

ACOUSTICS



WHY THEY MATTER

Northern Virginia Resource Center for Deaf and Hard of Hearing Persons
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www.nvrc.org



Bonnie B. O'Leary, Outreach Manager, Certified Peer Mentor
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NVRC – CELEBRATING 36 YEARS

- **Mission:** To empower deaf and hard of hearing individuals, and their families, through education, advocacy and community involvement.
- **Services:** Outreach and education, information and referral, hearing screenings, mentoring, weekly email news, ASL interpreting program, and advocacy for deaf, hard of hearing, late-deafened and deafblind individuals in Northern Virginia. www.nvrc.org

Amplified and captioned
phones

Alerting systems

Personal amplifiers

TV listening systems

Apps

(Not hearing aids!)

Device Demonstration Room



Contact Debbie Jones at djones@nvrc.org
for appointment

What do hearing loss and acoustics have in common?



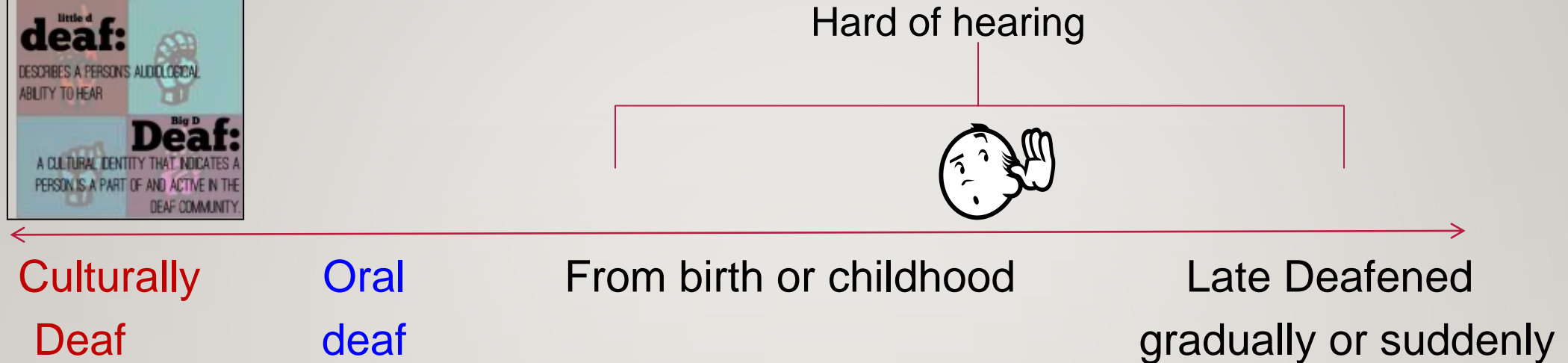
They are both invisible.

Understanding Hearing Loss...

...helps us understand WHY acoustics matter



Continuum of Deafness/Hearing Loss



Differences in communication preferences, degrees and types of hearing loss, suddenness and age of onset

Influencing factors: age, gender, culture, support system, financial stability, behavioral patterns and cognitive abilities, availability of resources

Aging and Hearing Loss

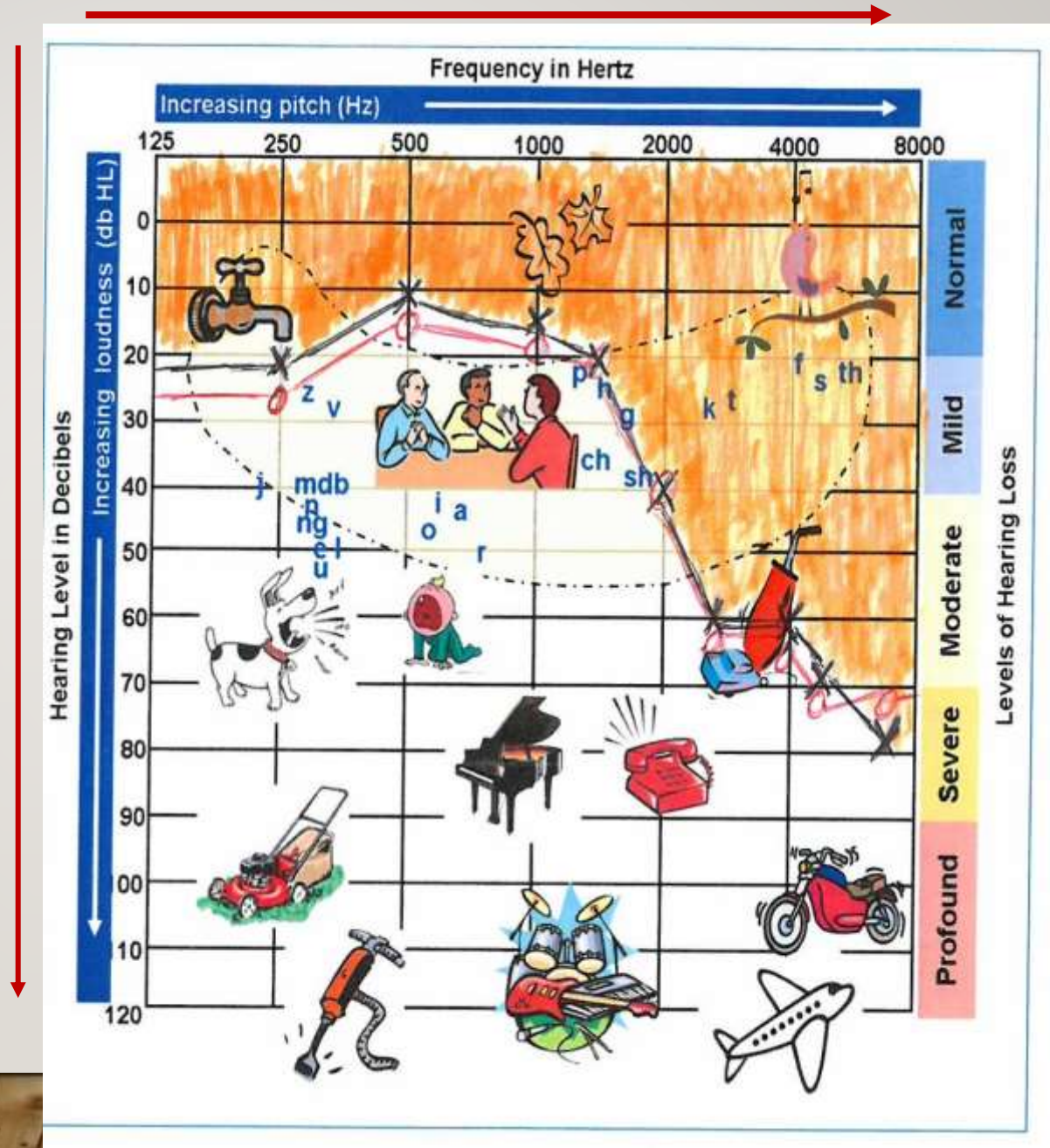
1 out of 3 seniors over age 65, 2 out of three over age 75



Fairfax County Aging Stats

- The County reports that 1 in 7 residents is 65+
- They project that by 2035 the ratio will be 1 in 5
- There are 95,875 residents between 65 and 74
33% = 30,333
- There are 62,241 residents over 75
66% = 41,079
- A total of 71,412 Fairfax County residents potentially have age-related hearing loss

Aging into high frequency hearing loss



EXAMPLE OF SOUND VISUALIZATION

- The rest room is upstairs to your right.
- Specials today include steak tartare and fish and chips with a special house sauce.
- Can I get you fresh towels and some soaps?

Yellow letters represent sounds in the high frequencies, blue letters represent sounds in the mid frequencies.

"It's windy here."

"No, it's Thursday."

"I'm thirsty too, let's make tea."



Three Popular Myths



1. HEARING AIDS AND COCHLEAR IMPLANTS ARE LIKE GLASSES FOR THE EARS



Limitations include:

- ❖ Distance from sound source
- ❖ Clarity of speaker/difficult speech patterns
- ❖ Background noise/other environmental challenges



2. DEAF AND HARD OF HEARING PEOPLE CAN LIPREAD OR SPEECHREAD

➤ *Lipreading:*

- Focus on lips

➤ *Speechreading:*

- Focus on lips, teeth, tongue, jaw, eyes, facial expressions, body language

- Only 30% of English is discernible on the lips.....which means 70% is not!

3. USE OF AMPLIFICATION BENEFITS PEOPLE WITH HEARING LOSS

- Speech generally sounds distorted to someone with a hearing loss
- Amplifying that speech through a PA system can make it worse by making it louder, not clearer

False



- A direct feed to the ear/s can be much more helpful
- FM system, I & R, hardwired

PockeTalker Pro

True!



Components of Communication

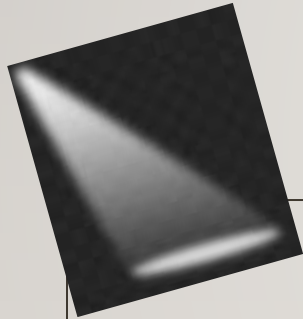
Speaker

Listener

Environment

Message

Acoustics = Environment



Community and Senior Centers,
Some Retirement Communities,
and Public Places

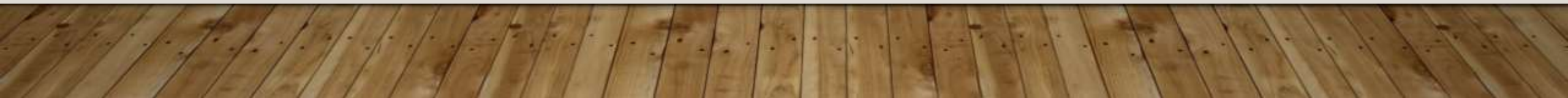
Community Center Renovation, Arlington



Older Adults Wellness Center, Fairfax



Retirement Community venue for Presentations and Gatherings, Loudoun



HOW ACOUSTICS AFFECT PEOPLE WITH HEARING LOSS

ACOUSTIC CHALLENGE

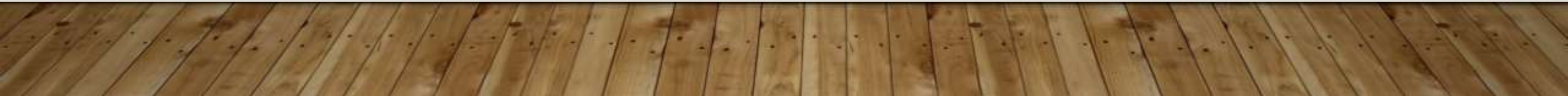
- Constant hum from vents
- Low maintenance floors, walls, super high “ceilings”
- Room dividers do not mute sounds from adjoining spaces

WHY IT'S DIFFICULT

- **Background noise**, can't regulate vents in any room to create quiet for conversation
- **Speech sounds bounce and echo** off surfaces, making conversation difficult if not impossible
- **Creates bleed**, competing noise

FAVORABLE, WELCOMING ACOUSTICS FOR PEOPLE WITH HEARING LOSS

- Plenty of sound absorption, enabling ease of communication
- Low ceilings, acoustic tiles
- If codes require cleanable surfaces such as wood-like floors, perhaps a subfloor to absorb footfalls.
- No hum from vents, or an ability to control the vents in each room
- Assistive Listening Systems in rooms where presentations are given
- Reston Community Center is an excellent example of a welcoming acoustic environment



What About Echo in Nursing Homes and other Healthcare Settings?

- *Causes stress for patients
- *Causes stress for staff
- *Affects speech intelligibility among staff, patients, and between staff and patients
- *Can make sleeping difficult
- *Can affect patient behavior

Sound Control for Improved Outcomes in Healthcare Settings
Anjali Joseph, Ph.D., Roger Ulrich, Ph.D.

IF YOU CAN'T CHANGE THE ENVIRONMENT YOU ARE IN, CHANGE *ENVIRONMENTS*

Too much echo?



Find a quieter setting



“Having a good acoustic environment can support inclusion and reduce confusion in people with dementia.”

McManus and McClenaghan (2010)

“Of all the senses, hearing is the one that has the most significant impact on people with dementia in terms of quality of life.”

from Social Care Institute for Excellence: Dementia

Fairfax County Public Safety Headquarters Training Classroom

Great
acoustics!



Dropped ceiling,
acoustic tiles

Carpet on floor



WHAT ABOUT APPS?

- There are still seniors who are reluctant to use certain types of technology
- AI often makes errors in a poor acoustic environment, so it is not 100% reliable
- A recent personal example, at Staples:
 - The check-out associate asked “Can I give you a bag?”
 - My app read “Can I give you a bath?”

What do Experts Say?



Shahriar Amiri
Chief Building Officer, Arlington County
Member ADAAG Federal Advisory Committee
Chair, ADAAG Plumbing Subcommittee
Member American National Standards Institute A117.1 Committee

- Mechanical Engineer
- 37 years working with architects, developers, design consultants
- ADA Title II requires equal access in assembly areas for HOH – technologies installed
- **Acoustics haven't caught up** – haven't historically been on the radar for HOH except relating to classrooms



Kimberly Paarlberg
International Code Council (ICC) Senior Staff Architect
Codes and Standards Dept.
Carmel, IN

- I-codes currently include acoustics requirements only in classrooms
- Acoustics in other locations would be designer's choice, depends on use of the space
- Code criteria for persons with hearing loss **do not include acoustics**
- Acoustical ceiling tiles are an expense
- Anyone can propose a code change to the I-codes
- Community Centers might consider classroom acoustics for senior areas?



Audrey Moore Recreation Center

Will be renovated by
the **DLR Group**



Anat Gant,
Los Angeles
Acoustics



Elise Robinson,
Washington, DC
Architect



David Manley,
Omaha
Acoustics

They expect to have a choice of 3 designs ready to show the County in a few months.

Senior Center acoustics will be addressed in the months after the design is chosen.

A Final Thought

Fairfax County strives to encourage residents of all ages and disabilities to age in their own communities, to take advantage of everything the County has to offer.

Acoustics do matter. Improving acoustics in public spaces where seniors congregate, and in private facilities such as retirement communities, our older adults will be able to engage in more socialization and participate in community life more fully.



If you would like a copy of this
PowerPoint, please email me:

boleary@nvrc.org

Thank you for listening! 😊