

Got Hearing?

Hearing Aids and Optimal Listening in the Classroom

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Goal of Presentation

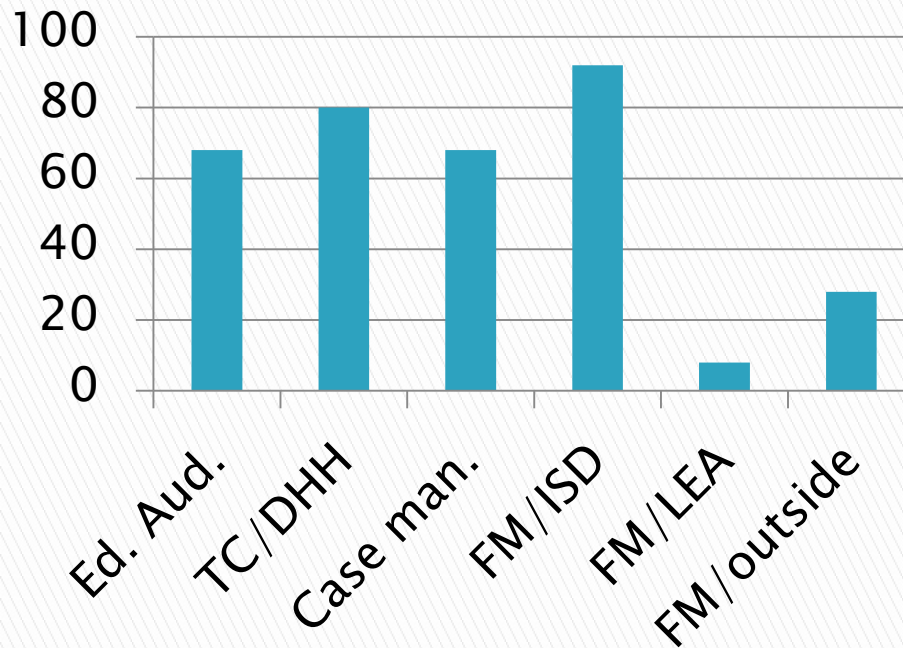
- ▶ Provide an overview of hearing loss in school-aged children
- ▶ Describe listening and learning needs unique to children with hearing loss
- ▶ Interact with hearing assistance technology commonly used in classrooms
- ▶ Identify resources and laws to support language and learning outcomes

The Changing Service Delivery Model

- ▶ We don't have to settle for anything less than full auditory access
- ▶ Children with hearing loss are general education students first
- ▶ “Push in” verses “pull out” – guard against creating curriculum casualties
- ▶ Allow the teacher to teach
- ▶ General education teacher=content expert
Special education staff member=access expert

MI Spec. Ed. Director Survey

- ▶ N= 25 (of the 57 ISDs)



Got Hearing?

▶ Notice it

◦ Prevalence of “Kids in the Cracks”

- 11–15% of school aged children have low or high frequency hearing loss of at least 16 dB or greater in one or both ears (Niskar, 1998)¹

◦ Who has hearing loss in your schools?

◦ Intelligence Work: “see something, say something”

▶ Question it

◦ Talk to teachers, parents, the student

◦ Look at the condition of the technology/devices

◦ What’s the Impact of THAT student’s hearing loss

▶ Do Something about it

◦ Laws support ensuring full access to curriculum

◦ IDEA, IEP, 504, RtI

Kids in the Cracks

DeConde Johnson, C. concept presented at EAA Summer 2011 conference

- ▶ Student A– identified early, received services, became ineligible based on failure model.
- ▶ Student B– hearing aids or cochlear implant and typical development track but is now falling behind.
- ▶ Student C– health department referral. Follow up?
- ▶ Student D– transfer student, little or no information, advocacy issues, parents declined service needs.
- ▶ Student E– late onset or progression of hearing loss– cancer treatment, trauma, parents report hearing loss or use of hearing aids in the past.
- ▶ Student F– live in rural areas of the state
- ▶ Student G– parents opt out of services
- ▶ Student H – **guess**

Measuring Hearing Loss

The basics: Interpreting the Audiogram

Type

Degree

Configuration



Relationship of Hearing Loss to Listening and Learning Needs

16-25 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<p>Impact of a hearing loss that is approximately 20 dB can be compared to ability to hear when index fingers are placed in your ears. Child may have difficulty hearing faint or distant speech. At 16 dB student can miss up to 10% of speech signal when teacher is at a distance greater than 3 feet. A 20 dB or greater hearing loss in the better ear can result in absent, inconsistent or distorted parts of speech, especially word endings (s, ed) and unemphasized sounds. Percent of speech signal missed will be greater whenever there is background noise in the classroom, especially in the elementary grades when instruction is primarily verbal and younger children have greater difficulty listening in noise. Young children have the tendency to watch and copy the movements of other students rather than attending to auditorily fragmented teacher directions.</p>	<p>May be unaware of subtle conversational cues that could cause child to be viewed as inappropriate or awkward. May miss portions of fast-paced peer interactions that could begin to have an impact on socialization and self concept. Behavior may be confused for immaturity or inattention. May be more fatigued due to extra effort needed for understanding speech.</p>	<p>Noise in typical classroom environments impede child from having full access to teacher instruction. Will benefit from improved acoustic treatment of classroom and sound-field amplification. Favorable seating necessary. May often have difficulty with sound/letter associations and subtle auditory discrimination skills necessary for reading. May need attention to vocabulary or speech, especially when there has been a long history of middle ear fluid. Depending on loss configuration, may benefit from low power hearing aid with personal FM system. Appropriate medical management necessary for conductive losses. Inservice on impact of "minimal" 15 – 25 dB hearing loss on language development, listening in noise and learning, required for teacher.</p>

Please Consider Indicated Items in the Child's Educational Program:

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> Teacher inservice and seating close to teacher | <input type="checkbox"/> Hearing monitoring at school every ___ mos. | <input type="checkbox"/> Amplification monitoring |
| <input type="checkbox"/> Contact your school district's audiologist | <input type="checkbox"/> Protect ears from noise to prevent more loss | <input type="checkbox"/> Educational support services/evaluation |
| <input type="checkbox"/> Screening/evaluation of speech and language | <input type="checkbox"/> Note-taking, closed captioned films, visuals | <input type="checkbox"/> FM system trial period |
| <input type="checkbox"/> Educational consultation/ program supervision by specialist(s) in hearing loss | <input type="checkbox"/> Regular contact with other children who are deaf or hard of hearing | |
| <input type="checkbox"/> Periodic educational monitoring such as October and April teacher/student completion of SIFTER, LIFE | | |

NOTE: All children require full access to teacher instruction and educationally relevant peer communication to receive an appropriate education.

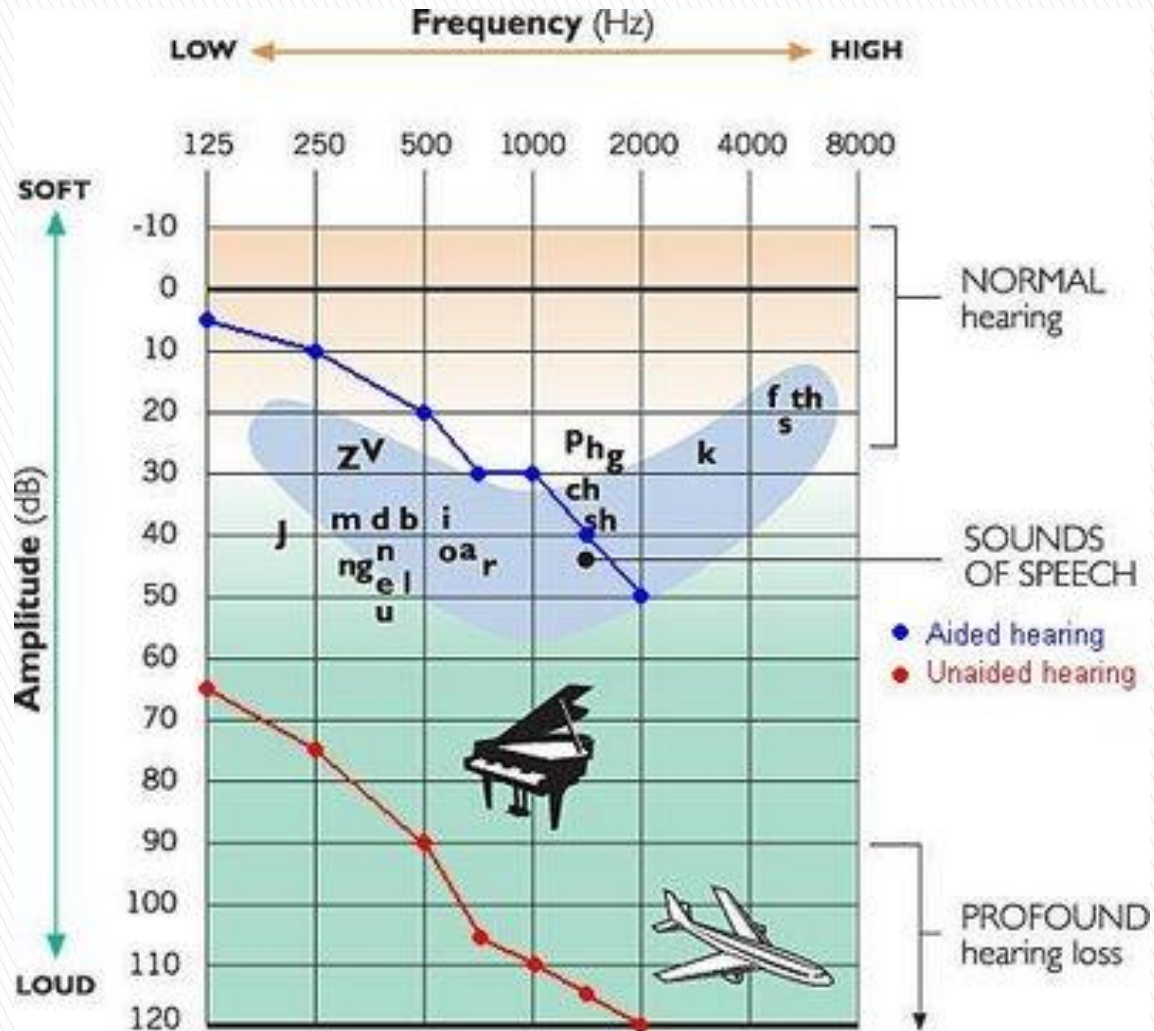
Distance, noise in classroom and fragmentation caused by hearing loss prevent full access to spoken instruction. Appropriate acoustics, use of visuals, FM amplification, sign language, notetakers, communication partners, etc. increase access to instruction. Needs periodic hearing evaluation, rigorous amplification checks, and regular monitoring of access to instruction and classroom function (monitoring tools at www.hear2learn.com or www.SIFTERanderson.com).

© 1991, Relationship of Degree of Longterm Hearing Loss to Psychosocial Impact and Educational Needs, Karen Anderson & Noel Matkin, revised 2007 thanks to input from the Educational Audiology Association listserv.

Verification of Hearing Aids

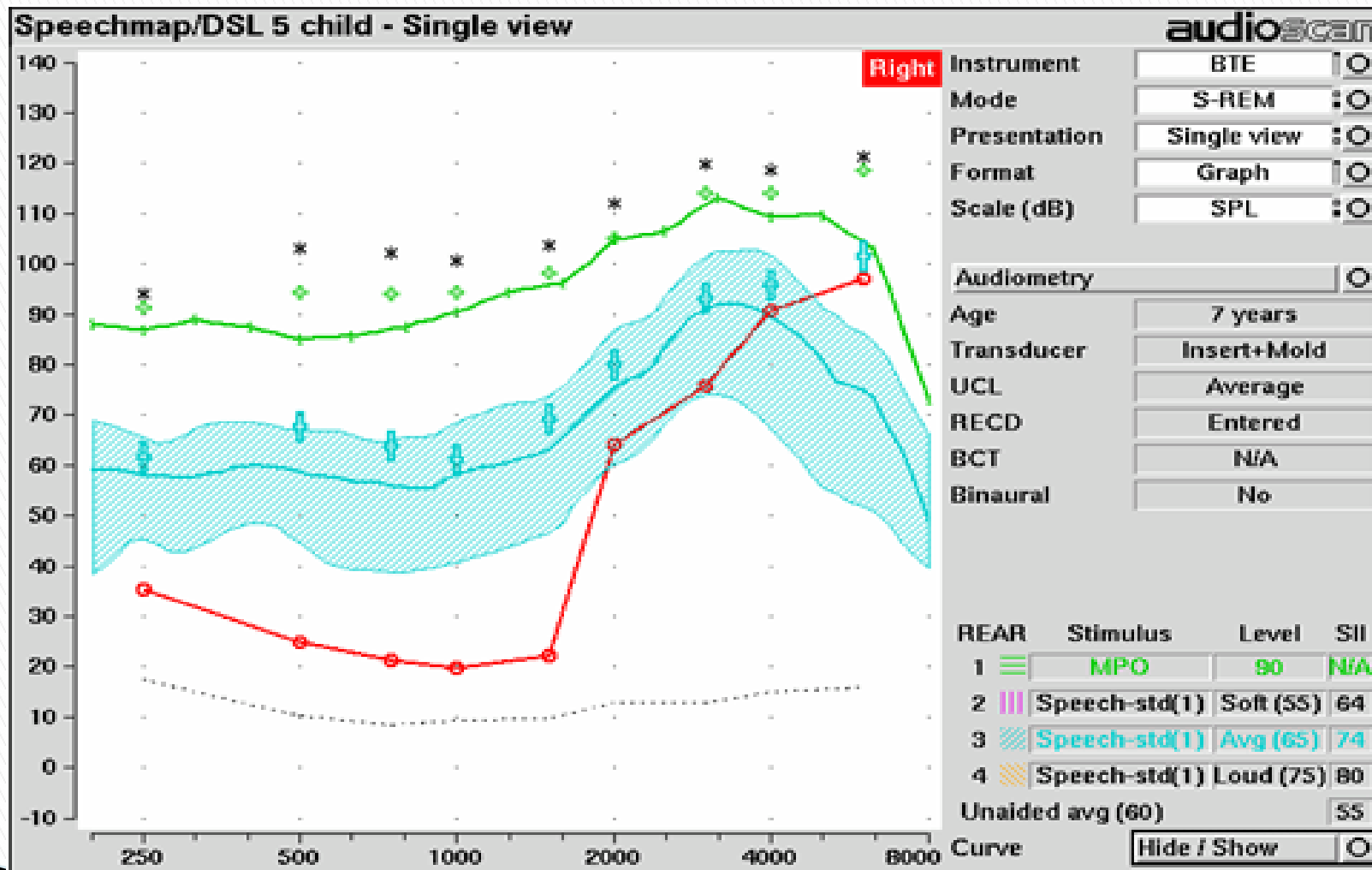
- ▶ Hearing Devices provide “opportunity” for hearing speech
- ▶ Cochlear implants vs. Hearing aids
- ▶ Verification of adequate hearing aid settings
 - Detection levels for tones and speech
 - Speechmapping/ SPLogram
 - How to see what can be heard–Audibility Index
 - Soft
 - Medium
 - Loud

Good Bye Aided Audiogram



Adapted from J.L. Northern and M.P. Downs from HEARING IN CHILDREN, (Williams & Wilkins, 1984)

Hello Speech Mapping



Listening Conditions are Dynamic

- ▶ Children with hearing loss perceive speech in an incomplete manner due to filtering and limitations of technology.
- ▶ Classroom Listening Conditions
 - The ANSI/ASA S12.60–2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools
 - **Goal:** Maximum background noise of 35 dB (A weighted) and reverberation time of 0.6 seconds for unoccupied classrooms, and a minimum sound insulation requirement between classrooms and adjacent spaces. (Thibodeau, 2009)
 - **Reality:** Average background noise – 60 dB· Reverberation time – .5–1.2 (Acoustical Society of America, 2008)

Consider Accommodations?

- ▶ Notice the noise levels of the classroom.
- ▶ Speech room? Hallway? Outside/Field trips?
- ▶ The problems with preferential seating.
Front of the class?

Teacher characteristics, topic, classmates, activities

- ▶ What are the most challenging listening situations?

Validation

- Ongoing process that ensures that the child/youth is receiving optimal speech input from others and that his or her own speech is adequately perceived.

Self assessment

LIFE, CPQ

Observation Questionnaire

ELF, CHILD, SIFTER, MAIS, FAPI and CHAPS

Evaluation

FLE, Ling Six Sound Test

See RM-HAT guidelines for validation measures and references

With and Without RM-HAT



Hearing Assistance Technology (HAT)

- Hearing Aids
 - Analog
 - Digitally programmable
 - Digital
- FM systems (receivers)
 - HA+Audioshoe+FM
 - HA+integrated FM
 - Cochlear implants
 - Area/neck Loops
 - Streaming
- FM systems (transmitters)
 - Traditional
 - Dynamic
 - Microphones



Remote Microphone Hearing Assistance Technology (RM-HAT)

- ▶ FM systems
 - incorporated in/routed through amplification devices
 - used for students with hearing loss
- ▶ Low gain FM systems
 - only FM receiver gain control
 - used for minimal/mild and unilateral hearing loss, and auditory processing weaknesses.
- ▶ Soundfield systems
 - general education technology
 - addresses immature auditory system, middle ear problems, and noise and distance issues



Benefits of different RM-HAT systems

- ▶ Kindergarten Classroom, 8 students 9–12 years of age, mild to severe hearing loss, tested using HINT sentences under different conditions with a + 10 s/n ratio (Anderson, 2004).
- ▶ Speech perception scores:
 - HA only – 82%
 - Infrared Soundfield – 83.1%
 - Personal FM – 94.4%

Survey of Student use of Amplification (DeConde-Johnson, 1998)

- ▶ Employed school based Audiologists
- ▶ Surveyed student equipment
 - HA-right ear n=478
 - HA-left ear n=472
 - FM n=212
- ▶ 56.8% of all prescribed amplification was in use and functioning satisfactorily

RM-HAT Personnel Qualifications

- ▶ Clinical audiologists–fit and service hearing aids/cochlear implants and can make recommendations for “consideration”.
- ▶ Educational Audiologist–school’s best resource for evaluating and recommending and fitting RM-HAT according to professional guidelines.
- ▶ Educational Team– must ensure devices meet needs in educational setting.
- ▶ Evidence Based Practice
 - Not just for audiologists but for educators too!
 - Rtl, progress monitoring, HAT

Take a closer look



Naughty

Nice

Got Hearing? Take Notice/ Ask Questions



Making sense of it all

Educational Impact Matrix for Students who are DHH

Michigan Department of Education–Low Incidence Outreach

- ▶ Audiological Factors
- ▶ Language and Vocabulary
- ▶ Functional Listening Skills
- ▶ Use of Amplification
- ▶ Academic/Vocational Performance
- ▶ Personal Adjustment and Transitions

Educational Impact Matrix for Students who are Deaf or Hard of Hearing

A. Factors for Consideration

Student Name	Teacher Consultant	Date		
AUDIOLOGICAL FACTORS 0	2	3	4	
<input type="checkbox"/> Bilateral mild hearing loss-16-40 dB PTA * <input type="checkbox"/> Unilateral hearing loss <input type="checkbox"/> Normal middle ear functioning <input type="checkbox"/> Speech Discrimination of 85% or above without amplification	<input type="checkbox"/> Bilateral moderate hearing loss 41-65 dB PTA <input type="checkbox"/> Fluctuating hearing loss <input type="checkbox"/> Occasional middle ear problems <input type="checkbox"/> Aided speech discrimination 85% or above	<input type="checkbox"/> Bilateral severe hearing loss 66-70 dB PTA <input type="checkbox"/> Frequent, manageable middle ear problems <input type="checkbox"/> Aided speech discrimination 70-84%	<input type="checkbox"/> Bilateral profound hearing loss above 70 dB PTA <input type="checkbox"/> Auditory Neuropathy <input type="checkbox"/> History of Progressive Hearing Loss <input type="checkbox"/> Chronic middle ear problems; difficult to manage <input type="checkbox"/> Aided speech discrimination <70%	Points (0-4) <input style="width: 50px;" type="text"/>
LANGUAGE AND VOCABULARY 0	4	6	8	
<input type="checkbox"/> At or above grade level on standardized assessment <input type="checkbox"/> On ELA Core Standards** for Language, Speaking and Listening, scores ≥80% on age/grade level through 5 th grade conventions <input type="checkbox"/> Participates, initiates, and sustains classroom & social interactions.	<input type="checkbox"/> One (1) grade level below on standardized assessments <input type="checkbox"/> On ELA Core Standards for Language, Speaking and Listening, scores 70%-79% on age/grade level through 5 th grade conventions <input type="checkbox"/> Intermittently participates in classroom & social interactions without prompts	<input type="checkbox"/> Two (2) grade levels below on standardized assessments <input type="checkbox"/> On ELA Core Standards for Language, Speaking and Listening, scores 60%-69% on age /grade level through 5 th grade conventions <input type="checkbox"/> Participates in classroom and/or social interactions with prompts	<input type="checkbox"/> Three (3) age/grade levels below on standardized assessments <input type="checkbox"/> On ELA Core Standards for Language, Speaking and Listening, scores ≤59% on age/grade level through 5 th grade conventions. <input type="checkbox"/> Rarely participates in classroom and/or social interactions with/ without prompts	Points (0-8) <input style="width: 50px;" type="text"/>
FUNCTIONAL LISTENING SKILLS 0	4	6	8	
<input type="checkbox"/> Understands connected speech <input type="checkbox"/> Understands concepts & vocabulary <input type="checkbox"/> Gains information <input type="checkbox"/> Follows conversational topics easily	<input type="checkbox"/> Obtains class content given cues about topic <input type="checkbox"/> Understands classroom vocabulary with support <input type="checkbox"/> Understands class content in small groups with minimal background noise	<input type="checkbox"/> Responds appropriately to familiar words & phrases <input type="checkbox"/> Responds appropriately to familiar routines <input type="checkbox"/> Understands part of class content in small groups and a quiet setting	<input type="checkbox"/> Developing auditory skills within closed sets <input type="checkbox"/> Understands single words and short familiar phrases supported with speech reading <input type="checkbox"/> Recognizes environmental sounds	Points (0-8) <input style="width: 50px;" type="text"/>
USE OF AMPLIFICATION 0	2	3	4	
<input type="checkbox"/> Amplification not prescribed <input type="checkbox"/> Identified/amplified more than 1 year ago <input type="checkbox"/> Independent use and care <input type="checkbox"/> Reports problems consistently <input type="checkbox"/> Uses amplification at home & school	<input type="checkbox"/> Limited knowledge of amplification <input type="checkbox"/> Identified & amplified in last 6-12 months <input type="checkbox"/> Needs occasional assistance with use & care <input type="checkbox"/> Reports problems >75% of the time <input type="checkbox"/> Uses amplification at school but not at home	<input type="checkbox"/> Declines use of assistive listening <input type="checkbox"/> Identified & amplified within last 6 months <input type="checkbox"/> Needs regular assistance in use & care <input type="checkbox"/> Reports problems <60% of the time <input type="checkbox"/> Inconsistent use at home and/or school	<input type="checkbox"/> Does not benefit from amplification <input type="checkbox"/> Identified & amplified within last 3 months <input type="checkbox"/> Needs daily assistance with amplification <input type="checkbox"/> Reports problems- <20% of time <input type="checkbox"/> Uses at school less than 50% of day	Points (0-4) <input style="width: 50px;" type="text"/>
ACADEMIC /VOCATIONAL PERFORMANCE 0	2	3	4	
<input type="checkbox"/> MEAP-ELA/Writing- Advanced/Proficient <input type="checkbox"/> State or district testing indicates no interference with educational and/or vocational performance <input type="checkbox"/> General Education teacher reports development of skills necessary to meet 80% of core standards. <input type="checkbox"/> Has no IEP/504 accommodations	<input type="checkbox"/> MEAP-ELA/Writing – Partially Proficient <input type="checkbox"/> State or district testing indicates minimal impact on educational and/ or vocational performance <input type="checkbox"/> General Education teacher reports indicate development of skills necessary to meet 70% of standards <input type="checkbox"/> Has IEP/504 accommodations supporting listening and hearing	<input type="checkbox"/> MEAP-ELA/Writing-Partially Proficient/Not Proficient <input type="checkbox"/> State or district testing indicate moderate impact on educational and/or vocational performance <input type="checkbox"/> General Education teacher reports development of skills necessary to meet 60% of core standards <input type="checkbox"/> Has content modifications & accommodations	<input type="checkbox"/> MEAP-ELA/Writing-not proficient or MI-ACCESS <input type="checkbox"/> State or district testing indicate significant impact on educational and/or vocational performance <input type="checkbox"/> General Education teacher reports development of skills necessary to meet 50% of core standards <input type="checkbox"/> Has significant content modifications and numerous accommodations	Points (0-4) <input style="width: 50px;" type="text"/>
PERSONAL ADJUSTMENT & TRANSITIONS 0	2	3	4	
<input type="checkbox"/> Advocates for technology & accommodations independently <input type="checkbox"/> Knows & uses resources for access in familiar and novel settings	<input type="checkbox"/> Advocates for technology & accommodations with minimal support <input type="checkbox"/> Knows & uses resources for access in familiar settings	<input type="checkbox"/> Advocates for self with technology or accommodations 1-2x/wk with prompts <input type="checkbox"/> Uses few resources for access in current setting & needs support to adjust to new setting	<input type="checkbox"/> Does not advocate for self with or without prompts <input type="checkbox"/> Needs information & training for access in new setting	Points (0-4) <input style="width: 50px;" type="text"/>

*Pure Tone Average

**Common Core State Standards

MSHA Conference March 24, 2012

Audiological/Amplification Use

AUDIOLOGICAL FACTORS	0	2	3	4	
<input type="checkbox"/> Bilateral mild hearing loss-16-40 dBPTA * <input type="checkbox"/> Unilateral hearing loss <input type="checkbox"/> Normal middle ear functioning <input type="checkbox"/> Speech Discrimination of 85% or above without amplification	<input type="checkbox"/> Bilateral moderate hearing loss 41-55 dB PTA <input type="checkbox"/> Fluctuating hearing loss <input type="checkbox"/> Occasional middle ear problems <input type="checkbox"/> Aided speech discrimination 85% or above	<input type="checkbox"/> Bilateral severe hearing loss 56-70 dB PTA <input type="checkbox"/> Frequent, manageable middle ear problems <input type="checkbox"/> Aided speech discrimination 70-84%	<input type="checkbox"/> Bilateral profound hearing loss above 70 dB PTA <input type="checkbox"/> Auditory Neuropathy <input type="checkbox"/> History of Progressive Hearing Loss <input type="checkbox"/> Chronic middle ear problems; difficult to manage <input type="checkbox"/> Aided speech discrimination <70%	Points (0-4) <input type="text"/>	

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Language, Vocabulary, Academic, Vocational

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Functional Listening, Personal Adjustments, Transitions

FUNCTIONAL LISTENING SKILLS	0	4	6	8	
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USE OF AMPLIFICATION	0	2	3	4	

PERSONAL ADJUSTMENT & TRANSITIONS	0	2	3	4	
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Scoring and Range of Service



A. Factors for Consideration (Matrix)	
	Points (Page 2)
Audiological Factors	<input type="text"/>
Language/Vocabulary	<input type="text"/>
Functional Listening Skills	<input type="text"/>
Use of Amplification	<input type="text"/>
Educational Performance	<input type="text"/>
Personal Adjustment/Transition	<input type="text"/>
Total Points A = <input type="text"/>	

B. Contributing Factors (Optional)	
	Factors +/- .5
Age of Student	<input type="text"/>
Program Demands	<input type="text"/>
Student Cooperation	<input type="text"/>
Interpreter/Captionist	<input type="text"/>
Change in Program	<input type="text"/>
Attendance	<input type="text"/>
Challenging Condition	<input type="text"/>
Other (s)	<input type="text"/>
Total Factors B = <input type="text"/>	

Educational Impact Score

A + (B optional) =

Comments:	
<input type="text"/>	

Impact Score	Suggested Range of Service in Minutes/Week*																																																		
	<i>*The ranges were compiled from data collected in Michigan between January and June 2011. For analysis purposes, service times were calculated on a weekly basis. This is NOT to suggest that all students should be seen weekly. This is only a guideline for the IEP team decision.</i>																																																		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0-8	0-14																																																		
6-16							9-20																																												
17-24																			21-37																																
25-32																																					35-50														

Laws that support optimal listening in the classroom:

- ▶ Individuals with Disabilities Education Act (IDEA)
- ▶ Section 504 of the Rehabilitation Act of 1973
- ▶ Americans with Disabilities Act (ADA)

<http://idea.ed.gov>

Building the Legacy: IDEA 2004



Part B
(ages 3-21)

[Click Here to Enter](#)



Part C
(ages birth-2)

[Click Here to Enter](#)

IDEA 2004

- ▶ Ensures that all students with disabilities receive a Free and Appropriate Public Education (FAPE) in their Least Restrictive Environment (LRE)
- ▶ The LRE requirements states “to the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities are educated with children who are nondisabled” (300.114).
- ▶ Least Restrictive vs. Language Rich

IDEA– Assistive Technology

- ▶ Regulation 300.105 states in part that “each public agency must ensure that assistive technology devices or assistive technology services, or both, are made available to a child with a disability if required as a part of the child’s special education, related services, and supplementary aids and services. On a case-by-case basis, assistive technology devices in a child’s home or in other settings is required if the child’s IEP team determines that the child needs access to those devices in order to receive FAPE”.

Definition of Audiology

34CFR300.34 (c) (1)

- ▶ Identification of hearing loss
- ▶ Determination of nature and degree
- ▶ Provide habilitation activities
- ▶ Develop hearing loss prevention programs
- ▶ Counseling regarding hearing loss
- ▶ Determine amplification needs

Routine Checking of Hearing Aids and External Component of Implanted Devices

- ▶ Public agency must ensure hearing aids are working properly
- ▶ Public agency must ensure that the external component of implanted devices are working properly
- ▶ Public agency is not responsible for post surgical maintenance, programming and replacement.

IDEA – General Education

- ▶ IDEA does allow for support for general education students. Some examples...
 - Early Intervening Services–34CFR300.226(a)
 - Soundfield
 - Document progress with intervention
 - Response to Intervention–34CFR300.307, 309, 311
 - Hearing preservation–34CFR300.34 (b)
 - Hearing aid/CI checks (300.113)
 - Monitor academics of students with hearing loss

GAP –Guide to Access Planning

Phonak Hearing Systems in collaboration with Cheryl DeConde-Johnson, Ed.D., and Carrie Spangler, Au.D.

- ▶ A program to promote communication access and hearing assistance technologies for teens and young adults
 - Workplace barriers and solutions
 - Extensive 504, IDEA and ADA resources
 - Self advocacy and determination
 - College planning, funding and accommodations
 - Coping strategies for teens
 - MyGap resources for students and families
 - And MUCH MUCH more!!!

Section 504

- ▶ Section 504 of the Rehabilitation Act of 1973 is a civil rights law that prohibits discrimination on the basis of disability, and guarantees individuals with disabilities equal access to an education as well as equal access in the employment setting for any program activity that receives federal financial assistance.

<http://www.gpoaccess.gov/uscode>

29 USC 794

Section 504–Eligibility Criteria/Considerations

- ▶ Physical or mental impairment which substantially limits a major life activity
 - These include learning, caring for oneself, performing manual tasks, walking, seeing, hearing and working
 - Jan 2009 amendment – grant eligibility to those who use hearing aids, cochlear implants and assistive technology. Eligibility determination need not entail extensive analysis and that it be expansive rather than stingy (Zerkel, 2009)
- ▶ Documentation of such impairment.
- ▶ 1.2% of school aged kids k–12 grade prior to amendment.

Americans with Disabilities Act (ADA)

- ▶ Pertains to individuals in all settings and provides for accessibility for individuals with disabilities
 - Employment
 - State and local government
 - Public accommodations
 - Commercial facilities
 - Transportation
 - Telecommunications
- ▶ Current law references a “mitigating device” such as a hearing aid or cochlear implant to be considered in determining protection under this law.

42 usc 12101 et. Seq.

<http://www.gpoaccess.gov/uscode>

Call to Action Summary

- ▶ **Three things you can do**
 - **Notice it**–Where are these kids? Be an investigator– look at equipment , ask for records, equipment adequate?
 - **Question it**–Technology–is it appropriate, where do you go, develop a team. Recognize naughty pile issues.
 - **Do something about it**– Strive for full access to communication, understand laws that support this, advocate for students, consider general educational plans, advocacy letters, and accommodations. Monitor need for referral.

Hand outs

- ▶ Got Hearing? Resources to help with students:
 - Educational Matrix website–www.mde-lio.cenmi.org
 - Karen Anderson Website with downloads and demo links–www.SucessforKidswithHearingLoss.com
 - EHDI website–www.michigan.gov/ehdi
 - EAA website–www.edaud.org
 - ASHA Website–www.asha.com
 - Guide to Access Planning (GAP)–www.phonak.com
 - MSHA Audiology committee–www.michiganspeechhearing.org/audiology.php
 - Sound Support–www.med.umich.edu/childhearinginfo/

References

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