highly portable
- Subject to interference
- Multi-frequencies allow many uses in same area

SPECIFICS OF INFRARED



- Ensures confidentiality
- May be integrated with PA systems
- Receivers required for everyone
- Receivers compatible with most infrared emitters

SPECIFICS OF AUDIO INDUCTION LOOP



- Loop of wire connected to output of amplifier
- Sometimes needs induction receiver
- Low maintenance
- Spill-over to adjacent rooms
- Susceptible to electrical interference

CART
COMPUTER-ASSISTED REALTIME TRANSCRIPTION

- Speaker's words displayed on screen or laptop monitor
- Provides *_verbatim_* readout
- Ideal for classroom, courtroom, meetings
- Edited printout or disk available

CAN
COMPUTER-ASSISTED NOTETAKING

- Speaker's words displayed on screen or laptop monitor
- Provides *_summary_* of what is said
- Suitable for individual or group
- Edited printout or disk available
- Less expensive than CART

C-PRINT™
COMPUTER-AIDED SPEECH-TO-PRINT

- Speaker's words displayed on screen or laptop monitor
- Provides *_near verbatim_* readout
- Uses word processing software aided by abbreviation software
- Captionist uses: ➢ reduced keystrokes
  ➢ text condensing strategies
- Developed at NTID

INTERPRETERS

Oral

American Sign Language

Sign Language Transliteration

Cued Speech

ACOUSTICS

- Can interfere with speech understanding
- Reverberation and background noise
- Signal to noise ratio
- Currently no Federal standards
- Technical help available to improve
- Consideration as ADA accommodation

STRATEGIES TO ENHANCE CLASSROOM ACCOMMODATION

- Teaching styles
- Speaking characteristics
- Reducing/eliminating background noise
- Seating and lighting
- Cooperation of faculty/other students
- Importance of visual information
- Using microphones effectively

RESOURCES

Northeast Technical Assistance Center Rochester, NY	716-475-6433 (V/TTY)
Self Help for Hard of Hearing People, Inc. Bethesda, MD	301-657-2248 (V) 301-657-2249 (TTY)
RESNA Technical Assistance Project Arlington, VA	703-524-6686 (V) 703-524-6639 (TTY)
HEATH Resource Center Washington, DC	202-939-9320 (V/TTY)
Rehabilitation Research and Training for Persons Who are Hard of Hearing or Late Deafened San Diego, CA	619-554-1540 (V/TTY) 800-432-7619

Answer Sheet

A	B	C
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	6.
7.	7.	7.
8.	8.	8.
9.	9.	9.
10.	10.	10.

What Happens at Follow-up Tests?

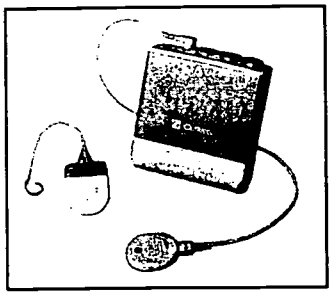
The person usually sees the audiologist at least once a year. The audiologist checks to see if the sound from the cochlear implant needs to be adjusted. The person receives speechreading lessons and listening training. (Some centers do not require this.) The amount of benefit varies from person to person.

What Kinds of Cochlear Implants Are Available?

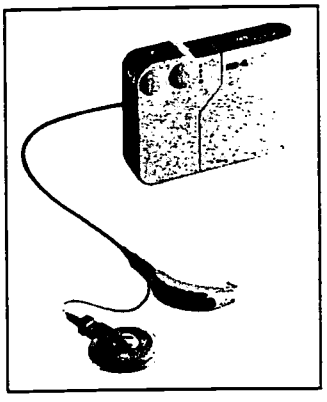
There are several different kinds of cochlear implants. All deaf people will not meet the requirements for all the different cochlear implants.

Some cochlear implants are:

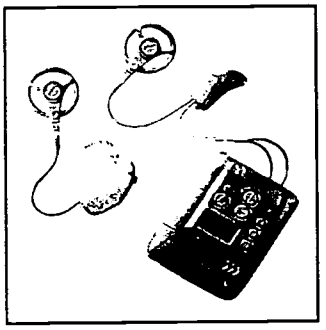
- still experimental
- only for people who became deaf after they learned to talk
- for understanding words without speechreading
- only for adults
- approved for distribution by the Federal Food and Drug Administration
- for people born deaf
- used with children.



Clarion S-Series



MED-EL Cochlear Implants



Nucleus/24 Cochlear Implant

Who Benefits the Most From a Cochlear Implant?

- People who learned to talk before they became deaf.
- People who received the implant soon after they became deaf.
- People who grew up using hearing aids.
- People who use speech and speechreading to communicate.

How Much do Cochlear Implants Cost?

Cochlear implants cost from $25,000 to $40,000. This includes the evaluation, surgery, hospital costs, fitting the device, and communication training. Some insurance companies help pay.

NETAC acknowledges NTID audiologists
Catherine Clark and Larry Scott
for their expertise in developing this brochure.

Visit Cochlear Implant Club International's
World Wide Web site for more information on
cochlear implant recipients and manufacturers:
http://www.cici.org

For more information, contact:

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COCHLEAR IMPLANTS

Northeast Technical Assistance Center

Located at the
National Technical Institute for the Deaf,
a college of Rochester Institute of Technology,
Rochester, New York

What is a Cochlear Implant?

A cochlear implant is an electronic device that helps some deaf people hear warning sounds (e.g., car horns) and voices, improve speechreading, and monitor their speech. A cochlear implant has two parts: one part is surgically inserted (put inside) in the ear and the other part is worn externally.

Deaf people with cochlear implants usually have tried hearing aids in the past. They may also have tried a vibratory aid. But these aids did not help them. So they tried a cochlear implant.

A cochlear implant is usually put in one ear. A few people continue to use a hearing aid in the other ear.

Who Can Get a Cochlear Implant?

Deaf people can get a cochlear implant if:

- They are healthy.
- They have a profound sensorineural hearing loss in both ears (90 dB or more).
- They have tried hearing aids without success.
- They have tried a vibratory aid recently. (Some cochlear implant centers do not require this.)
- They have had speechreading and listening training recently.
- They have nerve fibers in the cochlea that respond to electrical signals.
- They have a clear understanding of the limitations of a cochlear implant.

How Are People Evaluated for Cochlear Implants?

Before obtaining a cochlear implant, several tests are necessary. Usually these tests include:

- Hearing test
- Hearing aid evaluation
- Psychological evaluation
- Medical evaluation
- Speech perception tests (sometimes)
- Speechreading tests (sometimes)
  Electrical stimulation test of the auditory nerve (sometimes)
- Vibratory aid evaluation (sometimes).

What are the Parts of a Cochlear Implant?

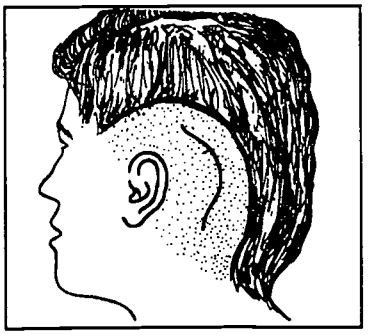
All cochlear implants have internal parts (inside the head) and external parts (outside the head):

Internal	External
Internal coil	Microphone
Electrodes (wire)	Speech processor
	External coil

Why is it Necessary to Have Surgery to Get a Cochlear Implant?

Surgery is required to insert the internal parts. The otologist (ear doctor) shaves the hair behind the ear and drills a hole in the bone. The internal coil is placed in the hole and the electrodes are inserted into the inner ear (cochlea). The doctor covers the internal coil with skin, and surgery is finished. Surgery usually lasts 2-3 hours. If there are no problems with the surgery, the person can leave the hospital in 1-4 days.

The healing period ranges from 10 days to six weeks. There will be a small scar behind the ear where the doctor cut the skin. This area must heal before the person receives the external parts.

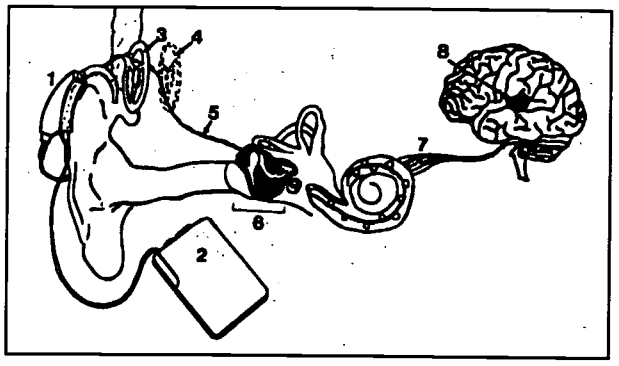


Usually the deaf person tries the cochlear implant for the first time three to six weeks after surgery. At that time the doctor makes sure the skin has healed. The audiologist then gives the person the external parts: the microphone, speech processor, and the external coil. The external parts are hooked together and connected to the internal parts. The audiologist asks the person to listen for sound and adjusts the controls in the speech processor. The sound should not be too soft or too loud. Sometimes this takes several hours or several visits. The person has to get used to listening to the new sounds. The new sounds are different from sounds heard through a hearing aid.

How do Cochlear Implants Work?

Sound enters the cochlear implant through the microphone. The microphone picks up the sound and changes it to electrical energy. It sends the signal through a cord to the speech processor. The speech processor changes the electrical signal into the correct electrical code and sends it to the external coil. The external coil is placed on the skin behind the ear. The external coil is usually held in place by a magnet or headset. It sends the electrical code across the skin to the internal coil. The internal coil sends the code to electrode(s) located in the inner ear (cochlea). The nerve fibers near the electrode(s) pick up the electrical code. They send the code to the brain. The deaf person knows that something made a sound.

Review



sound
↓
1. microphone
↓
2. speech processor
↓
3. external coil
↓
4. internal coil
↓
5. electrode(s)
↓
6. middle ear or inner ear
↓
7. nerve fibers
↓
8. brain
↓
Awareness of sound!

What are the Benefits?

With cochlear implants, some deaf people who were born deaf:

- are able to hear speech at normal conversational levels.
- are more aware of safety and warning sounds.
- can speechread better.
- can hear and produce more speech sounds and syllables in words, and therefore have clearer speech.
- can monitor the rhythm and loudness of their voice.

Most people who became deaf after they learned to talk:

- can use the cochlear implant to understand words without speechreading.
- can use the telephone.

Additional benefits:

- Assistive listening devices (i.e., FM Systems and Direct Audio Input) can also be used with cochlear implants.
- Some cochlear implants can be updated without requiring additional surgery.

What are the Possible Problems?

There is no guarantee that the cochlear implant will work:

- If there is a problem with the internal coil or electrode(s), then the person may not benefit from the cochlear implant and may need surgery again.
- External parts can be damaged by water (e.g., swimming) or rough activity. If the external parts break, they can be replaced. Replacing the equipment can be expensive.
- Sometimes an infection can occur around the internal coil after surgery. The doctor needs to treat the infection and surgery may be necessary again.
- The muscles in the face may become weak or paralyzed (no movement) because of the operation. This is usually temporary.
- The auditory nerve fibers may not respond to the electrical signal. Sometimes new bone grows in the cochlea and blocks the signal.

Teaching Students Who Are Hard of Hearing

Demographics
More than 20,000 students who self-identified as hard of hearing or deaf enrolled in academic year 1992-1993 in postsecondary education institutions. As the civil rights laws of people with disabilities are implemented further, we can expect greater numbers of students with hearing loss to enroll in mainstream educational institutions. Because there still is a stigma associated with hearing loss, some students in educational settings may be reluctant to make their hearing loss known.

Teaching Strategies Make a Difference
Administrative policies that encourage and provide for enrollment of students who are hard of hearing have to be in place. Equally vital for the success of students who are hard of hearing are instructors who are sensitive and responsive to their needs so that they can fully participate in the educational experience.

Students Function Differently
Students who are hard of hearing have residual hearing. To understand speech they use speechreading, which alone only allows about 30% understanding. They therefore use other strategies, including technology, to participate fully. They may sit up close, use hearing aids, use assistive devices, or a combination of all three. Though a hearing aid may help in one-on-one situations, in larger groups with a larger distance from the speaker and poor acoustics, hard-of-hearing students also may need assistive listening devices such as infrared, FM, or audioloops. Interpreters, notetakers, or computer-assisted real-time transcription (CART) may also be needed to follow the lectures as fully as possible. There are also other strategies and services that enable these students to have equal access to information in the classroom setting.

Warning Signs of Hearing Loss
Students with hearing loss may be hesitant to self-identify and faculty members may be instrumental in picking up the signs and following up with students to encourage them to do something about their hearing loss. Warning signs of hearing loss are:

- Giving inappropriate responses
- Speaking in an unusually loud/soft voice
- Not hearing when someone speaks from behind
- Appearing to pay attention but not actively participating in class discussions
- Asking for repeats often
- Responding with smiles and nods but no further comments.

If you suspect that a student in your class has a hearing loss, meet privately with the student to discuss your concerns and see what follow-up actions need to be taken.

TIPS FOR INSTRUCTORS

1. *Use Good Communication Techniques*
   - Repeat or rephrase questions/comments from the class before responding.
   - Face the class and speak naturally at a moderate pace.
   - Avoid the temptation to pick up the pace when time is short.
   - Do not speak while writing on the blackboard.
   - Lecture from the front of the room—not pacing around.
   - Point out who is speaking in group discussions.

- Do not drink or chew gum while lecturing.
- Do not stand or sit in front of a window where shadows will impede speechreading.
- Beards and mustaches make speechreading harder. Keep them trimmed.
- Discuss concerns about the student's ability to hear privately, not in front of the whole class.
- Encourage open communication from a student with hearing loss about your teaching style.

2. *Provide Classroom Services*
   - Provide handouts such as syllabus, lesson plans, and assignments.
   - Write announcements and assignments on the blackboard.
   - Write proper names, technical vocabulary, formulas, equations, and foreign terms on the blackboard.
   - Always use captioned films/videos or provide a written manuscript.
   - Help find seating near the front if requested by the student.
   - Arrange for a written instead of oral test.
   - Be aware of and know how to use assistive listening devices.
   - Be familiar with oral, sign, and cued-speech interpreters and how to work with them in class.
   - Provide copies of your class notes if a notetaker is not available.
   - Be familiar with computer-assisted real-time transcription (CART).
   - Support the student in advocating for communication access.

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NETAC

This *NETAC Teacher Tipsheet* was prepared by Brenda Battat, Deputy Executive Director, Self Help for Hard of Hearing People, Inc., Bethesda, Maryland.

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Working With Students Who Are Late-Deafened

Late-deafness means deafness that happened postlingually, any time after the development of speech and language in a person who has identified with hearing society through schooling, social connections, etc. Students who are late-deafened are unable to understand speech without visual aids such as speechreading, sign language, and captioning (although amplification of residual hearing may be used to assist with speechreading). Students who are late-deafened may have lost their hearing suddenly or gradually but share the common experience of having been raised in a hearing world and having become deaf rather than being born deaf. Here are some suggestions that will help teachers work more effectively with this population.

1. Allow time for student to introduce himself and discuss possible needs. Ask the student if he or she would like to make a small presentation to the class to educate others on the needs of late-deafened individuals and to let everyone know how they may be able to assist the student or meet the student before or after class to become familiar with possible barriers the student might face.

2. Learn basics of CART (Computer-Aided Realtime Translation) and other communication options. Students who are late-deafened tend to rely on written English as their primary mode of communication. CART can provide the student with instant information and the disk can be saved to help the student review the material at a later time. The student may not know about this service or other options that may help in the same manner.

3. Learn the basics of using interpreters and those interpreting methods that may be used by the late-deafened student (Sign Language Transliteration, Oral Transliteration, American Sign Language [ASL], and Cued Speech Transliteration). Students who are deaf and hard of hearing use varied modes of communication, depending on the age of onset of hearing loss and cultural background. Some late-deafened students know ASL or use signed English as their preferred mode of communication. Talk with the interpreter before or after class to learn more about interpreting and issues related to the type of communication being used.

4. Learn basics of the Americans with Disabilities Act and the Rehabilitation Act, Section 504. These are laws that affect students with hearing loss in schools.

5. Ask a student to help with notetaking as the text file of CART is not always useful. Because some lectures can be lengthy, it may be helpful to have another student summarize items and take notes, instead of having to read what may be very lengthy pages of text from the CART transcripts later on.

6. Be aware of environmental issues, such as not standing in front of a window and facing the student. Standing in front of a light source makes it difficult to speechread, pick up visual

cues, etc. Be aware of the student and try to face him/her when speaking, without distractions near the face or mouth.

7. Repeat questions and answers if at all possible.

8. Remember that English is the primary language of the student who is late-deafened. Use written English whenever possible.

9. Regulate cross-talk. Ask students to raise their hands so that the student who is late-deafened is always aware of who is speaking.

10. Identify speakers so that the student knows who is speaking and the CART person can also type in that information.

11. Provide access for out-of-classroom activities such as internships, group meetings, etc. If a student who is late-deafened needs to meet with a group, make sure he/she will have some way of knowing what the meeting is about...either through captioning, an interpreter, or other creative options.

12. Look directly at the student who is late-deafened when speaking. Try not to speak while writing on the blackboard or with your head down or your back facing the students.

13. Enunciate clearly and try to speak at a normal pace. Lipreading is more difficult when words are greatly exaggerated or mumbled.

14. Provide visual aids whenever possible. Overheads or notes on the board are very helpful to the student who is late-deafened.

15. If possible, allow time after class for the student to ask questions privately. Let the student know that is an option. Sometimes it is easier to ask questions privately, especially if they are not sure of some things and do not want to take up class time in case it is something they have missed.

16. Take advantage of the disability services coordinator of the postsecondary program or other resources, such as the Association of Late-Deafened Adults, Inc. (ALDA).

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This *NETAC Teacher Tipsheet* was prepared by Mary Clark, President, Association of Late-Deafened Adults, Inc., Fairfax, Virginia.

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The Role of Assistive Listening Devices in the Classroom

What are Assistive Listening Devices?
Many students who use hearing aids effectively in quiet environments have a difficult time following information presented in large college classrooms. In the classroom, the instructor's voice is competing with background noise, room echo, and distance. Therefore, the intelligibility of the instructor's voice is degraded by the poor room acoustics as well as the hearing loss. Most Assistive Listening Device systems (ALDs) use a microphone /transmitter positioned close to the instructor's mouth to send the instructor's voice through the air or by cable to the receiver worn by the student. By placing the microphone close to the instructor's mouth, ALDs can provide clear sound over distances, eliminate echoes, and reduce surrounding noises. Assistive Listening Devices have proven to be an effective teaching tool for students with hearing loss. Providing a good listening environment can have a major impact on an individual's academic performance.

What are the different types of Assistive Listening Devices?
ALDs utilize different technologies. Typically, they are wireless or wired. Wireless ALDs make use of radio frequencies, light rays, or magnetic inductive energy to transmit sound. Hardwired ones use direct electrical connection to transmit the auditory signal. Each system has special features, capabilities, advantages, and disadvantages. Three ALD systems–FM, Soundfield Amplification, and Induction Loop Systems–will be discussed.

Frequency Modulated (FM) Systems:
An FM system is a wireless, portable battery-operated device that uses radio transmission to send auditory signals, i.e. speech, from a transmitter to a receiver. With most FM systems, the instructor wears a lavelier microphone connected to a body-worn transmitter. The student wears the FM receiver unit clipped to his/her clothing. The FM receiver can also be connected to the student's hearing aid via an induction neckloop system or direct audio input cables. Special FM cables are also available for cochlear implant users. When the instructor speaks, the speech signal is broadcast by radio signals to the FM receiver linked to the student's hearing aid. The ranges of FM systems extend from 30 ft. to more than 200 ft., depending on the power and antenna. FM systems can transmit through walls and buildings. Therefore, multiple frequencies are required for adjacent room usage.

Recently, the FM receiver units have been significantly miniaturized. In FM/BTEs (behind-the-ear hearing aids), the FM receiver is built into the same casing as the hearing aid. Hearing aid manufacturers have also introduced wireless FM boot receivers that attach to the bottom of a hearing aid. An audiologist can assist with the selection and fitting of an appropriate FM system.

Soundfield Amplification Systems:
Soundfield amplification systems amplify and broadcast the instructor's voice through wall or ceiling-mounted loudspeakers. The system consists of a microphone/FM transmitter, amplifier, and one or more loudspeakers. A loudspeaker can also be placed next to the student. The soundfield speakers should be strategically placed in order for the student to achieve the most benefit from the system. The system should be installed under the guidance of an audiologist or someone who understands room acoustics.

Induction Loop Systems:
Induction loop systems use electromagnetic waves for transmission. Sounds are picked up by the instructor's microphone, amplified, and sent through the wire/loop, creating an invisible electromagnetic field. The telecoil (T-switch) in the student's hearing aid serves as a receiver for the signal. The loop can encircle the entire room or be small and hidden under a chair or table. When using large loop systems, care should be taken not to loop adjacent classrooms, as the electromagnetic energy will spill over, causing interference. Reportedly, newer three-dimensional loops have eliminated the problem of spillover.

What are the benefits of using Assistive Listening Devices?
A distinct acoustic advantage of ALDs compared to personal hearing aids is the position of the input microphone at a location close to the instructor's mouth. The microphone location allows the level of the instructor's voice to stay constant to the student regardless of the distance between the instructor and the student. The instructor's voice is also heard clearly over room noises such as chairs moving, fan motors running, and students talking.

- ALDs can be moved from class to class or permanently installed.
- ALDs are helpful when listening in a whole classroom or in small groups.
- ALDs can be used alone or in conjunction with personal hearing aids.
- ALDs are used with students who have varying degrees of hearing levels ranging from normal hearing acuity (e.g., students with learning disabilities, attention deficit disorders, central auditory process disorders) to students who have a profound hearing loss.
- ALDs can be beneficial when listening to audio and audiovisual equipment, e.g., VCRs, tape recorders, and stereos.

Strategies for Using Assistive Listening Devices

Assistive listening devices will provide maximum benefit when used appropriately. Here are helpful tips for using assistive listening devices.

1. Become knowledgeable about the ALD system. Request in-service training from an audiologist and/or manufacturer of the system. Involve the ALD user in the training.

2. Discuss with the student the situations where the ALD will be used.

3. Position the ALD's microphone in locations that will provide the clearest speech reception. The microphone should not be near a noise source, e.g. overhead projector. The lapel microphone should be between three to five inches from the mouth or sound source. Make sure that the voice intensity or sound source is not too loud. Loud speech signals can distort or over-amplify the ALD user.

4. Determine the best location for the ALD's receiver(s).
   a. For soundfield amplification system, the speakers must be strategically placed in the classroom. Consult with your audiologist and/or professionals familiar with room acoustics regarding the best placement of the loudspeakers.
   b. Head positioning and distance from the room loop are variables that need to be considered for students who use the telecoil in the hearing aid as the receiver. Different places in the room may be tried with the receiver to determine the best reception.

5. Provide information for the entire class on how the ALD will be incorporated into classroom instruction. Since the ALD user may not have access to questions raised by those not wearing the microphone, be sure to repeat questions and comments from other students. Remind students to speak one at time. When possible, pass the microphone/ transmitter from student to student. Some students will switch on the environmental microphone on the FM receiver in order to hear peers.

6. Continue to use the communication strategies you used with students who wear hearing aids.
   a. Face the student. Although the student can hear at greater distances with the ALDs, she/he may rely heavily on visual cues to aid understanding. Make sure the microphone does not block the mouth.
   b. Speak slowly and clearly.
   c. Favorable seating, close to the instructor and blackboard is still recommended.

7. Allow the student to couple the ALD system to audiovisual equipment when possible.

8. Perform a listening check with the equipment each time it is used. A maintenance routine and schedule should be established.

There are a variety of Assistive Listening Devices which can be utilized effectively in the classroom. No single technology is without limitations or can be expected to fulfill all the essential auditory needs of all users. Consult with an audiologist and the student to determine the most appropriate assistive listening device. ALDs can maintain a clear presentation of the speech signal in the presence of poor room acoustics. Therefore, the student with a hearing loss has better access to classroom information.

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This *NETAC Teacher Tipsheet* was prepared by Catherine Clark, audiologist, National Technical Institute for the Deaf, a college of Rochester Institute of Technology, Rochester, New York.

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C-Print™: A Notetaking System

What is C-Print™?
C-Print™ is a computer-aided speech-to-print transcription system developed at the National Technical Institute for the Deaf (NTID) as a support service option for some deaf and hard-of-hearing students in mainstream educational environments. It was developed by NTID researchers eager to improve the classroom experience for students at both the secondary and college levels, and is being used successfully in many programs around the country.

Research supports the idea that some deaf and hard-of-hearing students prefer printed text of lectures – the basis of the C-Print™ system – over sign language interpreters or notetakers as a means of acquiring information. Other students prefer an interpreter. It is an individual choice the Disability Support Service provider must work with.

Additionally, C-Print™ is cost effective and can be more readily available than stenography-based services that a university or secondary school may provide.

How does it work?
A typist called a C-Print™ captionist types a teacher's lecture (and students' comments) into a laptop computer. The typed information is displayed simultaneously on a second laptop computer or a television monitor for students to read during class. Afterward, the printed text is available to students for review purposes.

The system uses a laptop computer using word processing software aided by abbreviation software. The captionist receives training in an abbreviation system to reduce keystrokes, and in text condensing strategies. The captionist types as much information as possible, generally providing a more complete representation of what was said than summary notes.

What special equipment is needed?
To use C-Print™ in a classroom setting, one needs either two laptops (one for the captionist and one for the student) OR one laptop and one VGA (computer) monitor for viewing of typed text by more than one student.

How much does it cost?
Costs of using C-Print™ vary, depending on what equipment is used; the pay level and hours the captionist works; the work demands; service arrangements; and funding opportunities.

Typically, the word processing software costs approximately $100; communication software is approximately $200; and word abbreviation software costs approximately $400. Costs for laptop computers, display equipment, and captionists' salaries will vary. Salaries typically are between those of a professional notetaker and an interpreter.

Ideas for Faculty Working with C-Print™ Captioning

Here are some strategies for faculty members using C-Print™:

1. Introduce the captionist and the C-Print™ service at the beginning of the first class. Show your support of the service.
2. Allow the captionist to explain briefly what C-Print™ is, and to invite interested students to look at the screen after class.
3. Give the C-Print™ captionist any available materials before the next class. Items such as a course syllabus, handouts, outlines, readings, overheads, and vocabulary lists are useful for the captionist's class preparation. They are especially helpful for making the specialized dictionary for each class, with abbreviations of often-used vocabulary specific to that class.
4. Speak loudly and clearly during class so that the captionist can hear you easily.
5. Allow the captionist to sit in a location that makes hearing you, and the other students, as easy as possible.
6. Be sensitive and supportive to the captionist's comfort and needs in the classroom setting (e.g., close blinds to reduce glare on screen, allow use of desk or table of correct height/size).
7. Restate or summarize students' comments if they are hard to hear, or somewhat disorganized.
8. Be aware that the captionist will use "down times" in the class to edit notes taken earlier. "Down times" include periods of silent reading or writing, pauses during class transitions, etc.
9. Decide whether hearing students will have access to the C-Print™ hardcopy notes. Be sure your preference on this matter is well understood by the captionist, all the students – both hearing and deaf – and your department head or dean.
10. Involve the captionist as part of the educational team when discussing student needs related to C-Print™.

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The hearing aid myth

by Brenda Battat and Donna L. Sorkin

Brenda Battat

Donna Sorkin

Over 80% of all hearing loss is sensorineural, which means that the source of the problem is damaged hair cells in the cochlea. Although this type of hearing loss is generally not amenable to medical or surgical treatment, hearing aids often can be of benefit.

That being the case, you may wonder why students with hearing aids still request accommodations to be able to hear in class. The expectation by many people is that the hearing aids will correct hearing as glasses do vision, but this is not the case. Hearing aids provide amplification of sound that is very helpful. But there are other problems some people who are hard of hearing experience, such as not being able to discriminate the speech sounds they can hear, even with the added volume, and not being able to isolate speech from background noise. Hearing aids alone do not correct these problems.

Hard-of-hearing students are individuals who come in all shapes and sizes and so do their hearing losses. As a result, their ability to understand speech varies greatly, as do their needs in the classroom. Communication access has to be customized to meet the student's needs and may include hearing aids, communication strategies, assistive technology, notetaking, computer assisted real time transcription (CART), or some or all of the above.

> ....with hearing aids and assistive listening devices, students who are hard of hearing will still be working hard to hear.

Assistive technology can stretch a hearing aid's capability. Three types–FM, infrared and audioloop sytems–in conjunction with a hearing aid can increase intelligibility of the teacher's voice for a student by bringing the sound directly to the student's ear and by cutting out background noise that otherwise would compete with the teacher's voice. This technology may make enough of a difference that a student will be able to hear in class when he/she couldn't with hearing aids alone, and, depending on the level of hearing loss, the student may or may not need a front seat.

Even so, with hearing aids and assistive listening devices, students who are hard of hearing will still be working hard to hear. It's probably safe to say they can never relax and just absorb what the teacher is saying. They have to go through an additional step of listening intently to process what they are hearing and then form a reaction to it. The listening and processing part alone takes a lot of energy. In addition to hearing aids and assistive technology, they will be using speechreading and any other strategy they know to help them understand speech. All their efforts to hear are dependent upon factors that affect speechreading such as lighting, the instructor's teaching style, and room acoustics. As to why students may request notetakers, many people with hearing loss cannot watch the speaker for speechreading, ensure that their hearing aids and assistive devices are in sync, and take notes at the same time.

In essence, many students will be using a combination of technology, communication strategies, and every inch of concentration just to hear, and even with all that, it is entirely possible that some students, depending on their needs, will still not get everything said in class. Even though they may hear most of what the teacher says, there is a good chance that unless they have all the appropriate assistive technologies, or the teacher remembers to always repeat what the other students in the class are saying, the student will miss questions and comments from the class. Because of this some students may request CART. They may need this to fill in the gaps of what they are not getting through technology and other strategies or because their level of hearing loss is such that those other options do not work at all for them. CART provides verbatim transcription of everything said in the class. It may be the most reliable way for the student to get the information he/she needs, but even here the student is dependent on the accuracy of the stenographer, and this varies greatly.

Although they definitely will be working hard to do so, hard-of-hearing students can and do succeed at achieving communication access. They are able to do so when they have responsive teachers and school administrators who facilitate their requests for accommodations and are deter- mined to educate themselves and others about strategies for communication.

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Unreasonable...but not unusual

by Brenda Battat

A hard-of-hearing student, Anne, transferred from Gallaudet University to a mainstream university in order to, in her own words, "be schooled in my native language, English, the same language I've been schooled in all my life."

Brenda Battat

Upon arrival at the new university, she requested Computer-Aided Real-Time Transcription services (CART) for her Ph.D. classes. Her request was denied because she knew some sign language and therefore the disability services office staff said they would provide a sign language interpreter. Anne cited Title II of the Americans with Disabilities Act that states that the public school system is obliged to provide the accommodation the individual requests, but the school said they had the choice as to which accommodations they would provide.

Anne had been mainstreamed all through school, was brought up oral by a mother who was a speech therapist, and had learned some sign language. But like most hard-of-hearing students, Anne's first language was English. Though she could use some sign language for socializing among her friends, she was not comfortable signing, and her mastery of sign language certainly was not adequate for comprehension in doctoral level classes. She had the equivalent of intermediate level skills, but that did not indicate, by any means, that she was fluent.

Anne struggled for a semester with a sign language interpreter. She passed all her classes but at a very high price, working twice as hard as everyone else, feeling stressed and ready to drop out.

She decided she could not go another semester without the appropriate accommodations, but she had considerable trouble convincing the disability services staff that what she really needed was CART or C-Print services in order to perform to her potential. It took some strong self-advocacy on her part, coupled with letters of support from organizations who represent hard-of-hearing and oral deaf people, to persuade the office of disability services to consider her case. The disability services staff asked for evidence of Anne's sign language skills from a sign language interpreter who confirmed that she was far from fluent.

All this effort took considerable time away from Anne's studies and contributed to feelings of self-doubt. Finally the situation was resolved positively, and she was informed that starting in the fall she would be provided with CART services. She was relieved and delighted, even more so because the decision came on her birthday. Although the good news was a great birthday present, no student should have to go through that kind of experience to get the accommodations she has a right to by law.

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Meeting the needs of hard-of-hearing students

by Brenda Battat and Donna L. Sorkin

As a result of efforts over the past decade to ensure the civil rights of 42 million Americans with disabilities, college administrators can expect students with a variety of disabilities to be knocking at their institutions' doors. How well prepared are college administrators and faculty to respond to Federal mandates covering access to programs and services for that group of students? And in particular, how competitive are they when it comes to recruiting them?

Brenda Battat

Donna Sorkin

This is the first in a series of articles describing the needs of the largest disability group, one which is also growing-students who are hard of hearing. The total population of people with some degree of hearing loss in America; mild to profound, is approximately 28 million, or 10% of the U.S. population. Incidence of hearing loss varies by age. Approximately two percent of children under 18 years of age have some level of hearing loss. For the college-age population of young adults between the ages of 18 and 25, an estimated four percent have some level of hearing loss. The progression continues as people age so that by age 65, one-third of the population has a hearing loss.

Of the 28 million people of all ages with hearing loss, approximately two million have a profound hearing loss. Of those, approximately 300,000 to 400,000 who are congenitally deaf or have been deafened prior to age 18 may consider themselves culturally Deaf and rely upon sign language as their primary mode of communicating. In contrast, the group of people who are hard of hearing generally seek to maximize use of their residual hearing aided by use of hearing aids, cochlear implants, assistive technology, speechreading and other assists that promote listening and speaking.

Often hard-of-hearing and deaf students are characterized as one group with similar needs and common solutions to their communication access problems. The reality is very different from this perception. In fact, communication preferences, rather than actual level of hearing, are a major determinant of communication preferences. Students who describe themselves as Deaf are likely to have grown up as part of Deaf culture. Some will have attended deaf schools with strong support from a tight-knit community including vocational rehabilitation services. This group may prefer not to use their voices and will request sign language interpreter services.

In contrast, hard-of-hearing students most likely have attended mainstreamed schools and speak English as their first language; rather than using sign language interpreters, they depend on a variety of technologies and other strategies such as speech reading. They may request real-time captioning in the classroom.

Although it is impossible to predict how an individual student will perform, average standardized test scores for reading comprehension and language skills indicate that the greater the level of hearing loss, the greater the lag or delay in performance. Hence, students with severe-to-profound hearing loss are more likely to require preparatory courses before entering a degree program than students with lesser losses.

Another key difference between deaf and hard-of-hearing people is the visibility of the two groups. Although people who consider themselves to be part of Deaf culture comprise a much smaller proportion of the total population of people with hearing loss, they are immediately identifiable through their use of American Sign Language. As a group with its own culture and language, members of Deaf culture will also tend to identify themselves as such. The Deaf community has become an influential group in America and has been successful in making their needs and communication preferences well known. Consequently, government and the general public increasingly equate the preferences of this group with the needs of anyone who has a hearing loss. Not only do students who are hard of hearing not stand out, but depending on the degree of their hearing loss, they may hide their hearing loss from others. Because there is a stigma in our society associated with hearing loss, people are often embarrassed to state that they have a hearing loss for fear of being rejected or thought of as less capable. Hard-of-hearing students may wish to be less than open about their hearing loss with peers and teachers. Some may not even identify themselves to offices at colleges and universities providing services to students with disabilities, especially if they feel that seeking such help constitutes a "big deal." To the extent that the college or university can provide such services in a low key, sensitive fashion, hard-of-hearing students will be more likely to seek help and benefit from such services.

Too often, those hard-of-hearing students who do identify themselves to the appropriate office are disappointed by the lack of understanding of what it means to be hard of hearing. After getting over their inherent reluctance, they must expend time and energy to educate college personnel about their needs and then advocate for accommodations that can enable them to participate fully in the classroom and in college life. Because of the tendency of college personnel to be misinformed about the needs of hard-of-hearing students, their response is often to offer sign language interpreters, which generally is of no help to this group. Also, if they wear hearing aids, they may have to overcome the assumption that they can hear normally. Hearing aids provide enormous benefit in certain situations such as one-on-one conversations in quiet settings. But students face a variety of different listening environments such as large classes in huge lecture halls with poor acoustics, small classes with considerable interactive participation, and diverse teaching styles and extracurricular activities, which are often very noisy. These are all situations in which hearing aids perform less well and therefore in which the students need other accommodations and strategies such as assistive listening devices, captioning, appropriate teaching styles, and other strategies to supplement their hearing aid(s).

Future articles in this series will focus on specific elements of access for hard-of-hearing students such as assistive technology, including computer assisted real-time captioning (CART), communication access in the classroom, communication access on campus and in the dorms, developing faculty/staff awareness, university policies and recruitment of hard-of-hearing students, and vocational rehabilitation linkages with disability services offices in colleges and universities.

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Responsive teachers make a difference!

by Brenda Battat


Brenda Battat

Teachers can make a big difference in a student's comfort level using assistive technology in the classroom and ultimately in their academic success. For example, assuming the disability services office has arranged for an FM system for a hard-of-hearing student, that effort alone is not the total solution. It takes assertiveness and know-how to actually use the system and benefit from it fully, and that level of confidence can be greatly affected by the teacher's responsiveness.

Going to a class cold and asking a teacher to use a strange device when she is trying to get the class off to a good start is not a good idea. Ideally, the student would go to the teacher at the start of the semester to introduce himself and describe and demonstrate the system. This way the teacher knows the student and becomes familiar with the technology and what is expected of her. The teacher's reaction, negative or positive, will have a major impact on how and if the student uses the technology in the future.

A responsive faculty member makes a difference not only in the individual student's comfort level but also in setting the tone for the rest of the class. This is particularly important in interactive classes where it will be necessary for other students to use the microphone to ensure that the student with hearing loss can hear everyone's comments and questions in addition to the teacher's presentation. The teacher is the best person to orchestrate any access solutions in the classroom such as passing around the microphone. Therefore she should be thoroughly familiar with assistive technology, CART services, interpreters, and notetakers and the "etiquette" surrounding their use, such as only one person speaking at a time when using an assistive listening device or speaking directly into a microphone and not waving it around for emphasis when speaking. Teachers should also know and use presentation skills that will enhance a student's ability to hear what's going on in the class. The NETAC office recently published a Teacher Tipsheet titled, *The Role of Assistive Listening Devices in the Classroom*, which provides additional information on the use of this technology.

A student with hearing loss is probably embarrassed at having to use accommodations in the classroom and at being singled out as different. Having a responsive teacher who is willing to understand and to use accessible presentation skills, thereby getting everyone else to understand and cooperate, goes a long way in enabling the student to feel confident and be able to fully participate in a class conducive to learning.

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Communication access in the classroom

by Brenda Battat and Donna L. Sorkin

Brenda Battat

Donna Sorkin

A hard-of-hearing student stopped going to class because he couldn't hear the professor, even while wearing hearing aids. He thought he could get by if he studied the assigned text. However, the final exam covered additional material that had been given out during the semester, he failed the class.

Situations such as this are not because they can be prevented. There are strategies that both teacher and student can use to help a hard-of-hearing student participate fully in classroom activities.

In the last issue of this newsletter, we noted that the needs of hard-of-hearing students are often overlooked. Hard-of-hearing students appear to be coping well and they often don't make known their needs. With many more older students in the classroom now, these problems are intensified and increasingly on the minds of hard-of-hearing, individuals who are evaluating a school's ability to meet their needs.

There are expenses associated with communication access, so an allocation should be included in the budget to ensure that the school can respond to requests for auxiliary aids and services, as required under the Americans with Disabilities Act. For hard-of-hearing students these requests might include assistive listening devices, notetakers, oral or cued speech interpreters, and Computer-Assisted Real Time Transcription (CART).

Teachers can make it easier or harder for a student who is hard of hearing to function in the classroom depending on communication and teaching styles. Most important is the use of good communication techniques, which will benefit all students. As students who are hard of hearing rely on visual clues, especially being able to see the speaker's face to speechread, faculty should teach from the front of the room rather than pacing around, not speak while writing on the blackboard or looking down at notes, avoid eating, or drinking while speaking, and keep beards and mustaches trimmed as they can affect a student's ability to speechread. Repeating or rephrasing questions from the class before responding to a student's question is also very helpful.

Other accommodations relate to various formats for getting information to the student accurately. Hard-of-hearing students do not get information through the grapevine as they cannot overhear conversations and may not easily be able to join their classmates in informal discussions during class breaks. Important information should be provided as much as possible in written form, either handouts, e.g., course syllabus, lesson plan, copy of teacher's notes, dates, times and places of tests, or written announcements put up on the blackboard. Videos used in class should be captioned. If this is impossible, a transcript should be given to the student to read.

Faculty and staff need to be aware of the stress the hard-of-hearing student will likely experience. Getting set up with CART or an assistive listening device can be time consuming and frustrating. As discussed in our last article, disability services offices may focus on providing sign language interpreters, and as a result they may not have available assistive listening devices that are helpful for hard-of-hearing students.

The issue of financing these types of accommodations can be a barrier. If so, the student can get caught in the crossfire of administrative hassles, sometimes not having the accommodations in time for the beginning, of the semester, sometimes not at all, and, as a result, having to attend some classes without any hearing help.

Setting up an accessible environment, from admissions to the classroom, will greatly facilitate students who are hard of hearing being able to participate comfortably and therefore increase their opportunity for educational success. This is their right and the responsibility of the educational institution.

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Communication access on campus for students who are hard of hearing

by Brenda Battat and Donna L. Sorkin

Brenda Battat

Donna Sorkin

Four years at college is a stage of life, one that contributes to our development as a human being. Although the academic elements are the primary reason most people pursue higher education, college is more than just classes. College is also a microcosm of society, a home away from home, a place to learn both formally and informally, and therefore a place where each and every student must be able to participate and feel comfortable and safe.

For hard-of-hearing students, participating and feeling comfortable and safe means there must be communication access in place throughout the campus and in the dormitories. Only then can students with hearing loss interact on an equal level with peers and take advantage of all that college has to offer.

Public phones throughout the campus, outside and inside, especially emergency phones, should be hearing aid compatible and be equipped with volume control. TTYs should be placed conveniently across campus according to ADA requirements. All fire alarms, both in public areas of the campus, common areas of the dormitories, and in the dorm rooms of students with hearing loss, should be equipped with visual strobe lights. Auditoriums where lectures and performances are held should have assistive listening devices installed. These can be used not only by hard-of-hearing students but by anyone with hearing loss when an event is open to the general public. Likewise, the systems will be used during parents' weekend. Commencement, and other activities when alumni, parents, and friends of the college make use of these facilities.

Speaking of commencement, this milestone event should be set up so that all hard-of-hearing and deaf graduating seniors and their family members can understand all of the speeches and proceedings. This is most effectively achieved by setting up computer assisted real time transcription, particularly when activities are held' outdoors where acoustics are poor. Commencement is a very visible event where the educational institution has an opportunity to publicly demonstrate its commitment to providing access to all participants who need assistance with communication access. It will also be greatly a precipitated by international families whose first language is not English.

Hard-of-hearing students will also need to be able to use the various services offered on campus such as academic and psychological counseling, learning and writing centers, in- and out-patient medical services, the office of financial aid, and legal services, to name a few. All staff members need to be trained in communicating with people who have difficulty hearing and to be sensitized to their needs. Such basic techniques as speaking slowly and clearly, facing the person, and not covering the mouth when speaking should become second nature. Recruitment staff should know how background noise and poor acoustics affect the ability to hear, and interview space should be organized to overcome such barriers as much as possible. There should also be available assistive listening devices to use with students who need them to communicate in face-to-face situations.

Just as removing architectural barriers allows students with physical disabilities to move freely about the campus, providing communication access allows those students who cannot hear well to have access to all college programs and services. Hard-of-hearing students can move easily around campus, but they cannot participate once they get into buildings unless communication access is appropriately provided. Although hearing loss is much less visible and therefore much less likely to be thought about, a lack of communication is a barrier in much the same way that steps or narrow doorways are a barrier to students with mobility impairments. Different problem, different solution, but neither less needed nor less crucial to those who are hard of hearing.

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