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Transitions in Audiology Practices Series:

Promoting Interventional Audiology in Multidisciplinary Practice

Lori Zitelli, AuD, CH-TM

Lori Zitelli, AuD, CH-TM

Lori Zitelli joined UPMC as an audiologist in 2012. She became Managing Audiologist in 2021. She received her clinical doctorate in Audiology from the University of Pittsburgh. She is a part-time lab instructor at the University of Pittsburgh and teaches a Clinical Procedures Lab for first year AuD students. Her special interests include amplification, tinnitus/decreased sound tolerance evaluation and treatment, clinical education, clinical research, and interventional audiology. She is an active fellow of the American Academy of Audiology.

Disclosures

- **Presenter Disclosure**:
  - Financial: Lori Zitelli receives a salary from UPMC, University of Pittsburgh, Cranberry Hearing & Balance, & Treble Health, Inc. She received an honorarium for this presentation. Non-financial: Lori Zitelli is a trustee of the AAA Foundation; a member/volunteer of AAA and ASHA.
- **Content Disclosure**: This learning event does not focus exclusively on any specific product or service.
- **Sponsor Disclosure**: There is no external sponsor for this course.

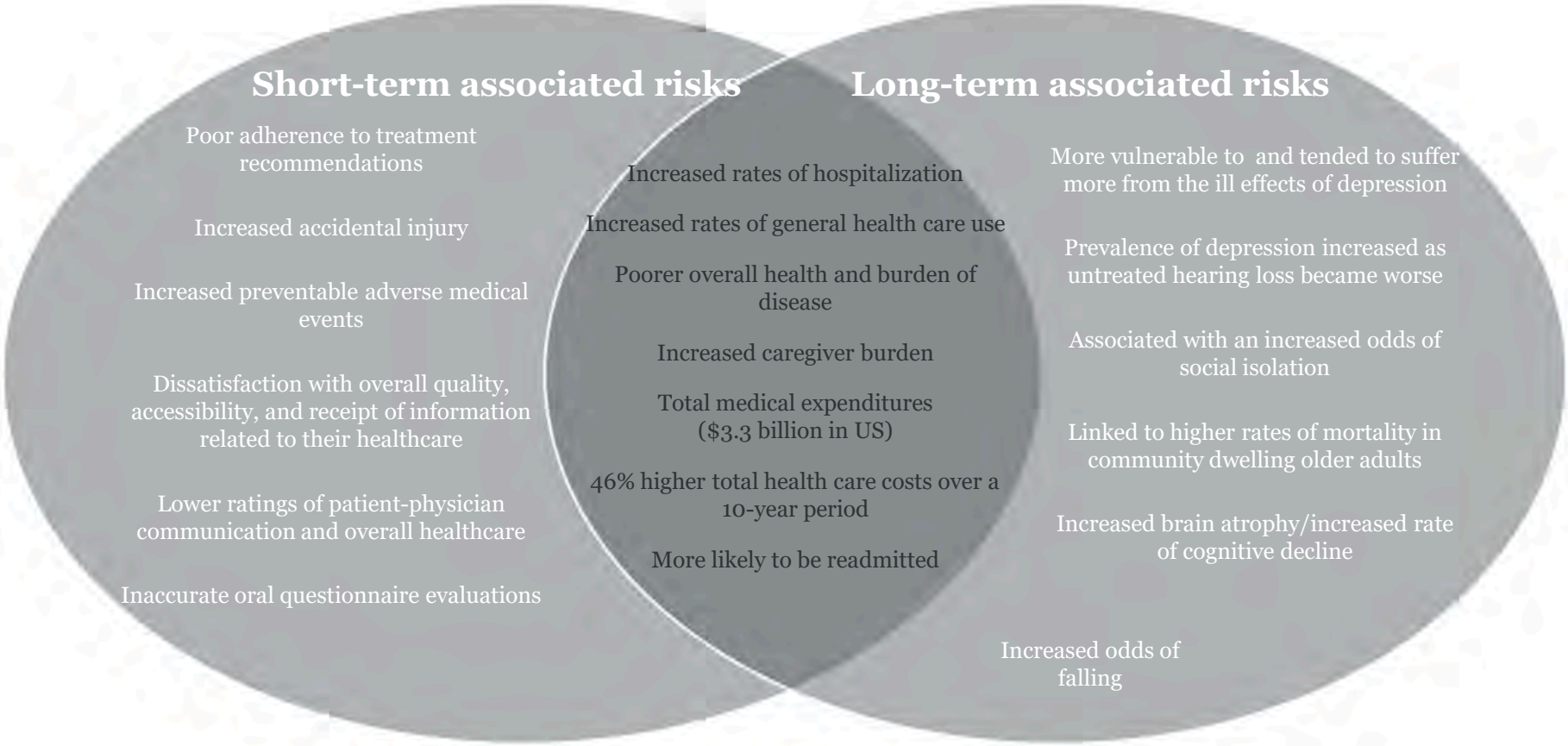
Learning Outcomes

After this course, participants will be able to:

1. Describe the negative effects that untreated hearing loss can have on healthcare outcomes.
2. Outline the critical components of an interventional audiology program.
3. List 3 different settings where interventional audiology services can be implemented.

Today's Agenda:

There are many risks associated with untreated HL.



Too many references to list here – see reference list at end!

Several studies using randomized-controls show AHL contributes to the acceleration of cognitive and physical decline in adults

Lin et al, 2013	Cognitive function
Fisher et al, 2014	Early Death
Mick et al, 2014	Social Isolation
Li et al, 2014	Depression
Lin et al, 2014	Cortical Changes

Lin, F. R., Yaffe, K., Xia, J., Xue, Q. L., Harris, T. B., Purchase-Helzner, E., ... & Health ABC Study Group, F. T. (2013). Hearing loss and cognitive decline in older adults. *JAMA internal medicine*, *173*(4), 293-299.

- 1984 adults (70-79) followed over 12 years to evaluate whether HL is independently associated with cognitive decline.
- 1162 participants with baseline HL had 32% / 41% poorer scores on cognitive function tests than those with normal hearing

The Take-Home Messages:

- Participants with HL have a 24% increased risk for cognitive impairment.
- Individuals with HL decline at a faster rate than those without.
- A 25-dB HL = 7 years of cognitive decline.

Fisher, D., Li, C. M., Chiu, M. S., Themann, C. L., Petersen, H., Jónasson, F., ... & Cotch, M. F. (2014). Impairments in hearing and vision impact on mortality in older people: the AGES-Reykjavik Study. *Age and ageing*, *43*(1), 69-76.

- 4926 pts (67+) into 3 groups+: vision-only impairment, hearing-only impairment, and dual sensory impairment followed over 7 years

The Take-Home Messages:

- Significantly increased mortality from all-cause and cardiovascular disease was observed for the HI and DSI, especially among men.
- After further adjustment for mortality risk factors, individuals with HI remained at higher risk for death from cardiovascular disease.

Mick, P., Kawachi, I., & Lin, F. R. (2014). The association between hearing loss and social isolation in older adults. *Otolaryngology–Head and Neck Surgery*, *150*(3), 378-384.

- Is age-related HL associated with social isolation?
- 1453 participants (ages 60-84)

The Take-Home Messages:

- Women within this age range are more likely to alter their lifestyle due to their hearing loss.
- Thus, they are more likely to become socially isolated.

Li, C. M., Zhang, X., Hoffman, H. J., Cotch, M. F., Themann, C. L., & Wilson, M. R. (2014). Hearing impairment associated with depression in US adults, National Health and Nutrition Examination Survey 2005-2010. *JAMA otolaryngology–head & neck surgery*, *140*(4), 293-302.

- Estimated prevalence of depression among adults with HL
- 18318 participants
- Prevalence of depression increased as HL got worse (except among deaf)

The Take-Home Message:

- Adults under the age of 70, particularly women, had a significant association between moderate hearing loss and depression.

Lin, F. R., Ferrucci, L., An, Y., Goh, J. O., Doshi, J., Metter, E. J., ... & Resnick, S. M. (2014). Association of hearing impairment with brain volume changes in older adults. *Neuroimage*, *90*, 84-92.

- Brain volume changes monitored for ~6.5 years in 126 adults (56-86)

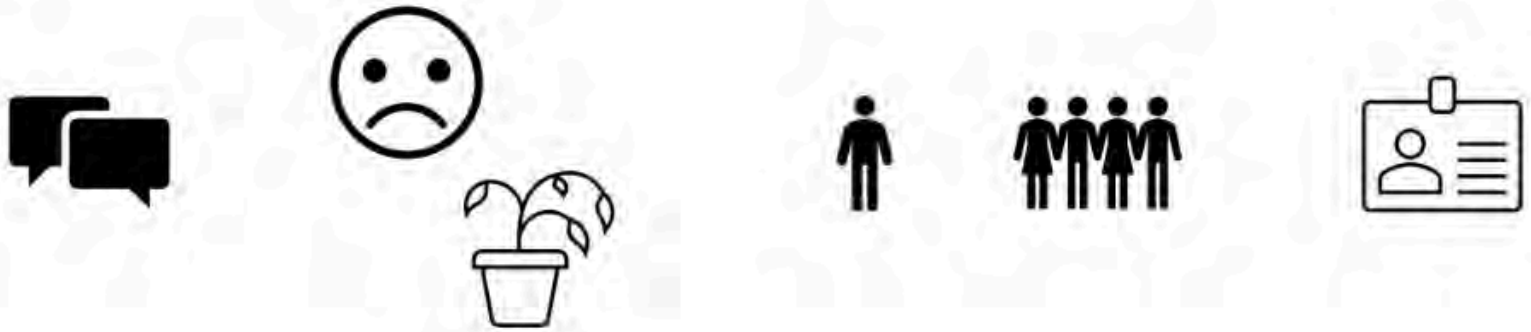
The Take-Home Message:

- Peripheral hearing loss is independently associated with accelerated brain atrophy in whole brain and regional volumes concentrated in the right temporal lobe.

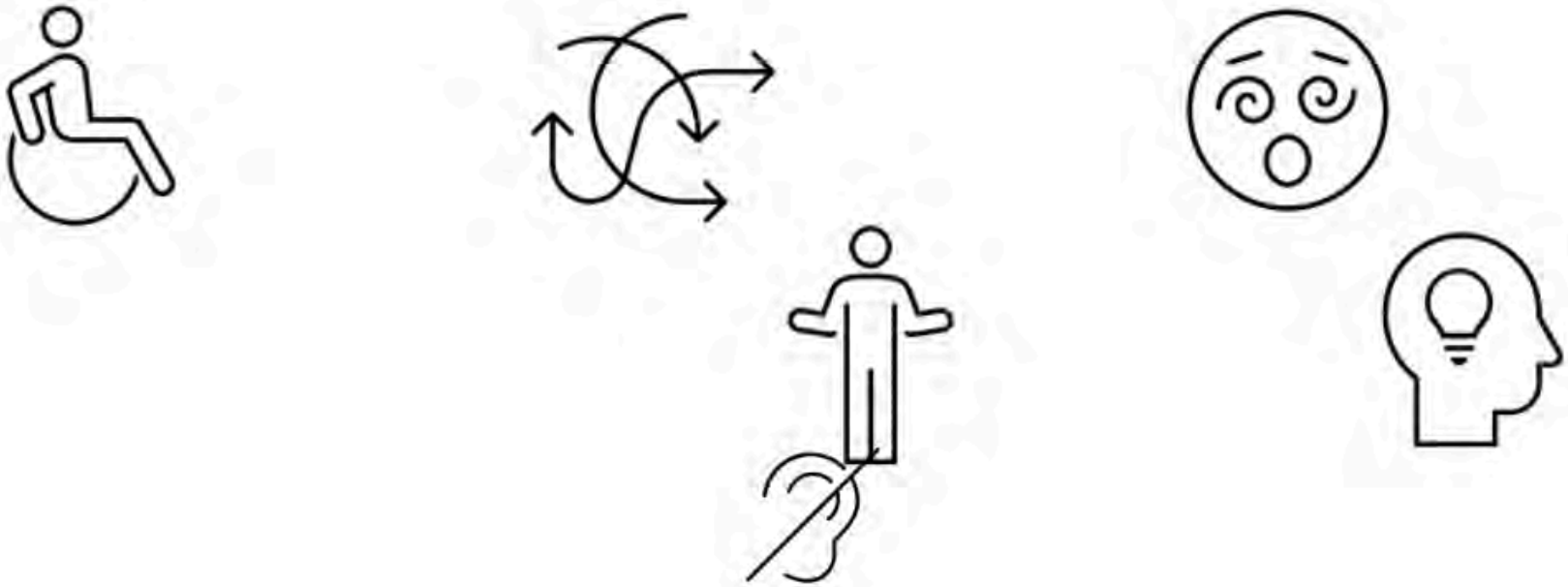
Audiological data are being studied in the context of other comorbidities…and the verdict is IN.

- Lin et al (2013) – Hearing Loss and Cognitive Decline in Older Adults
- Lin, Niparko, & Ferrucci (2011) - Hearing Loss Prevalence in the United States
- Cruickshanks et al (1998) – Cigarette Smoking and Hearing Loss
- Jones & White (1990) - Mental Health and Acquired Hearing Impairment: A Review
- Genther et al (2013) - Association of Hearing Loss with Hospitalization and Burden of Disease in Older Adults

Hearing loss is being recognized as a public health crisis.



Hearing loss is a leading cause of years living with a disability (YLD)…



…and the third most common chronic physical condition after arthritis and heart disease.

Age-related hearing loss is a public health issue!

Haile et al, 2021; Blackwell, Lucas, & Clarke, 2012

Dementia Prevention, Intervention and Care

Lancet Commission 2020

40%
of dementia

Potentially modifiable

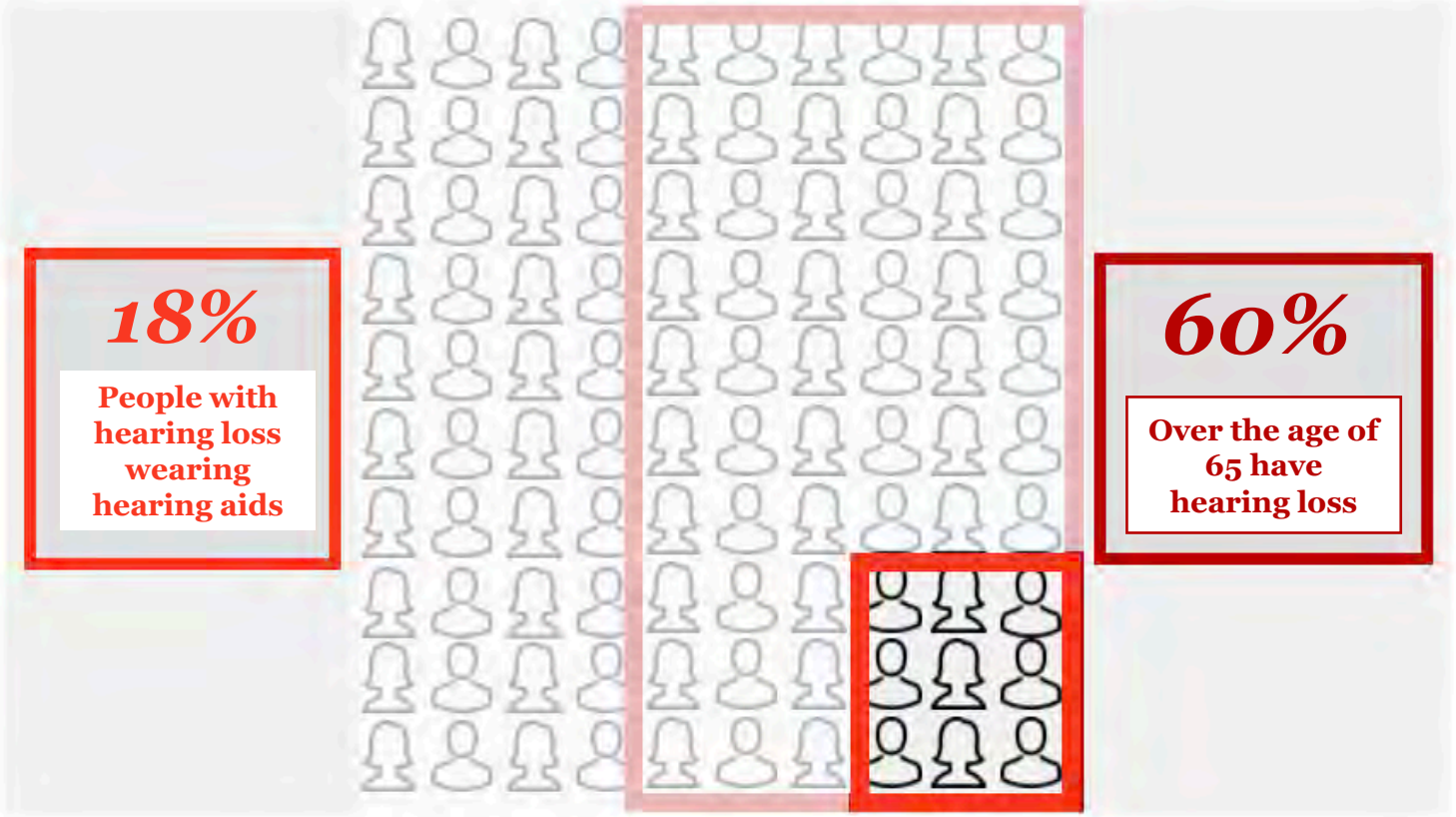
Hearing impairment

Single largest modifiable risk factor

12 risk factors:

Education
Hypertension
Hearing impairment
Smoking
Obesity
Depression
Physical inactivity
Diabetes
Low social contact
Alcohol consumption
Traumatic brain injury
Air pollution

Livingston et al, 2017



Chien et al, 2012

Hearing loss is under-recognized.

~40%

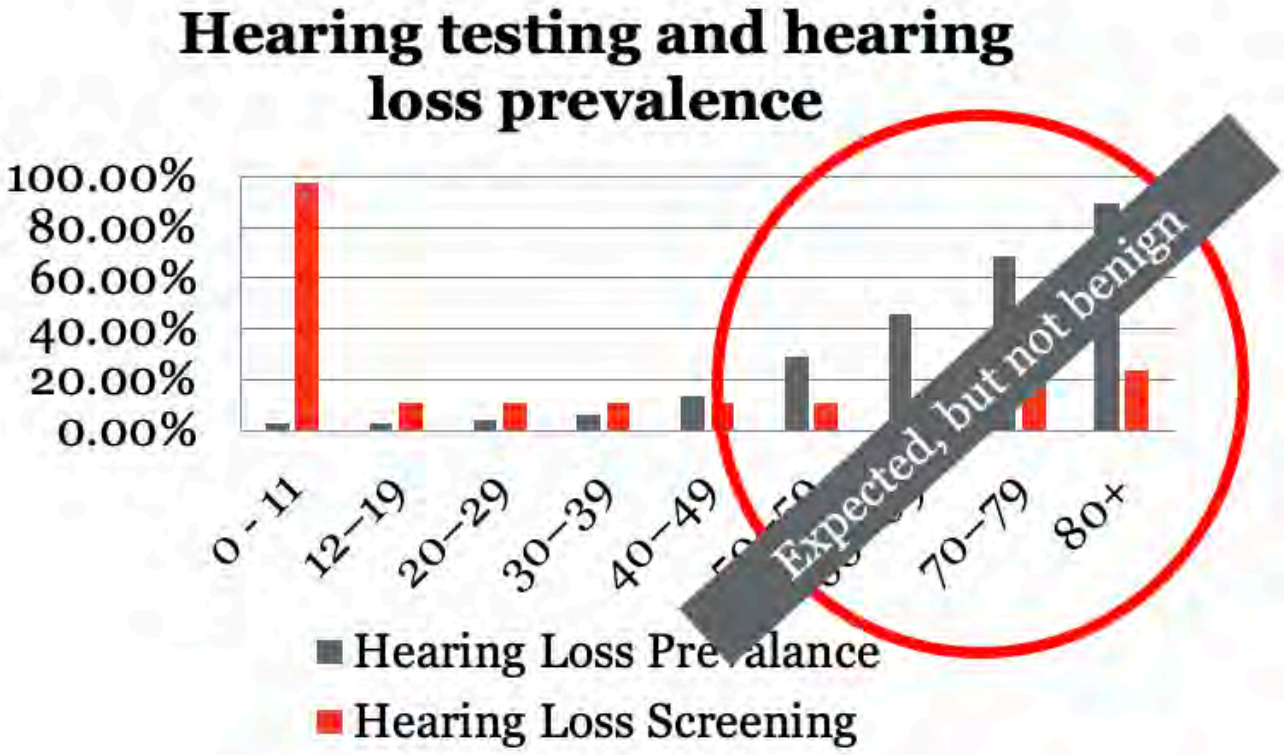
of people who have hearing loss recognize it

~50%

of health providers recognize hearing loss

Mormer et al, 2020

We are very good at identifying hearing loss in babies, but we expect adults to self-identify.



2019 Summary of National CDC EDHI Data

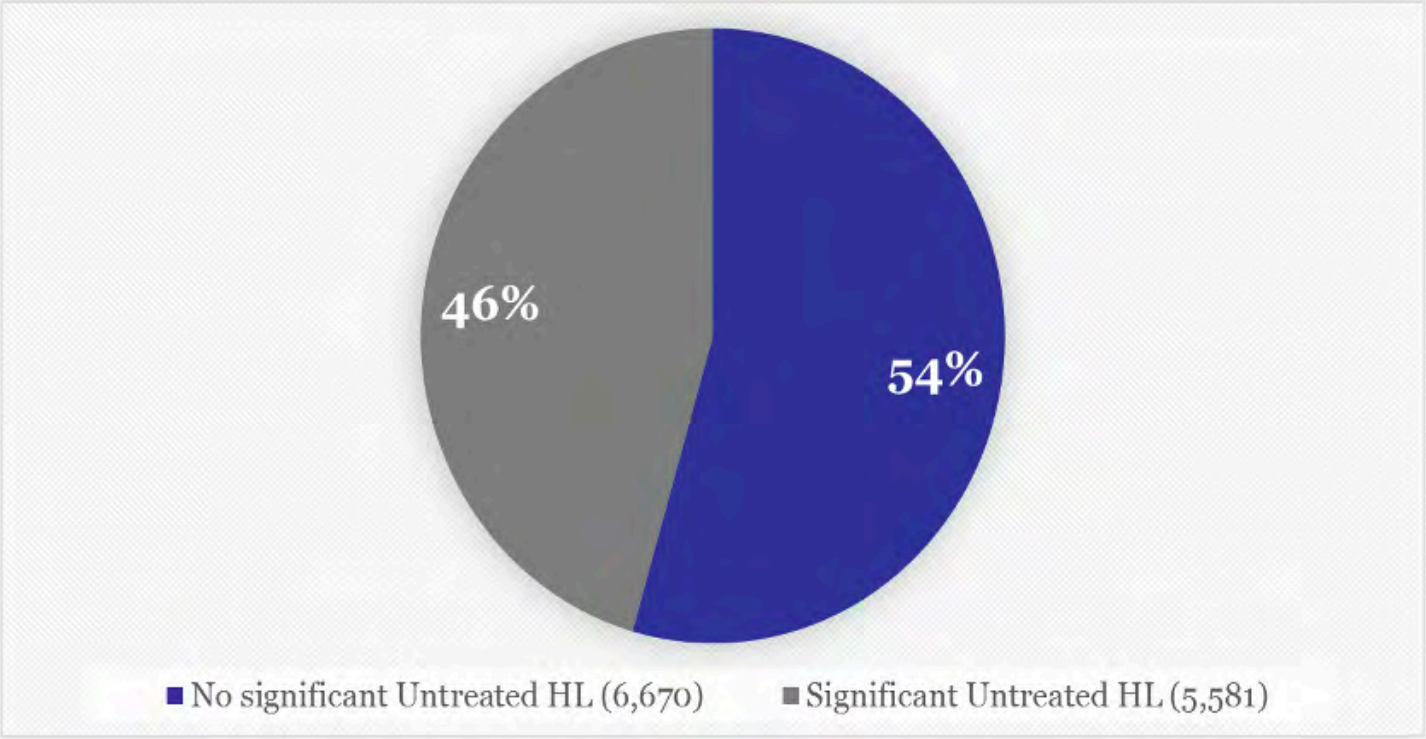
Lin, Niparko, & Ferrucci, 2011

Abrams & Kihm, 2015

Equipped with hospital census data and the estimates for the prevalence of untreated hearing loss in age groups over the age of 65 (65-70, 71-80, 81-85, 85+), it can be estimated how many patients age 65+ were admitted and have probable significant untreated HL.

For example:

UPMC PUH / MUH data

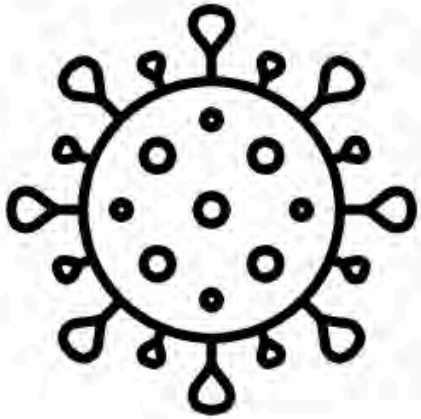


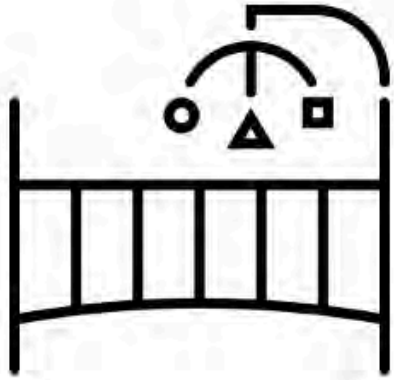
2016-2017 Fiscal Year
12,251 admits

The Provider's Assumption	The Facts
"I'll be able to tell when my patients have hearing loss because they'll be wearing hearing aids."	Only an estimated 3.8 million (14.2%) of Americans 50 years old or older with hearing loss actually wear hearing aids
"When I ask my patients if they have hearing loss, they'll be able to tell me."	Many individuals with significant hearing loss do not self-identify as someone with hearing loss, so many patients may not recognize that they have significant hearing loss and therefore will not request assistance

Chien & Lin, 2012; Palmer et al, 2009

Interventional Medicine emphasizes treatment of chronic disease, early detection/intervention, and promotion of a healthy lifestyle.

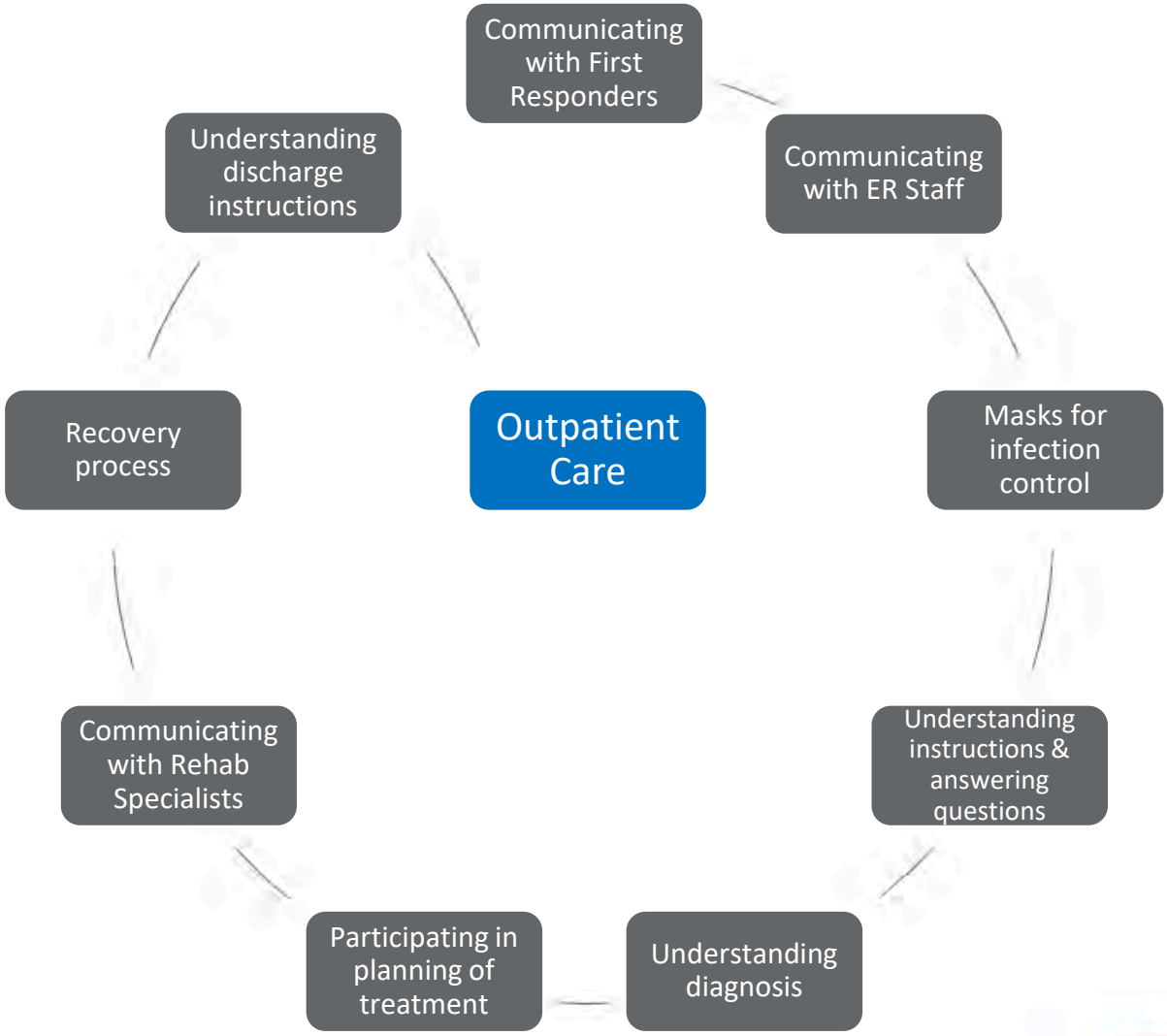




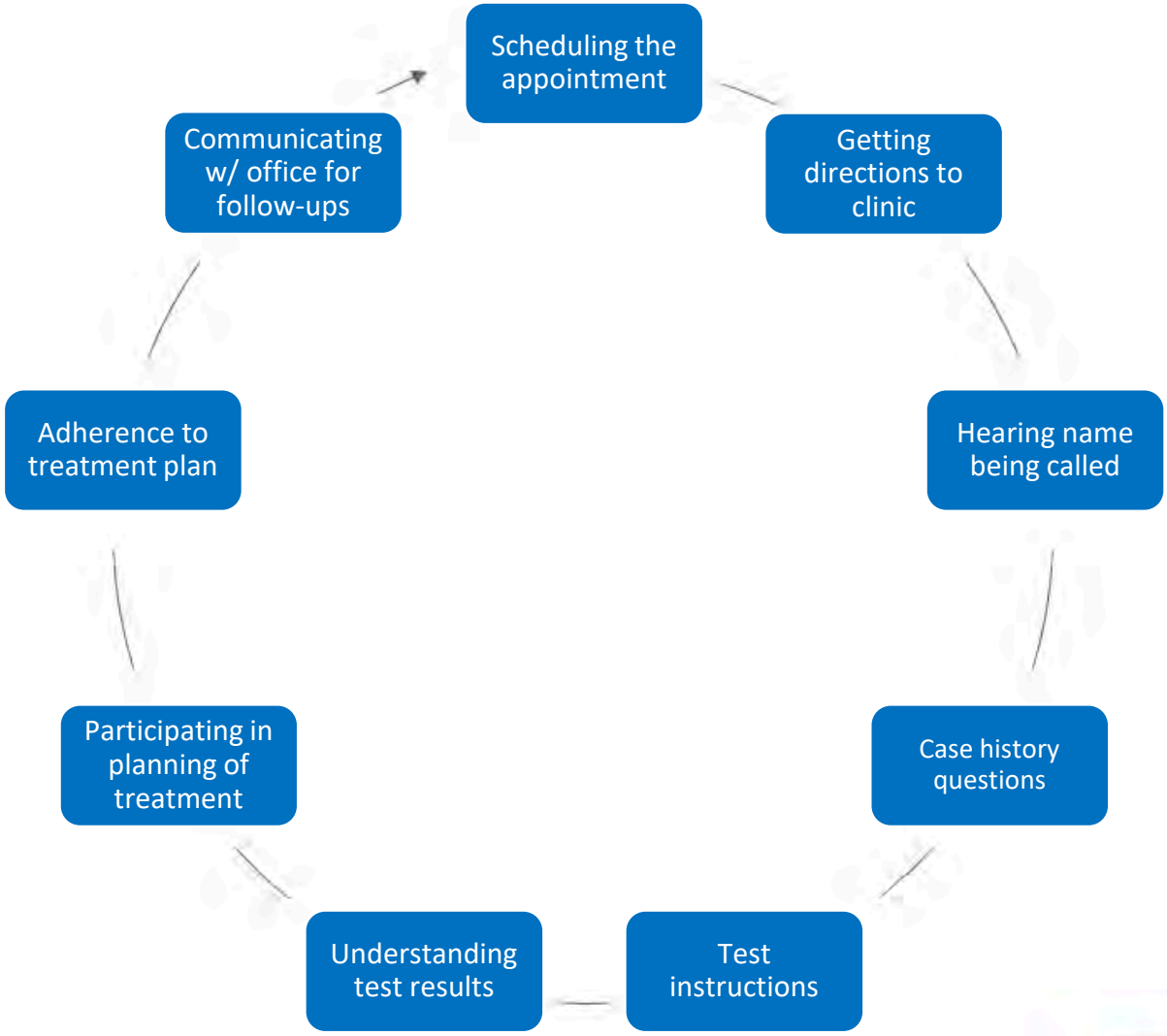
Interventional Audiology
(coined by Brian Taylor & Richard Tysoe):
Managing hearing loss in order to impact other primary concerns.
In this case, hearing loss is neither the person's nor the other health care provider's primary concern.
Pairing with physicians can be the ticket to reaching previously unreached patients.

Taylor & Tysoe, 2012

Hearing loss affects care as an inpatient…



…and as an outpatient.



Patients perceive that healthcare providers don't always have the best attitude about serving patients with disabilities. There is a need for our intervention!

Sanchez et al (2000)

Perceived accessibility versus actual physical accessibility of healthcare facilities

Hemsley et al (2001)

Nursing the patient with severe communication impairment

Grabois, Nosek, & Rossi (1999)

Accessibility of primary care physicians' offices for people with disabilities: An analysis of compliance with the Americans with Disabilities Act

Interventional Audiology

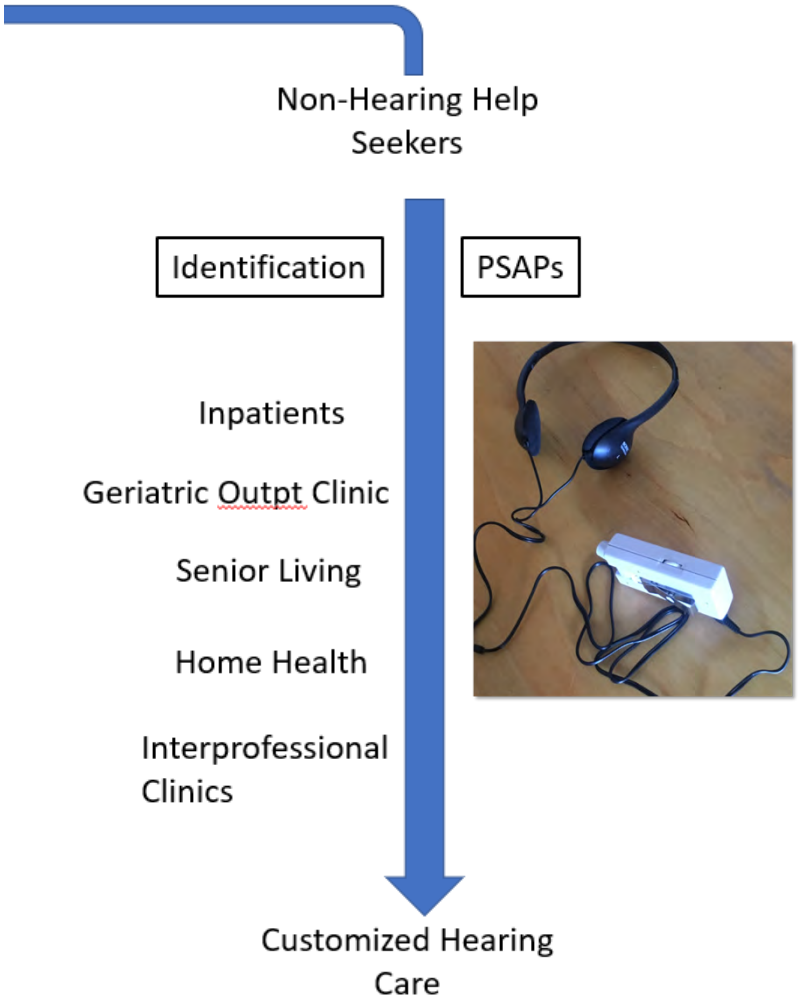
If you're unable to…

…understand care providers…

…participate in decision-making…

…stay connected to friends and family…

…you're not able to fully access healthcare.



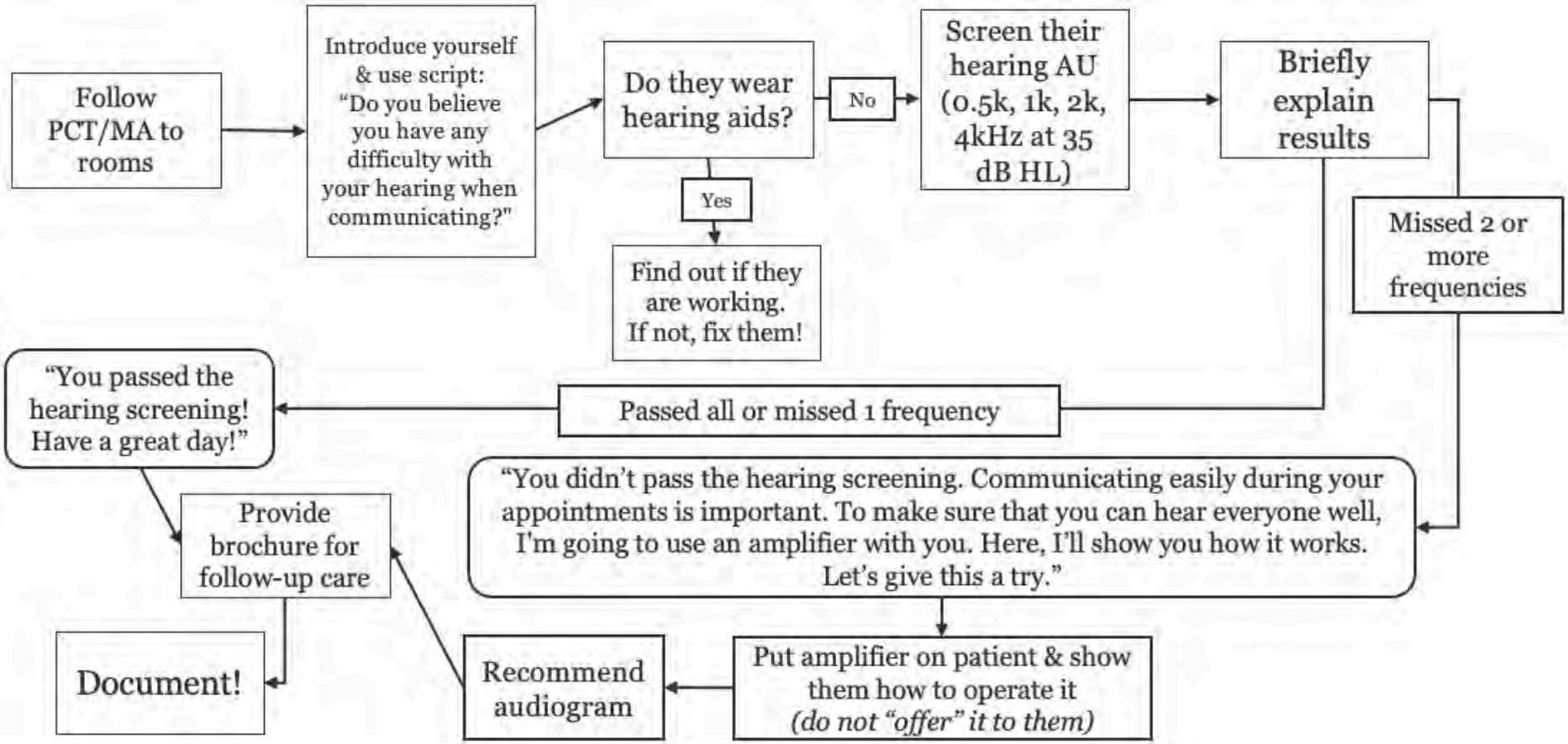
Communication challenges in a health care setting:

Challenges

- Patient feels anxious, unwell
- Unfamiliar terminology
- Masks
- Noise
- Sense of rushed communication
- Line of vision when health care provider is using the e-record
- Hearing Loss
- Vision Loss
- Cognition
- Language barriers

What can be done?

Example Clinic Flow



Several strategies specific to audiology may result in the most effective interventional audiologic care.

- Be the first provider to see each patient.
- Be efficient.
- Develop a quick and easy way to relay information about the patient's communication status to your team members.
- Be aware of your surroundings and be flexible.
- Promote adherence to your recommendations by making them as easy as possible to follow.

Considerations for an Interventional Audiologist

Have a script to explain what you are doing there

- Remember, you'll be the first one in the room. They will be confused when you tell them they are getting a hearing screening. They think they are here for evaluations related to their surgery.
- Example: "My name is Lori. I'm here from audiology. You'll be seeing several people today and it's really important that you can communicate with them so that you are able to participate in your care. To make sure you can, we're going to do a quick hearing screening before any of the rest of your appointments."

Use a method of evaluation that is FAST.

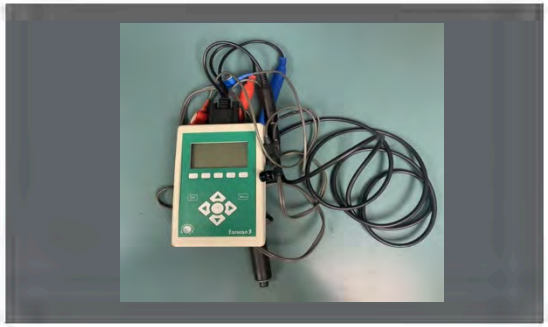
- Our goal is to be unobtrusive and stay out of everyone's way!
- We want our participation in this clinic to be seamless.

Use equipment that:

- …is portable (you will be moving in and out of rooms)
- …doesn't require a wall outlet (this is a pain in the you-know-what and a time-waster)

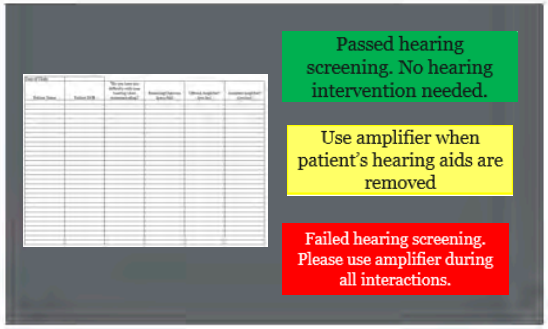
Bring with you:

Plug in when not in use



Plus foam inserts

You can also bring hearing aids back to the audiology clinic for troubleshooting, tubing changes, etc.

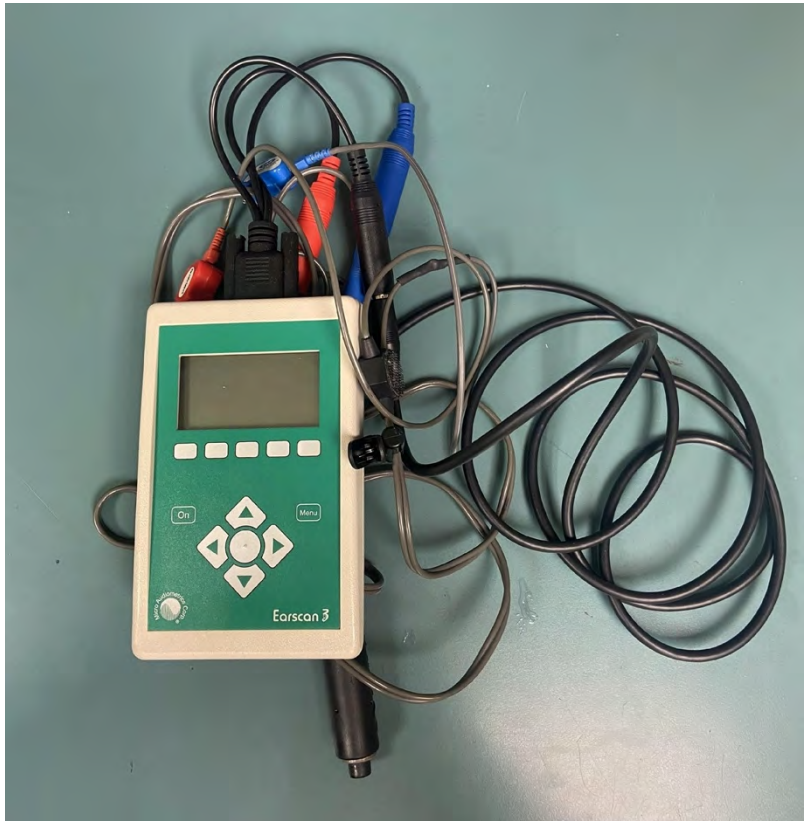


How to Recommend Follow-Up Care

- For someone who fails the hearing screening:
  - “When you are ready, the next step would be to get a comprehensive hearing test. I know you have other things you are dealing with right now and it’s ok if this is not a priority right now. I’ll give you some information that tells you how to schedule that type of appointment and you can do it whenever you’re ready. The good news is that you'll have this amplifier available to you all day today, and then when you arrive for your surgery and post-surgery as well.”
    - We really want to spin this to the focus on communication related to their health care right now.
  - Give them a brochure with the list of our clinics and contact info!

Example of a portable audiometer & screening protocol:

- Screening frequencies:
  - (500?), 1000, 2000, 4000
- Screening level:
  - 35 dB HL



Example of an amplifier:

Headset or earbuds for patient to wear

Microphone to pick up sound

Battery compartment for AAA battery (included, underside)

Wheel for on/off & volume adjustment

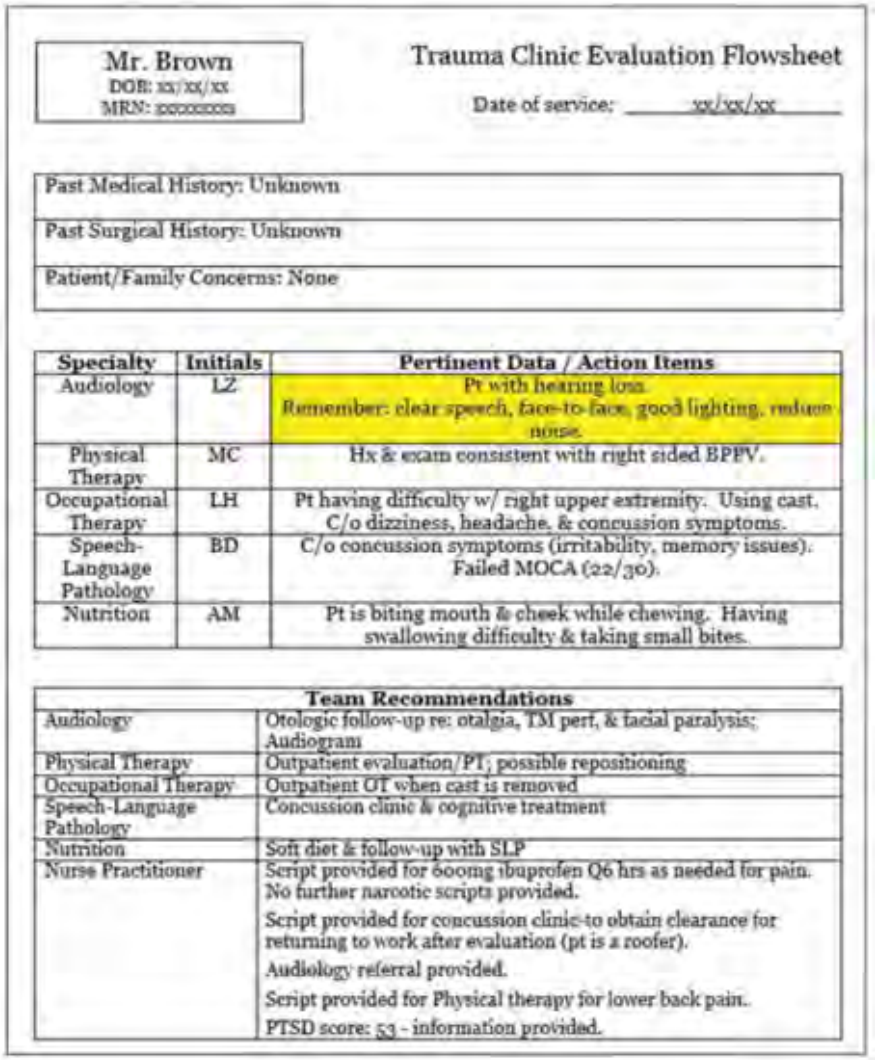
Clip for attaching to clothing or pocket

Off-label use of a PSAP (personal sound amplification product)

https://www.sonictechnologyproducts.com /superear-se5000

How to communicate information to other providers?

- Example of flowsheet from post-trauma clinic
- Be concise during in-person interactions and remember your audience
  - "He is wearing hearing aids. Please make sure you are facing him and speaking loudly and clearly."
  - "He has significant hearing loss. You need to use an amplifier when you're talking to him."
  - "He passed the hearing screening. You don't need to do anything differently."
  - **NOT** "He failed the hearing screening at 2000 and 4000 Hz in the left ear, and at 1000 and 2000 Hz in the right ear."



Mr. Brown
DOB: xx/xx/xx
MRN: xxxxxxxx

Trauma Clinic Evaluation Flowsheet

Date of service: xx/xx/xx

Past Medical History: Unknown
Past Surgical History: Unknown
Patient/Family Concerns: None

Specialty	Initials	Pertinent Data / Action Items
Audiology	LZ	Pt with hearing loss. Remember: clear speech, face-to-face, good lighting, reduce noise.
Physical Therapy	MC	Hx & exam consistent with right sided BPPV.
Occupational Therapy	LH	Pt having difficulty w/ right upper extremity. Using cast. C/o dizziness, headache, & concussion symptoms.
Speech-Language Pathology	BD	C/o concussion symptoms (irritability, memory issues). Failed MOCA (22/30).
Nutrition	AM	Pt is biting mouth & cheek while chewing. Having swallowing difficulty & taking small bites.

Team Recommendations	
Audiology	Otologic follow-up re: otalgia, TM perf, & facial paralysis; Audiogram
Physical Therapy	Outpatient evaluation/PT; possible repositioning
Occupational Therapy	Outpatient OT when cast is removed
Speech-Language Pathology	Concussion clinic & cognitive treatment
Nutrition	Soft diet & follow-up with SLP
Nurse Practitioner	Script provided for 600mg ibuprofen Q6 hrs as needed for pain. No further narcotic scripts provided. Script provided for concussion clinic to obtain clearance for returning to work after evaluation (pt is a roofer). Audiology referral provided. Script provided for Physical therapy for lower back pain. PTSD score: 53 - information provided.

In the CPC interdisciplinary clinic, you will screen patients' hearing, interpret the results, and apply one of these stickers to their flow sheet:

Passed hearing screening. No hearing intervention needed.

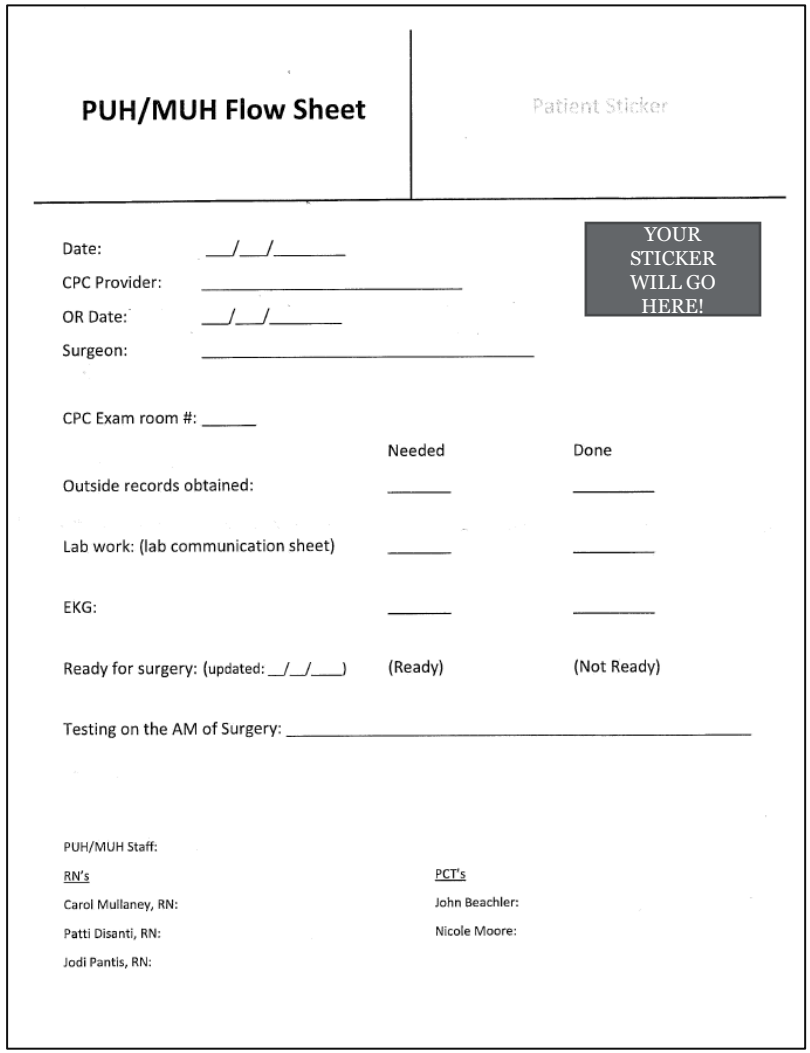
Green = go!

Use amplifier when patient's hearing aids are removed

Yellow = be careful!

Failed hearing screening. Please use amplifier during all interactions.

Red = danger zone!



PUH/MUH Flow Sheet

Patient Sticker

YOUR STICKER WILL GO HERE!

Date: __/__/_____

CPC Provider: _____

OR Date: __/__/_____

Surgeon: _____

CPC Exam room #: _____

	Needed	Done
Outside records obtained:	_____	_____
Lab work: (lab communication sheet)	_____	_____
EKG:	_____	_____
Ready for surgery: (updated: __/__/____)	(Ready)	(Not Ready)

Testing on the AM of Surgery: _____

PUH/MUH Staff:

RN's

Carol Mullaney, RN:

Patti Disanti, RN:

Jodi Pantis, RN:

PCT's

John Beachler:

Nicole Moore:

We track data from each of our clinics and the AuD students use it for their research projects.

- Daily log
- Spreadsheet

Date of Clinic:					
Patient Name	Patient DOB	"Do you have any difficulty with your hearing when communicating?	Screening Outcome (pass/fail)	Offered Amplifier? (yes/no)	Accepted amplifier? (yes/no)

UPMC Center for Perioperative Care

Team-based
Multidisciplinary
"Prehabilitation"

Many thanks to the University of Pittsburgh Au.D. Students and Dr. Sam Esper!

The goal of the CPC is to identify and reduce surgical risks, ultimately resulting in improved outcomes.

- Patients identified as “high risk” account for more than 30% of ICU admissions, 70% of post-operative deaths, and 90% of the care provided during hospitalization.
- Anesthesiologists facilitate the multidisciplinary team.
  - We are now a part of this team!

Inpatient Activities

Many thanks to the UPMC Au.D. Externs!

UHEAR:

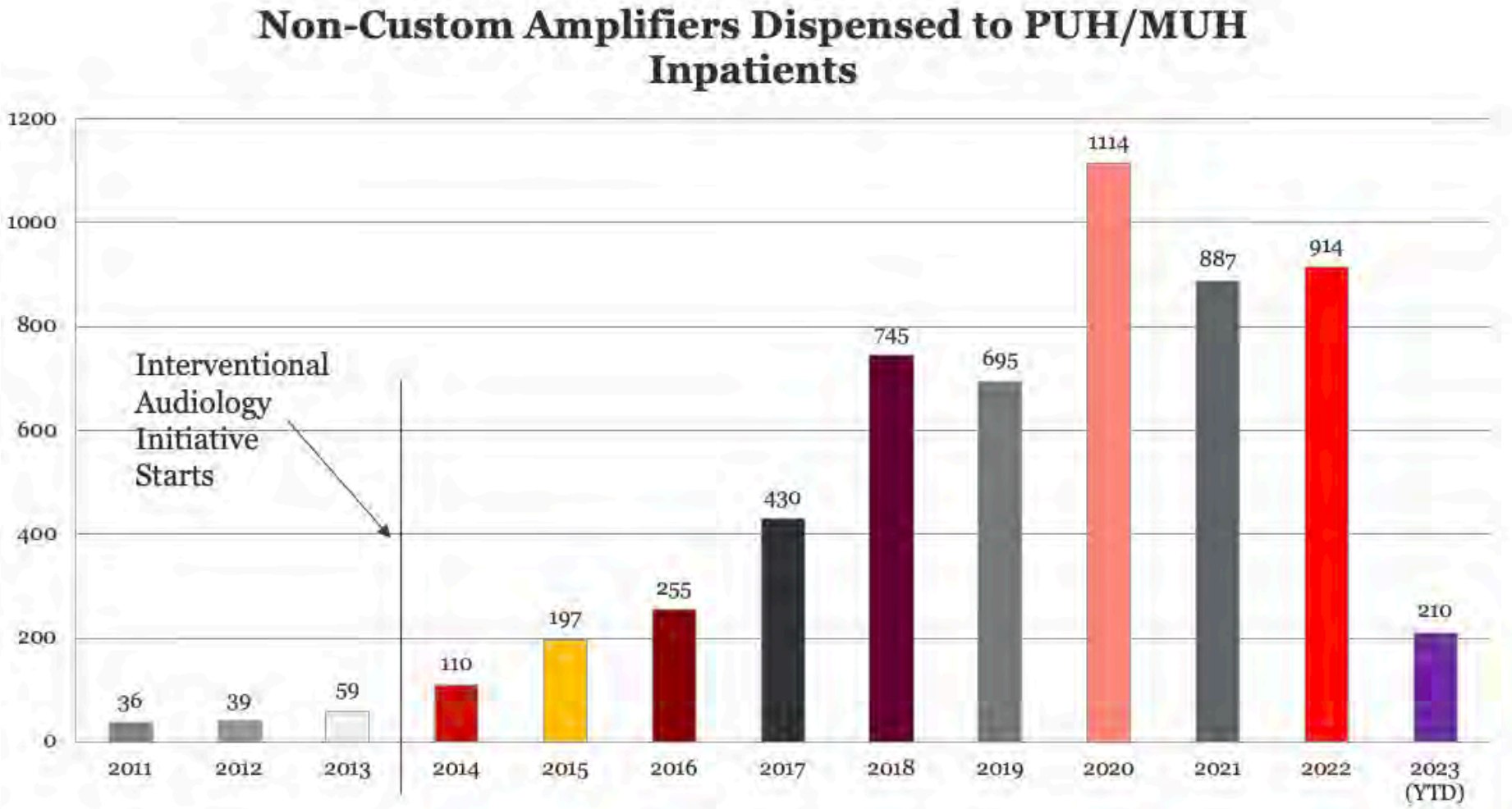
- **U**PMC
- **H**earing **E**ducation and **A**mplifiers for **R**ecovery

Diagnostic services

Hearing aid services

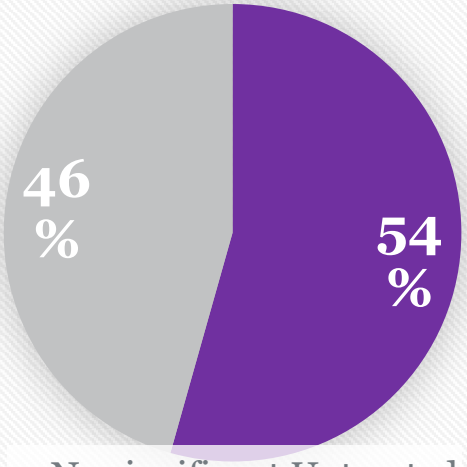
Amplifiers

Even though we're delivering more non-custom amplifiers than ever…

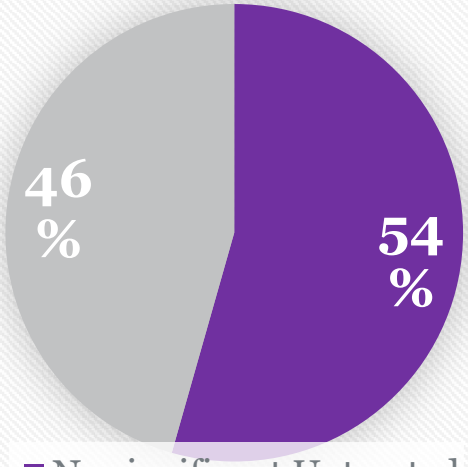


Armed with our hospital census data, we can estimate how many patients age 65+ were admitted and have significant untreated HL.

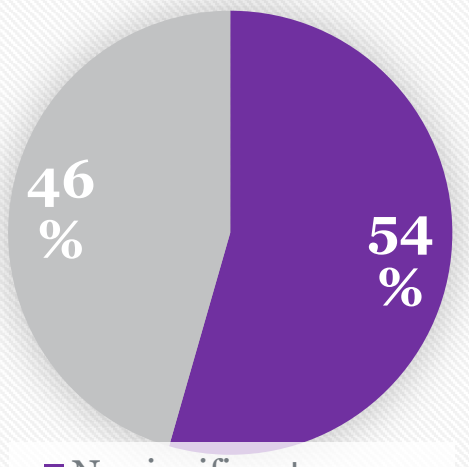
2014-2015 Fiscal Year
12,188 admits



2015-2016 Fiscal Year
12,098 admits

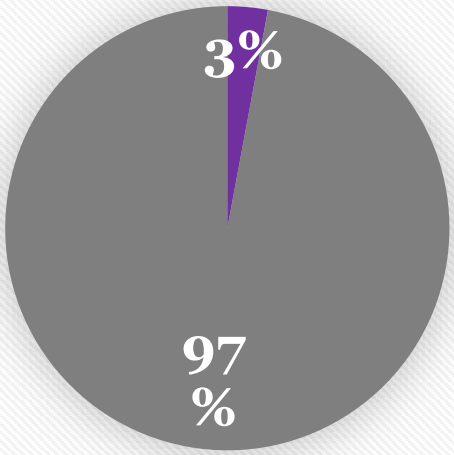


2016-2017 Fiscal Year
12,251 admits



There is ALWAYS more work to be done!

2014-2015 Fiscal Year
12,188 admits



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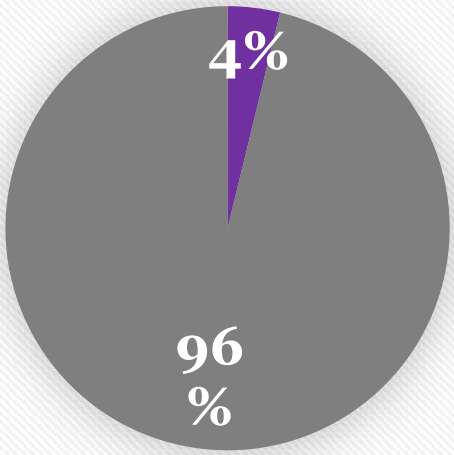
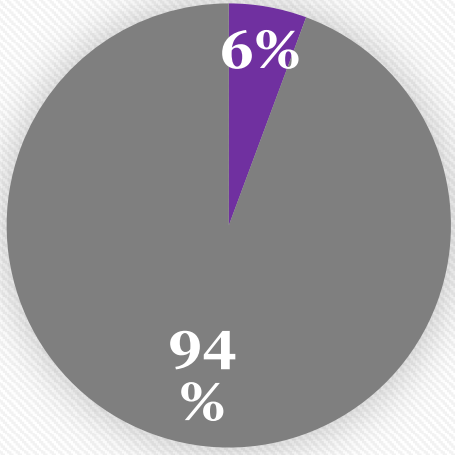
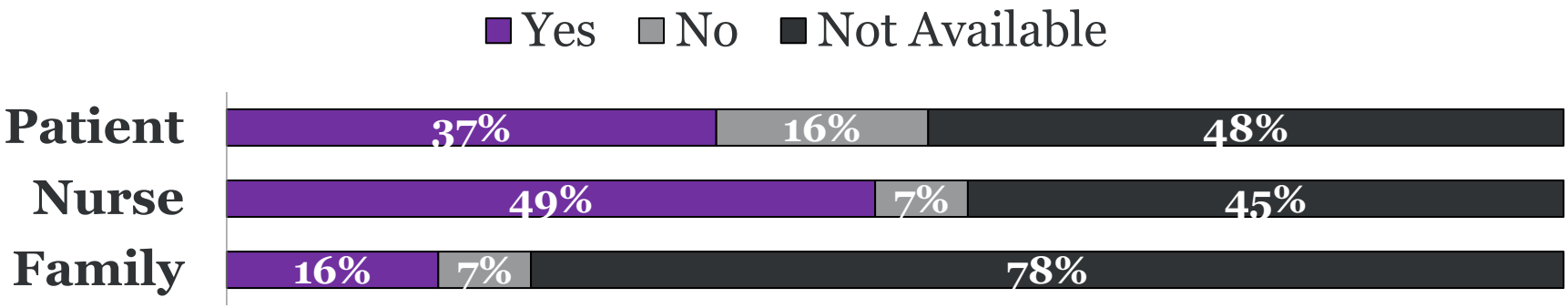


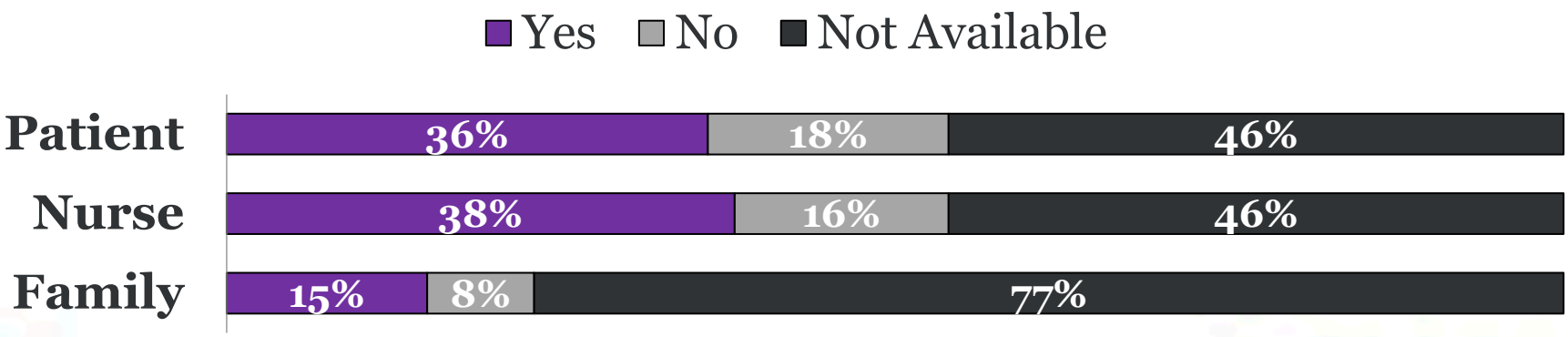
2016-2017 Fiscal Year
12,251 admits



Do you know how to use the device?



Is the device helping you to communicate?



One approach to keeping amplifiers top-of-mind

Unit (PUH)	Description	Contact	Email	Location of Amplifiers	Department Phone #
1st Fl RPU	Radiology Procedures Unit			(back office)	

Examples - Inpatient

Home Health

IHEAR:

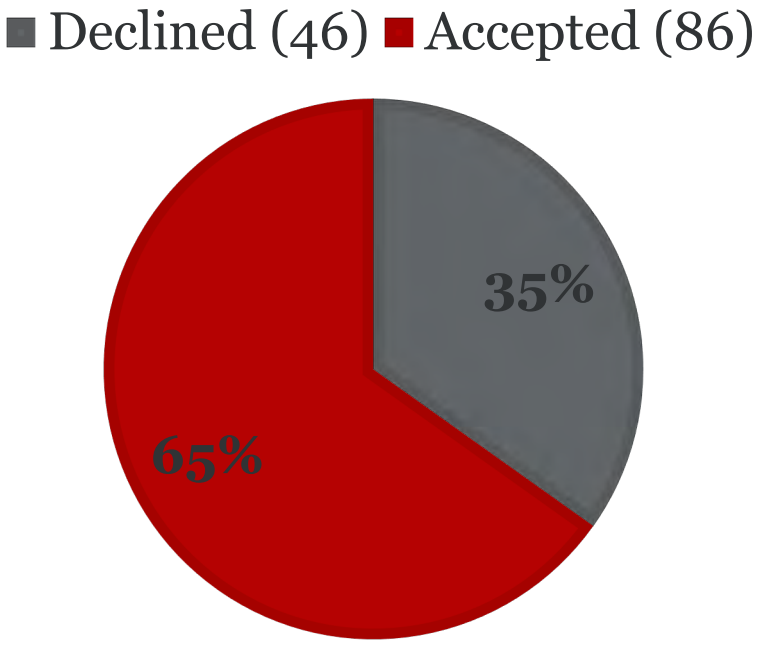
- **I**nterprofessional
- **H**elp
- **E**ncouraging
- **A**uditory
- **R**ehabilitation

Many thanks to the CRS!

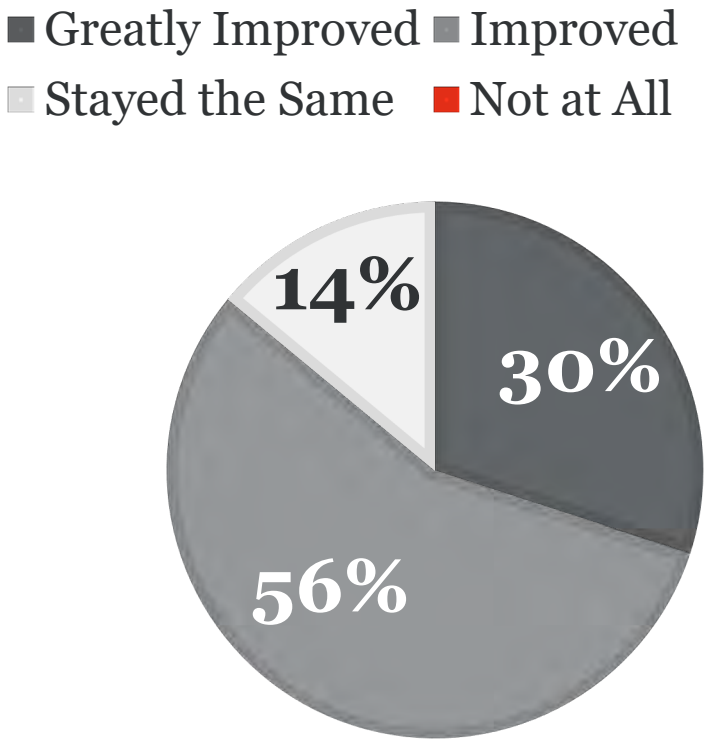
Suggested language

- "I've noticed that you are putting a lot of effort into hearing me. Communicating easily during our sessions is important. To make sure you can hear me easily (well), I'm going to use an amplifier with you. Here, I'll show you how it works. Let's give it a try."
- "I want to make sure that it is easy for you to hear me today *(or easy for us to communicate today)* so we are going to use this amplifier. I'll show you how it works."

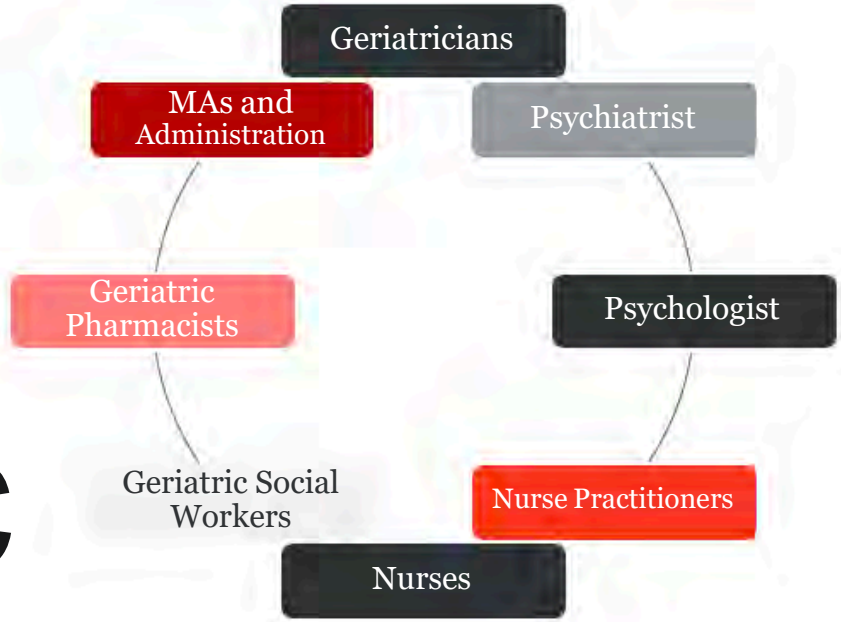
What did patients do when they were offered the use of an amplifier during their appointment? (132 were offered)



In the situations where you were able to use an amplifier, how much was communication improved?



"Our goal is to help older patients **stay independent, optimize self-care ability, and maintain quality of life**."



Geriatric Outpatient Clinics

EAR:

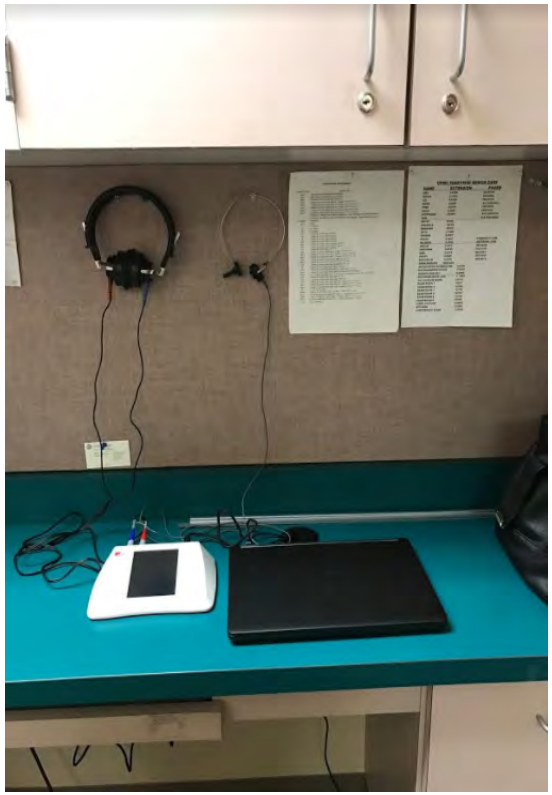
Embedded

Audiology

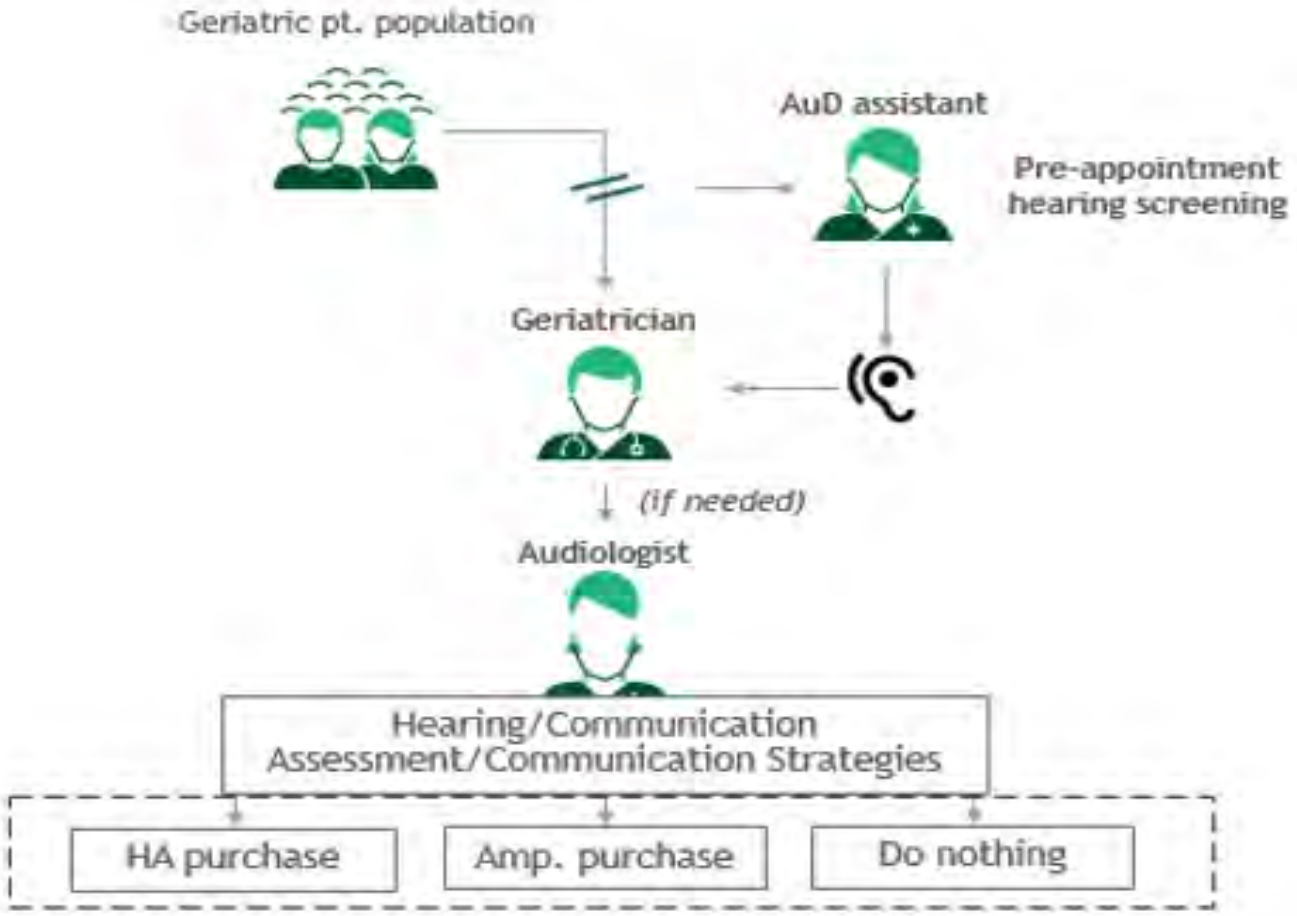
Resources

Many thanks to Virginia Milne & Dana Ailes!

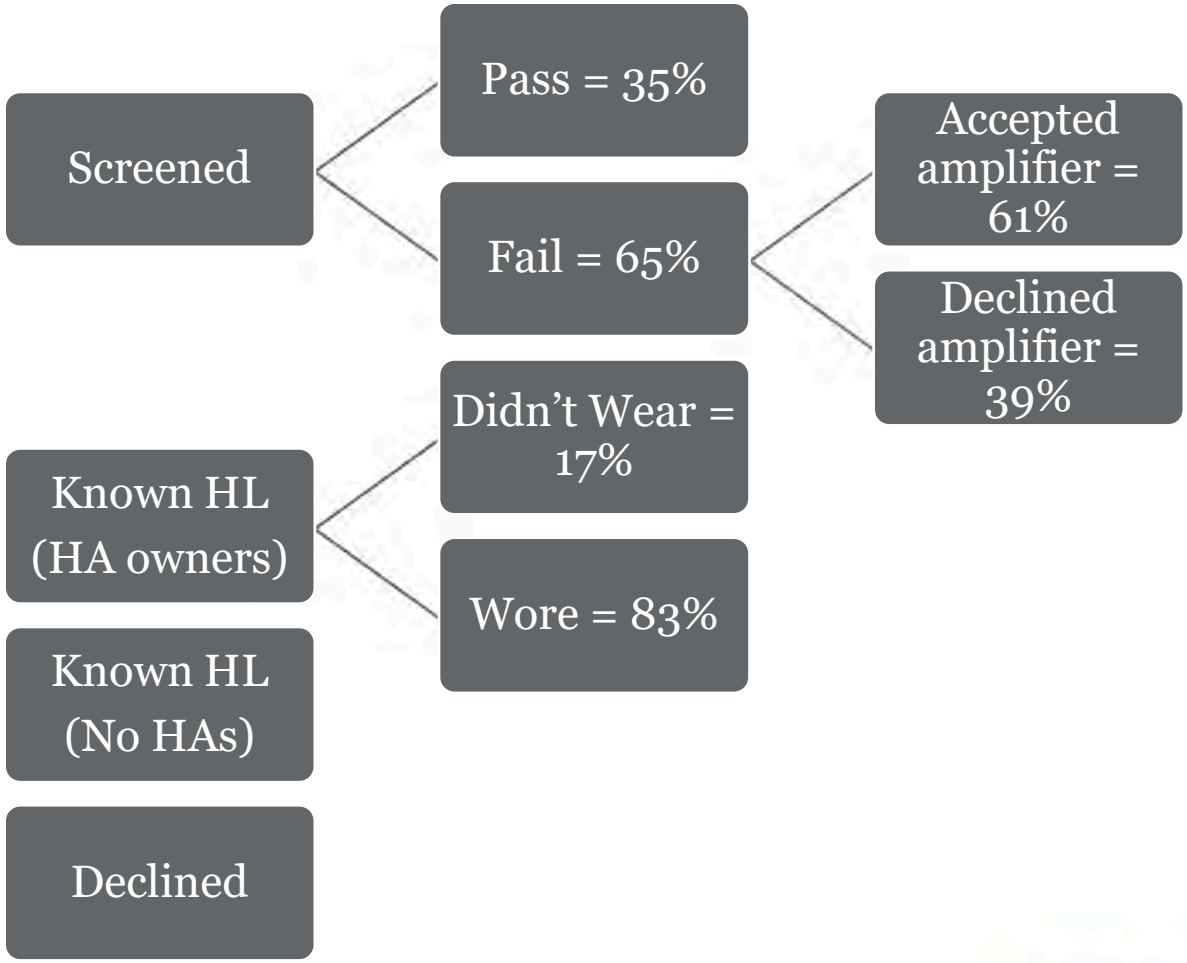
They very kindly gave us space in their busy office to set up our equipment.



Embedded Audiology Resources



More than 1000 unique patients!



Some patients purchased HAs or amplifiers from the Geriatric Clinics.

- 130 patient purchased hearing aids
- 311 patients purchased amplifiers
  - 47 on clinic days, 164 on non-clinic days

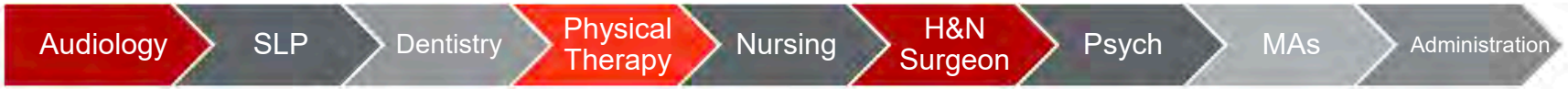
ENT HNC Survivorship

"…we view survivorship as the period after treatment has ended, and when a person is seen as free of disease."
http://www.otolaryngology.pitt.edu/upmc-head-neck-cancer-survivorship-clinic

Many thanks to Marci Nilsen & Jonas Johnson!

The primary goal of our Survivorship Clinic is to identify and treat unmet needs among our survivors.

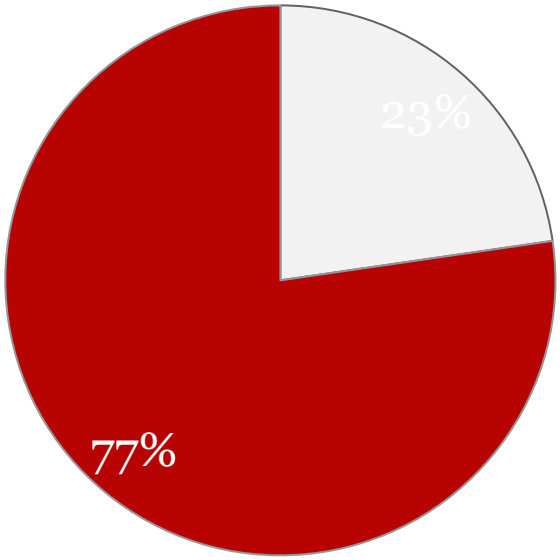
- Once the cancer is gone, these patients' lives don't go back to "normal."
- Some of the most prevalent treatment-related issues reported include: swallowing, pain, skin changes, dry mouth, dental health, opening mouth/trismus, taste, excess/thick mucous/saliva, shoulder disability/motion, voice/hoarseness (Chera et al, 2014)
- Team members include providers from:



- "The idea of the survivor's clinic is wonderful. I felt abandoned after my surgery, and there were side effects that I didn't know who to go to, to deal with. I came away from the appointment with a lot of information and a better sense that I can care for myself better." – Survivorship Patient

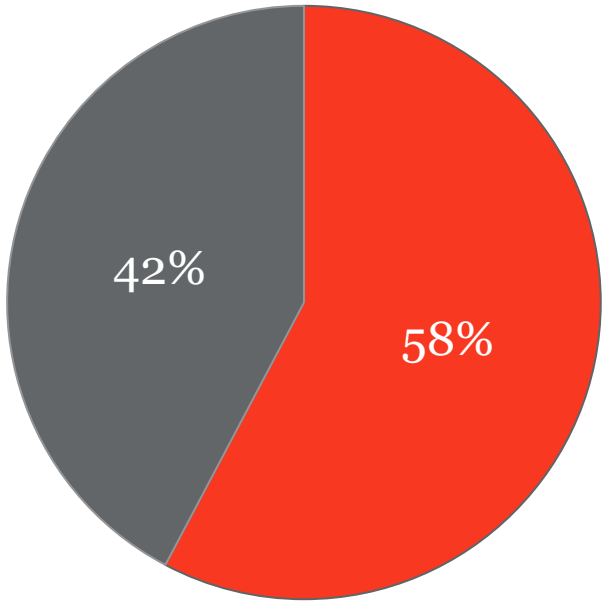
A little more than ¾ of the patients seen in Survivorship Clinic did not pass the 30 dB HL hearing screening…and only ~half of those *think* they have a hearing loss.

Hearing Screening Results (Survivorship Patients) n = 251



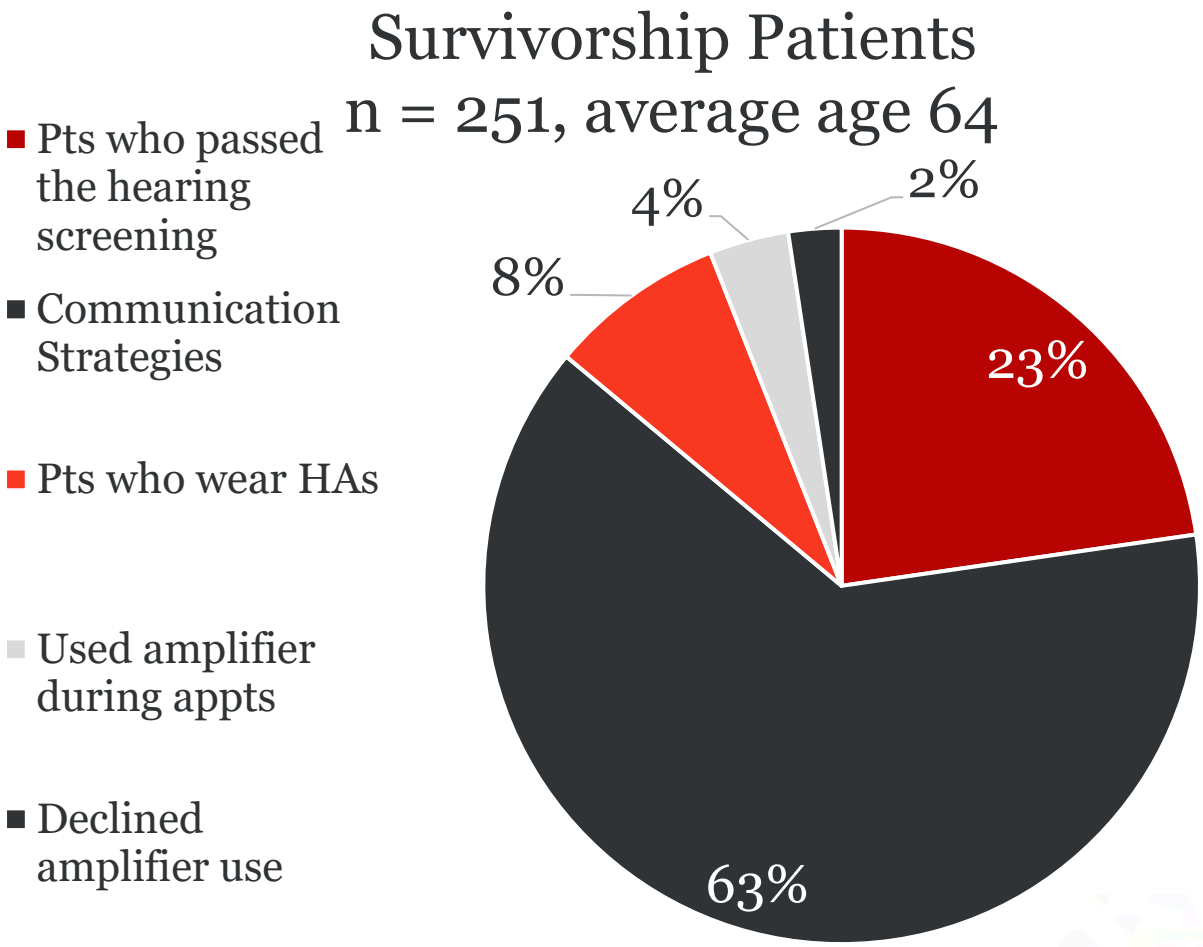
- Survivorship Pts who passed 30 dB HL hearing screening
- Survivorship Pts who failed 30 dB HL hearing screening

Reporting of HL When Asked (only patients who failed screening) n = 194



- Pts with HL who reported HL when asked
- Pts with HL who DID NOT report HL when asked

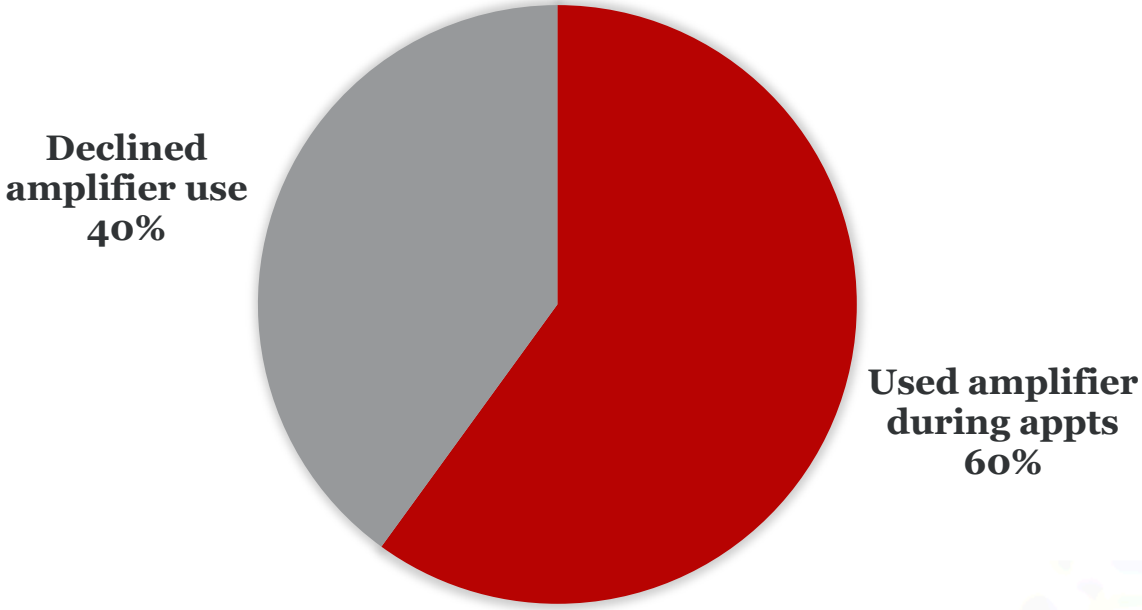
Approximately ¼ of the patients seen in the ENT Survivorship Clinic passed the 30 dB HL hearing screening bilaterally.



The majority of patients who had an amplifier recommended to them used it, but 40% declined.

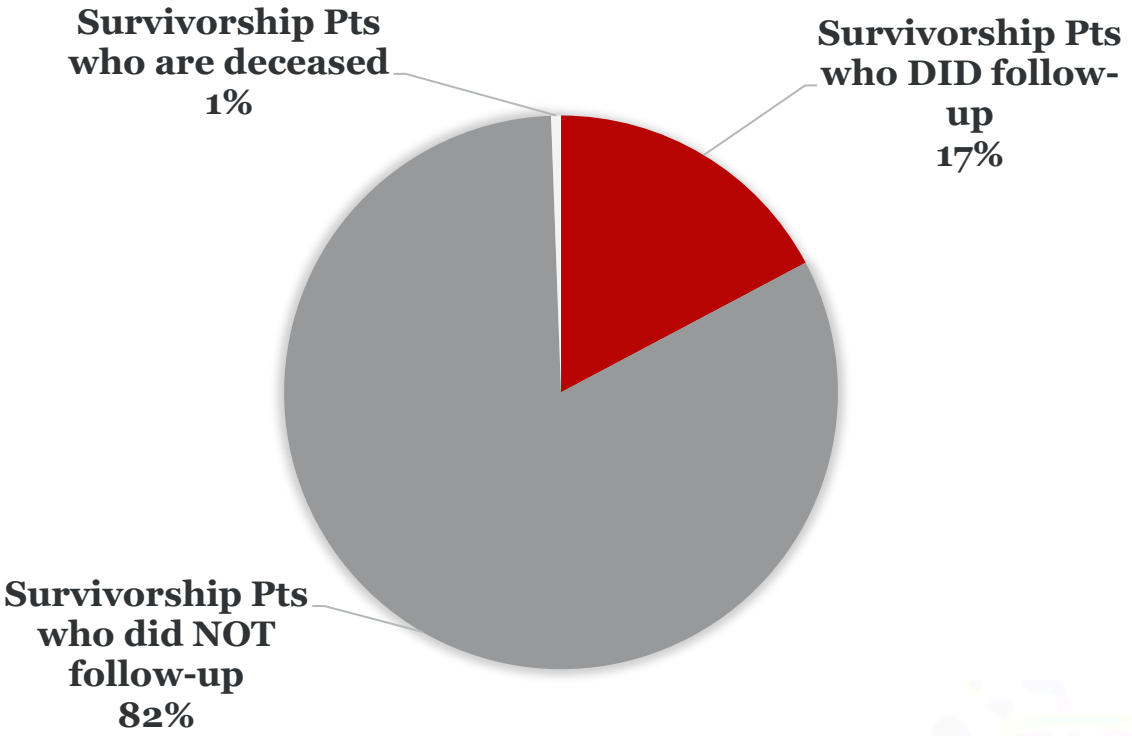
PTS WITH KNOWN SIGNIFICANT HL OR FAILING 30 DB HL SCREENING BILATERALLY AT ALL FREQUENCIES WHO HAD AMPLIFIER RECOMMENDED TO THEM

N = 15

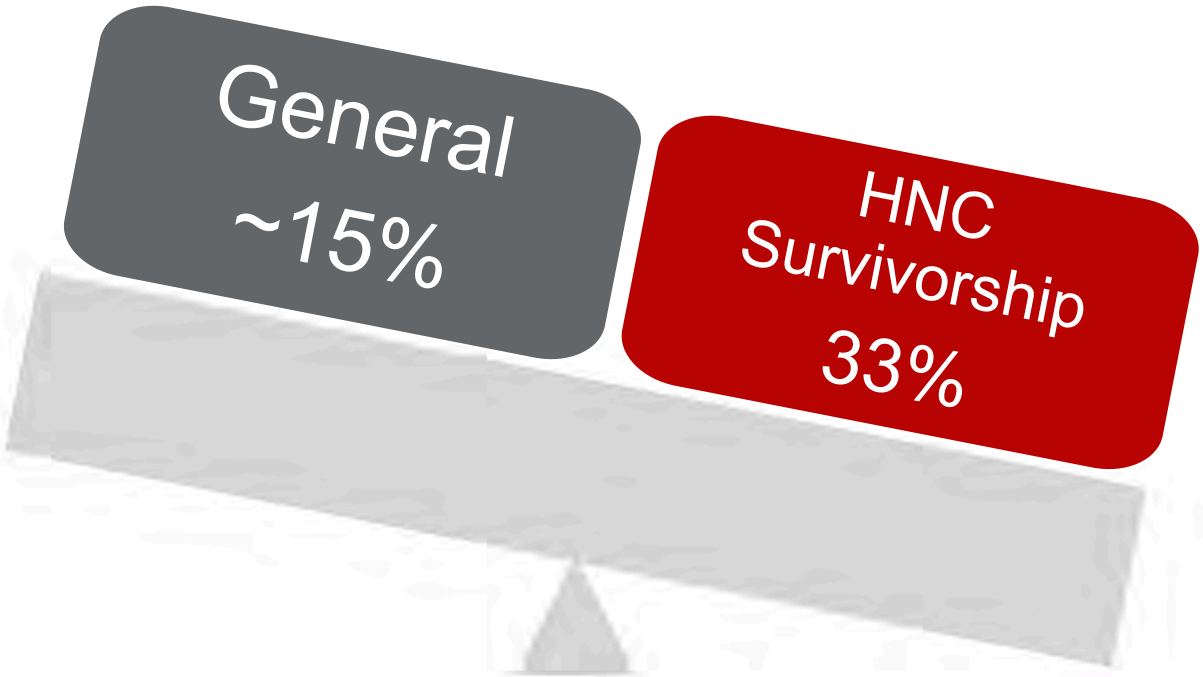


The challenge of promoting better adherence…

**SURVIVORSHIP PATIENT FOLLOW-UPS:
OF THOSE WHO NEEDED AUDIOLOGY FOLLOW-UPS
AND SAID A UPMC LOCATION WAS CONVENIENT…**



The number of Survivorship patients reporting tinnitus is approx. double what we see in the general population.



Back to the accuracy of self-perceived hearing loss…

Screening	Self Perception: Normal Hearing	Self Perception: Hearing Loss
Normal Hearing	82% (N=236)	18% (N=51)
Hearing Loss	46% (N=344)	54% (N=398)

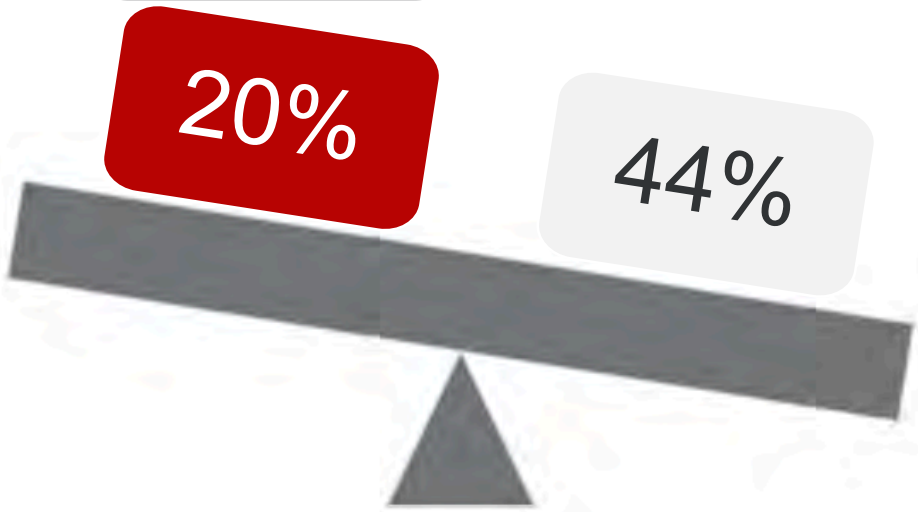
Post-Trauma Clinic

Many thanks to Ben Reynolds!

Americans who can't pass a 25 dB hearing screening

(Lin et al, 2011)

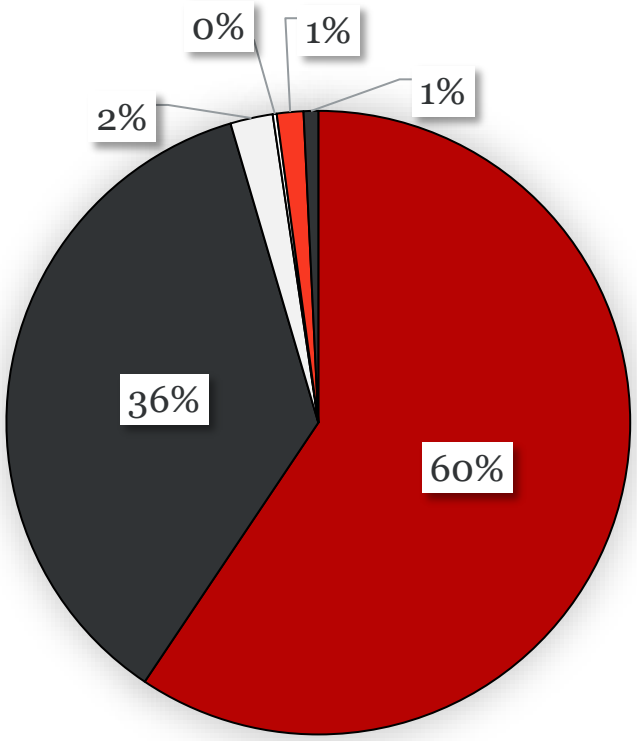
Post-Trauma Clinic patients who can't pass a 25 dB hearing screening



As of 9/10/19

When intervening on the day of clinic, we found…

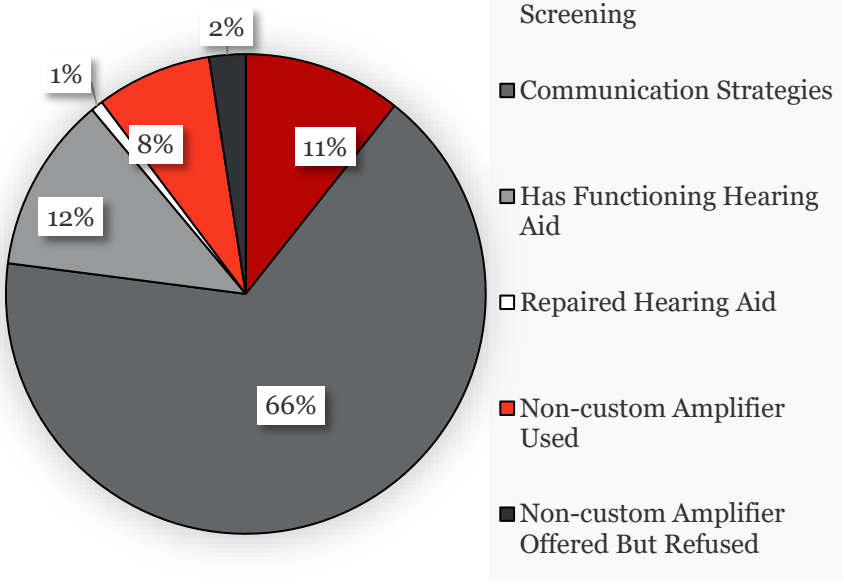
Trauma Clinic Patients (Total) n=1606



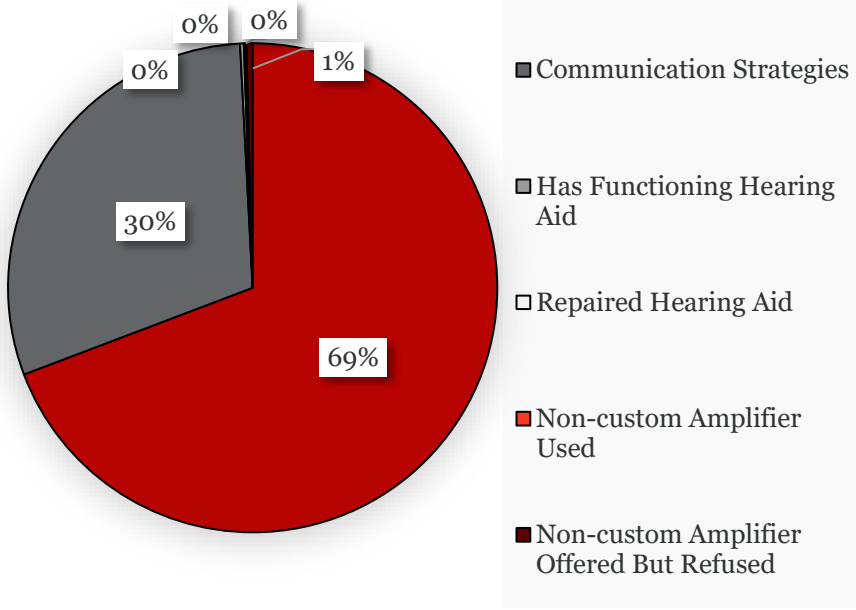
- Passed the Hearing Screening
- Communication Strategies
- Has Functioning Hearing Aid
- Repaired Hearing Aid
- Non-custom Amplifier Used
- Non-custom Amplifier Offered But Refused

When you look specifically at the 65+ group, it's a very different picture.

Trauma Clinic Patients (65+) n=273



Trauma Clinic Patients (Under 65) n=1333



Senior Living Facilities

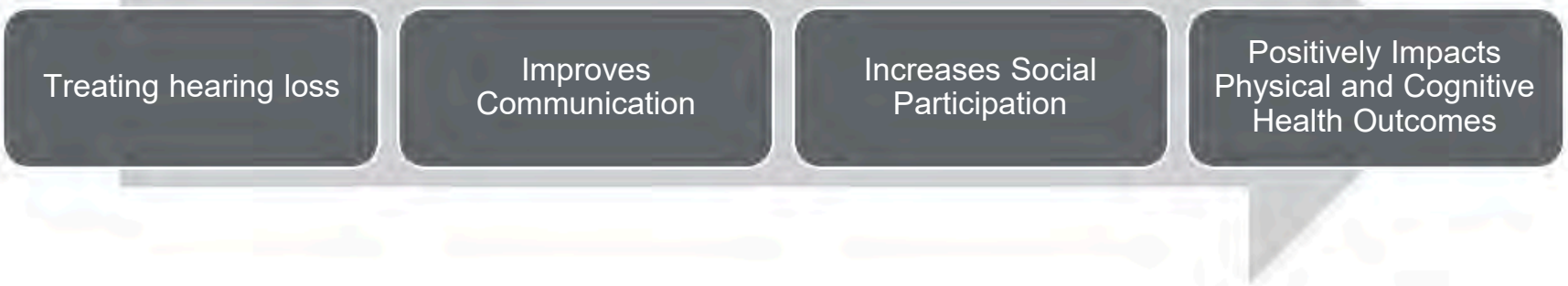
HearCARE:

Hearing and
Communication
Accessibility for
Resident
Engagement

Many thanks to the entire HearCARE team!

HearCARE

Hearing for Communication and Resident Engagement



- **Setting:** UPMC Senior Living Communities: Assisted Living/Personal Care
- **Interventions:** Consult Model (Audiologist 1X per month) versus Engage Model (addition of Communication Facilitator embedded 2X per week in the community)
- **Primary Outcomes:** Hearing-Specific HRQoL and Satisfaction with Social Participation
- **Secondary Outcomes:** Staff Satisfaction and Family Burden

Testing two interventions to provide hearing health care in Senior Living Residences

CONSULT MODEL of CARE

UPMC LIFE CHANGING MEDICINE

Seneca Manor

HearCARE
Hearing and **C**ommunication **A**ssistance for **R**esident **E**ngagement

HearCARE audiology services to residents in UPMC skilled nursing, assisted living, personal care, and independent living facilities.

Amanda Cassidy, AuD
Licensed Audiologist

Available services include:
Hearing evaluations (with an order from a physician)
Selection & fitting of cost-effective hearing aids & hearing assistive devices
Maintenance & repair of hearing aids & hearing assistive devices
Cerumen (earwax) removal

This is a free service regardless of where devices were purchased!

Dr. Cassidy will be available in this facility on the [insert day of the month] to help with your hearing needs.

Dr. Cassidy can be contacted at 724-940-5751 if you have any questions.

ENGAGE MODEL of CARE = CONSULT + Communication Facilitator

HearCARE in action: Cate Dymowski, Communication Facilitator, working on a hearing aid outside of a resident's room

Future Areas of Expansion?

Emergency Room

- Pts needing help probably also being missed in ED
- 36% of elderly patients seen in ED reported HL (Ballabio et al, 2008)
- May need to alter consult system to accommodate timing needs

Palliative Care

- Hearing allows pts to access treatment plans, goals-of-care discussions, and social/spiritual support (Smith, Jain, & Wallhagen, 2015)
- Hospice and palliative medicine providers believe age-related HL impacts care, but only 15% screen for HL (Smith, Ritchie, & Wallhagen, 2016)

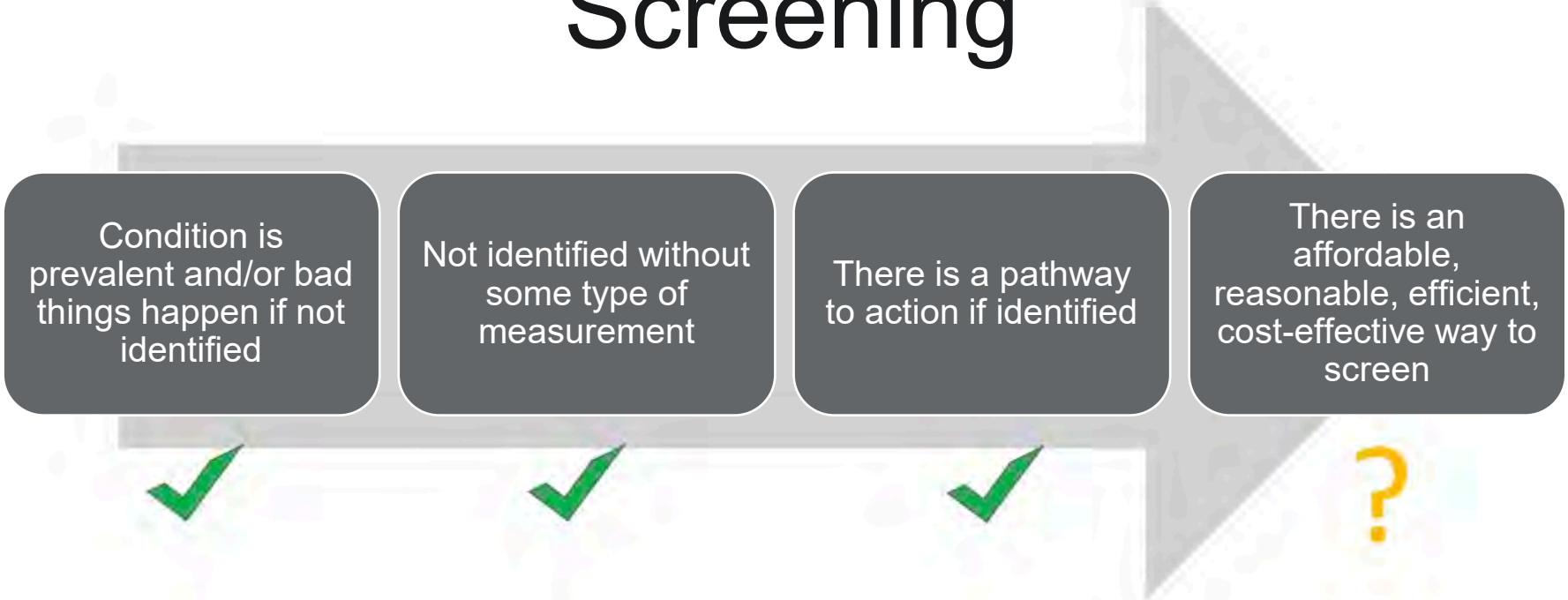
Radiology / Imaging

- Patient motion is a frequent cause of degradation of MR images, which added to substantial costs to the radiology department (Andre et al, 2015)
- Information and communication together can reduce anxiety that patients experience related to imaging procedures (Tazegul et al, 2015)

Inpatient Rehabilitation

- Assistive technology
- Bowel/bladder training
- Neuropsychology
- Occupational therapy
- Physical medicine and rehabilitation
- Physical therapy
- Recreational therapy
- Rehabilitation engineering
- Rehabilitation nursing
- Robotics and gaming
- Speech and language therapy
- Transitional rehabilitation units

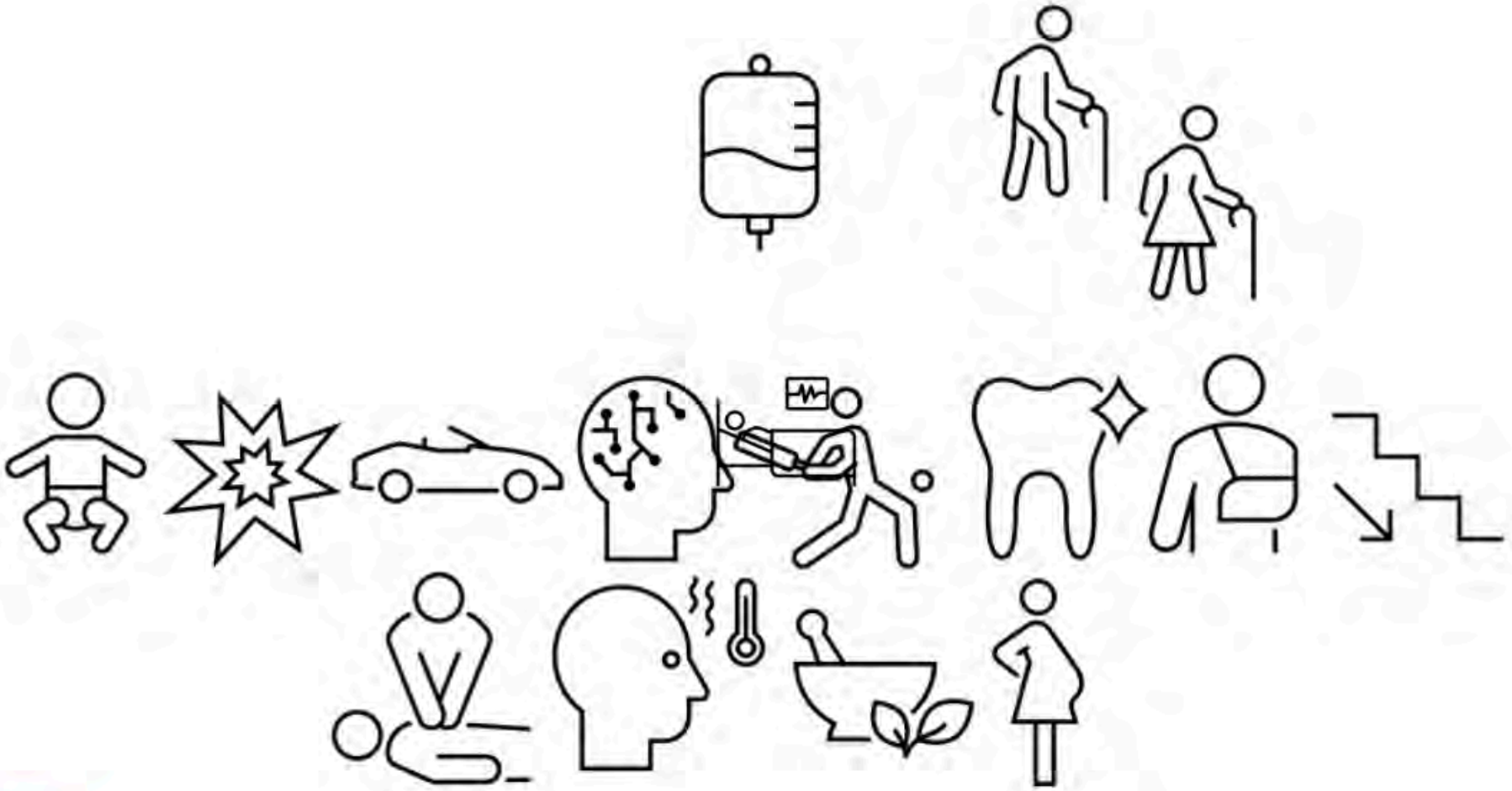
Necessary Components to Justify Recommendation for Screening



Next steps?

Focus on ways to identify HL!

Interventional Audiology services can be provided to patients who are…



Take Home Messages

- Hearing loss can and does negatively affect healthcare outcomes.
- WE are the ones who must advocate for our patients in this area.
  1. They may not even recognize that they have hearing loss.
  2. Other healthcare providers are unlikely to recognize hearing loss.
  - Together, these 2 reasons account for why we need to identify untreated HL and intervene to improve communication!

Thank You!

Transitions in Audiology Practices Series:

Promoting Interventional Audiology in Multidisciplinary Practice

Lori Zitelli, AuD, CH-TM

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