Disclosure

I have no relevant financial relationships with any companies related to the content of this course.
HEARING LOSS OR DEMENTIA

*Ms. Smith has to work hard to follow what others are saying especially in noisy environments — at a party, an office gathering, on the street — her cognitive energies are focused on deciphering what is said. She is introduced to someone whose name she does not know. She asks again what is the person’s name. She still does not quite get it

*The conversation goes on from there, and within a couple of minutes she has lost track of the subject, guessing at responses, making noncommittal replies, smiling and nodding her head

*When she walks away she has no idea about what the people were talking

Learning Outcomes

After this course, participants will be able to:

• Enumerate the causes and modifiable risk factors for dementia and the significant role of hearing loss in the equation
• Appreciate the implications of the communication changes and behaviors that occur with dementia and their implications for audiologic practice
• Discuss the contribution of hearing interventions to dementia onset, dementia progression and brain health
• Recognize if Mrs. Smith has dementia or hearing loss or both?!!!!
Dementia Projections Worldwide (WHO, 2017)

2018

152 Million

50 Million

2050

GLOBAL COST
http://www.who.int/mental_health/neurology/dementia/en/

• 10 million new cases every year
• $818 billion – majority of care by family members
• 7th leading cause of mortality
A new case of Dementia is diagnosed every four seconds.

Dementia is the leading cause of dependency and disability among the elderly.

Disability Adjusted Life Years (DALYs) attributed to Dementia rose 82.6 percent between 2004 and 2030.

If global dementia care were a country, it would be the 18th largest economy in the world exceeding the market values of companies such as Apple and Google.

*More than 90% of persons with dementia have hearing loss (Martini et al., 2015)

*Most persons with dementia and hearing loss do not use hearing aids: 21% (Nirmalasari, Mamo, et al., 2016)

*Fitting hearing aids earlier may have a mitigating effect on memory loss trajectory (Maharani, Dawes, et al., 2018)
DEMENTIA IS NOT A DISEASE?

- A syndrome; a group of symptoms affecting ability to process thought; affects memory, thinking, behavior, and social activities severe enough to interfere with daily living and independent functioning
  - Progressive
  - Gradual in onset, and often overlooked
  - Communication impaired
  - Difficulty performing activities of daily living
  - Memory loss
  - Personality changes
  - Impaired reasoning
  - Decline in ability to learn new information

Not A Normal Part of Aging: The Trajectory (Moga, et al., 2017)
• A downward spiral, individuals with dementia experience a gradual transformation from an independent, fully functioning participant in their own life, to total dependence on others, oblivious to the world around them but need to communicate and to belong remains.

DEMENTIA: MULTIFACTORIAL

ALZHEIMER’S-A PROGRESSIVE BRAIN DISORDER - MOST COMMON CAUSE OF DEMENTIA

Parietal Lobe (language, spatial perception, reading, writing)
Frontal (judgment, attention, carrying out tasks and behavior)
Temporal (language, recognition of faces and objects)
Hippocampus, new memory formed
CONNECTIONS BETWEEN REGIONS DESTROYED, CORTEX SHRINKS
DEMENTIA: A HIGHLY VARIABLE CONDITION

– Individual differences in the amount of pathology required for the initial expression of clinical symptoms
– Some people with neuropathological brain changes do not have dementia
– People who have good cognitive reserve can tolerate more neuropathology - before develop dementia
– Less cognitive reserve leads to earlier development of dementia
  • reserve may be related to either the brain anatomical substrate, adaptability of cognition, resilience

COGNITIVE RESERVE

• Cognitive Reserve – Empowers the brain to tolerate atrophies and insults and as a result, delay symptom onset; a construct that moderates between age related decline, pathological damage, and clinical outcome/status
COGNITIVE RESERVE MODEL

The brain actively attempts to cope with brain damage by enlisting compensatory approaches.

Individuals with more CR would be more successful at coping with the same amount of brain damage (AKA same amount of brain damage or pathology will have different effects on different people)

Persons participating in a variety of leisure activities characterized as intellectual (eg, playing games, going to classes) or social (eg, visiting friends or relatives etc.) are 38% less to develop dementia (Scarmeas, Levy, Tang, et al., 2001)

Cognitive activity strengthens the functioning and plasticity of neural circuits
COMMUNICATION

• The Ability to be Understood and to Understand Others
  – Involves use of a common system (spoken or written)
  – Loss of memory impacts ability to remember words and their meaning
  – People with dementia have increased difficulty using words to express themselves and understanding what others are saying
  – When ability to communicate is impaired our social history and networks are impacted
THREE PARTS OF COMMUNICATION
(From Dementia Australia)

- Tone and Pitch of Voice (38%)
- Body Language (55%)
- Words (7%)
EARLY STAGE—OFTEN OVERLOOKED

- Foster and support independence, individuality
- Accommodate for a shorter attention span
- Normalize day to day activities
- Do say—You may recall. Don’t say—Don’t you remember

MIDDLE STAGE

- Forgetful of people’s names and recent events, moderately severe impairments in memory, increasing difficulty with communication, language, judgment, and activities of daily living are apparent, thus increasing the need for assistance and surveillance by caregivers, wander and repeat questions
MIDDLE STAGE – HOW TO COMMUNICATE

- FORGET LOGIC AND REASON
- PROVIDE CHOICES
- VALIDATE
- DISTRACT AND REDIRECT

LATE STAGE

- Loss of language (i.e., incoherent babbling or muteness) and decreased recognition of family and self, unaware of time and place, delusions, hallucinations, repetitive, and bizarre behaviors, difficulty walking, behavior change including aggression
LATE STAGE – HOW TO COMMUNICATE

- Address need for comfort
- Use rhythm and music
- Do not talk about the person in front of them
- Assume what you are saying can be understood

REMEMBER

- DEMENTIA CHANGES HOW PEOPLE COMMUNICATE, BUT THEY STILL HAVE NEEDS AND FEELINGS
- NEEDS CAN BE COMMUNICATED IN MANY WAYS
- BE MINDFUL OF PERSONHOOD
- DECREASE IN COMMUNICATION ≠ DECREASE IN FEELING
BRAIN CHANGES ASSOCIATED WITH DEMENTIA - THE SEVEN A’S

• AMNESIA - MEMORY LOSS
• ANOSOGNOSIA – NO KNOWLEDGE OF DISEASE
• APHASIA-LOSS OF LANGUAGE
• AGNOSIA-LOSS OF RECOGNITION
• APATHY-LACK OF INTEREST
• APRAXIA-IMPAIRMENT OF MOTOR SKILLS
• ALTERED PERCEPTION-VISUAL PERCEPTUAL IMPAIRMENT

MEMORY CHANGES

LOSS OF THE ABILITY TO USE THINGS MEMORY CAN DO FOR THE PERSON TO ENABLE THEM TO LIVE INDEPENDENTLY

• Short term – asking same question over and over again
• Long term
• Inability to learn
• Dementia – prevents the brain from recalling memories, the memories are in storage but person is unable to call them up!

• Anosognosia – A multifaceted phenomenon; a deficit of self-awareness; individual has no knowledge of having a condition or unable to perceive changes in personality or behavior-overestimation of abilities
Aphasia

• Loss of spoken language (middle stage -40% of language lost)
  – Non-verbal language heightened
  – Behavior communicates needs

AGNOSIA

• Loss of recognition of what an object is, who people are and what things are used for
  – Safety Implication
APATHY

• Lack of Interest
  – Must capitalize on best time of day for patient function by asking family member about optimal time for appointment; keep appointments brief; make sure accompanied by caregiver and/or family member

APRAXIA

• Impairment of fine and gross motor skills despite intact muscle power-loss of ability to carry out skilled movements and gestures, despite having the desire and physical ability to do so
• Problem with sequencing, hearing aid handling skills, etc.
HEARING LOSS and DEMENTIA

- **Dementia** – A complex, multifactorial process; a group of syndromes characterized by progressive loss of mental function severe enough to interfere with social and communicative function, performing everyday activities; impaired processing of emotional prosody is often present
- **Hearing Loss** – An auditory-cognitive-based condition that interferes with communication, cognitive function, performing everyday activities; impaired processing of emotional prosody, impaired auditory encoding in the cochlea and impaired decoding in the brain

BECAUSE OF DIFFICULTY COMMUNICATING AND MAINTAINING INTERPERSONAL RELATIONS THERE IS A TENDENCY TO DISENGAGE FROM SOCIAL INTERACTIONS
HEARING LOSS AND DEMENTIA

* Occur insidiously and frequently unrecognized
* Hearing loss and cognitive decline are frequently attributed to aging
* Delayed recognition – detrimental to health
* Earlier detection may improve patient outcomes
* Stigma
* General practitioners often dismissive and unhelpful
* Cognitive reserve deficit - for remembering, responding, analyzing and even thinking
A team of 24 international experts met and reviewed available scientific data on dementia and generated evidence-based recommendations about how risk and how best to manage, prevent, and deliver care to this population (Frankish & Horton, 2017).

RISK FACTORS INCLUDED IN MODEL

- Those listed in the UK National Institute of Health and Care Excellence (NICE) and US National Institutes of Health (NIH) guidelines
- According to their calculations, 35% of dementia risk is attributable to a combination of nine risk factors
NON-MODIFIABLE (Galvin, 2017)

- AGE
- SEX
- FAMILY HISTORY

Modifiable
(Lancet Commission Report (2017))

35% of Dementia is Preventable

1. **Hearing Loss** – 9%
2. Less education – 7%
3. Smoking – 5%
4. Depression – 4%
5. Physical inactivity – 3%
6. Hypertension – 2%
7. Social isolation – 2%
8. Obesity – 1%
9. Diabetes – 1%

Simple health behavior changes could prevent a third of dementia cases.
• **Key Philosophy Underlying Conclusions**
  
  – Cognitive resilience in later life likely enhanced by building brain reserve earlier in life through education, physical exercise, intellectual stimulation engagement in leisure activities) over the lifespan
  
  – May be a window of opportunity to intervene in middle age by identifying and eliminating modifiable risk factors at different stages of life
  
  – Reduce dementia incidence via interventions for factors including more childhood education, exercise, maintaining social engagement, reducing smoking, management of hearing loss, depression, diabetes, and obesity

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**HEARING LOSS AND DEMENTIA**

*It's your brain that hears. Not your ears.*
**Distinctive Features of HL and Dementia**

- Primary care physician, geriatricians, and nurse practitioners least likely to be involved in diagnosis
- U.S. and Canadian task forces recommend against screening *asymptomatic* community dwelling older adults
- Rapidly increasing in incidence
- Major cause of disability
- Affect social functioning
- Threat to safety
- Costly
- Largely underestimated
- Lack of awareness of far-reaching consequences of ignoring

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**HEARING LOSS AND DEMENTIA**

Occur insidiously and frequently unrecognized
Hearing loss and cognitive decline are frequently attributed to aging
Consequence of delayed recognition – detrimental to health
Early detection may improve patient outcomes
Stigma and misunderstanding negatively effect persons with dementia and hearing loss
General practitioners often dismissive and unhelpful
At greater risk for falls – in hospitals and at home
Recognition of sensory input compromised
Retention of new information may be compromised
Physical activity limitations
## Caregiver Burden

<table>
<thead>
<tr>
<th>SD</th>
<th>Hearing Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor self-reported health outcomes</td>
<td>Partners experience social impacts</td>
</tr>
<tr>
<td>Low subjective well-being</td>
<td>Partners feel stressed</td>
</tr>
<tr>
<td>High metabolic rates</td>
<td>Partners anxious - safety concerns</td>
</tr>
<tr>
<td>High levels of stress hormones</td>
<td>Increased tensions in relations, intimacy</td>
</tr>
<tr>
<td>Reduced quality of life (QoL)</td>
<td>Feel anxiety and stress when serving as “ears”</td>
</tr>
<tr>
<td></td>
<td>Reduced QoL</td>
</tr>
<tr>
<td></td>
<td>Stress with loud television!</td>
</tr>
</tbody>
</table>

## THE CONNECTION
(Nirmalasari, Mamo, et al., 2016)

- Hearing loss prevalent: 60% of persons seen in a memory clinic had hearing loss
- Hearing loss is significant: 54% had moderate to severe hearing loss
- Most persons with dementia and hearing loss do not use hearing aids: 21%
- Any longitudinal associations between hearing loss and dementia are NOT causal
Hearing Loss and Dementia: The Risk (Lin, et al., 2011)

- Prospective study (N=639; Baltimore Long. S)
- Dementia free at baseline
- Hearing loss **INDEPENDENTLY** associated with incident, all-cause dementia (mean 11.9 year fu) for participants > 60 years
- Over 1/3 risk of incident dementia associated with baseline hearing loss
  - risk increases with baseline hearing loss-severe hearing loss 5X more likely to develop dementia; mild HL 2X more likely

Dementia Risk in a Sample of Older Australian Men
(Ford, et al., 2018)

- N= 37,898 men followed over a period of 11 years
- Self reported hearing loss at baseline, NO dementia diagnosis at baseline
- Mean age – 72.5 years; Follow up period – 11.5 years
- Men with hearing loss older were older than those without hearing loss
- Men with hearing loss were significantly more likely to develop dementia over the 11 year follow-up period than were men free of hearing impairment
NATIONWIDE POPULATION BASED STUDY – TAIWAN (Wen, et al., 2016)

- Taiwan’s National Health Insurance Database
  - Participants diagnosed with dementia (N=6546, mean age-80 years; non-dementia - N=103,163, mean age – 74 years)
  - More women than men with dementia; persons with lower income higher dementia rate; oldest-old highest rate of dementia
- Used ICD-9CM codes for hearing loss, senile cataracts, vascular disease and depression

RISK FACTORS FOR DEMENTIA

- NON-MODIFIABLE – Age, female sex
- RECOGNIZED RISK FACTORS/CO-MORBIDITIES
  - Lower income, depression, head injury, vascular disease & diabetes mellitus
- NEW POTENTIAL RISK FACTORS: Hearing loss and senile cataracts
### THE TRANSITION TO DEMENTIA AND HEARING LOSS (FRITZE, et al., 2016)

- Longitudinal study
- Dementia diagnosis based on ICD-10 codes; hearing loss diagnosis based on ICD-10 categories (e.g. bilateral, unilateral hearing loss)
- Data from largest health insurance database in Germany – administrative claims data

### THE TRANSITION TO DEMENTIA AND HEARING LOSS (FRITZE, et al., 2016)

- Incident dementia diagnosis (14,602) (9% of sample)
- Presence of bilateral hearing impairment increased risk of an incident dementia diagnosis by 16% (6 year trajectory)
- Persons with bilateral hearing impairment experienced a faster incident dementia diagnosis compared to all other persons; depression also associated with faster transition to dementia
- Persons receiving treatment by an ENT had a faster ID diagnosis as compared to persons without such treatment

• Of persons with self reported HL at baseline 16.3% developed all-cause dementia as compared to 12.1% of those without self reported HL
• Mean time to all-cause dementia was 10.3 years in the HL group vs. 11.9 years without HL
• Over time, persons with baseline hearing loss declined 54% faster than those without baseline hearing loss

Time Course (Davies, et al., 2017)

• Moderate self reported hearing difficulties and moderate to severe hearing loss are cross-sectionally associated with dementia
• Incidence of dementia (11 years) 39% higher in individuals with moderate self-reported hearing and 57% higher in those with poor self-reported hearing as compared to those with normal hearing after adjusting for multiple covariates
CONCLUSIONS
(Loughrey, Kelly, Kelley, et al. 2018)

• Systematic review and meta-analysis included 36 studies; N=20,264
• Age-related hearing loss is a possible biomarker and modifiable risk factor for cognitive decline, cognitive impairment, and dementia (not for AD)
• Cohort studies indicate that age-related hearing loss (ARHL) precedes the onset of clinical dementia by 5 to 10 years

STATE OF THE SCIENCE (Yuan, Sun, Sang, et al., 2018)

• Persons with moderate to severe hearing loss (self reported or objectively assessed) are at greatest risk of developing dementia
• Impaired communication and speech comprehension in persons with ARHL in combination with poor verbal communication can confound cognitive testing
HEARING LOSS

WHY THE CONNECTION??

DEMENTIA

• Cascade Model vs. Common Cause Model vs. Cognitive Burden vs. Multi-Level Model

[Stahl, 2017]
COMMON CAUSE POSTULATE/SHARED PATHWAY

*The loss of sensory input from hearing loss combined with cognitive decline from dementia derive from the same neurodegenerative process in the aging brain but one does not cause the other

*HI and cognitive decline share common age related change factors such as degeneration of the CNS

COGNITIVE BURDEN, COGNITIVE LOAD THEORY
(aka EFFORTFULNESS HYPOTHESIS)

- HL puts an extra cognitive load on the brain, taxing its structure and leading to more degeneration and in turn leads to cognitive reserve depletion

- Hearing loss distorts speech leading to recruitment of compensatory brain regions to help compensate for auditory processing deficits

- This depletion of cognitive reserve may reduce or divert the cognitive resources available for other cognitive processes placing an excessive cognitive load on higher cortical regions

- The extra cognitive load on individuals with hearing loss could be at the expense of encoding and processing speech into memory
*Hearing loss may increase “cognitive load,” or the total amount of demand placed on the brain at any given time; high cognitive load could impair performance on cognitive tests (Whitson, et al., 2018)

*By increasing cognitive load, sensory impairments might limit the neural resources needed for optimal performance on cognitive task; loss of sensory input could directly alter brain structure and function (Whitson, et al, 2018)

CASCADE HYPOTHESIS

*Auditory deprivation affects cognition directly via impoverished sensory input which leads to poor verbal communication, and indirectly via decrease in social engagement

*Prolonged reduction in hearing function leads to insufficient stimulation, the auditory deprivation cascades into decreased social interactions, and social isolation, loneliness, depression, & poor verbal communication cascades in to cognitive decline/dementia

*hearing loss may lead to depression, social isolation, and lack of physical activity, which could cause cognitive impairment
DO OUR INTERVENTIONS WORK?

INTERVENTION PHILOSOPHY

- Window of opportunity to intervene by addressing dementia risk factors may be middle age
- A life-course approach to hearing/communication
- Hearing intervention can facilitate clinical management
- Modifiable risk factor which may slow down transition to dementia
MANAGEMENT GOALS

- Maintaining social engagement
- Maximize ability to communicate
- Reduce caregiver burden
- Optimize safety in the home

PRINCIPLE GOALS FOR DEMENTIA CARE (WHO, 2017)

- Early diagnosis in order to promote early and optimal management
- Optimize physical health, cognition, activity and well-being
- Identifying and treat accompanying physical illnesses
- Detect and treat challenging behavioral and psychological symptoms
- Providing information and long-term support to carers
REMEMBER

• Persons with dementia in the early stages especially will likely have the ability to understand care choices but decisions about care will vary with the progression of the disease and the type of decision require
  • For example, your patient may be able to choose that h/she wants to continue using hearing aids; depending on stage patient may be unable to choose which setting or unit works best
  • Remember in your care planning that people with dementia are most comfortable with a regular routine at home – Make sure you know person’s daily routines as this will help you with instructions regarding what time of day to insert and remove hearing aids, day to replace batteries; where to keep hearing aids so are accessible (may want to keep batteries in separate place and assign that responsibility to a caregiver)

PRIMARY CATEGORIES OF INTERVENTION

• Hearing Aids
• Cochlear Implants
• Hearing Assistive Technologies

*Hearing clearly leaves greater cognitive reserve for remembering, responding, analyzing and even thinking*
Efficacy of Sensory Interventions

- There is no direct effect of hearing aids on cognitive decline; rather, depressive symptoms and social isolation may mediate the association (Dawes et al., 2015; Amieva et al., 2015)
- By facilitating improved communication, hearing aids may improve mood, reduce anxiety, improve quality of social interaction, and increase social engagement, thereby perhaps impacting scores on cognitive tests (Amieva et al., 2015)
- Patients may feel less exhausted after an hour of socializing – and can engage more with family and friends
- There is a positive effect of implants on depression and cognitive status – and of HA use on depression and social and emotional loneliness (Castiglione et al., 2016; Weinstein et al., 2016; Boi et al., 2012)

- French epidemiological study – population based sample (N=3,777)
- Hearing loss – self reported; *follow-up over a period of 25 years
- In their sample they demonstrated an increased risk of dementia in persons with self-reported hearing problems NOT using hearing aids
- Increased risk of functional disability associated with hearing difficulties at baseline in persons not using hearing aids

Maharani, Dawes, Nazroo, et al. (2018)(EUN=2040)(18 years)

- There was a decline in episodic memory (immediate and delayed recall; backward count) leading up to self rated hearing aid use in ALL participants
- Rate of cognitive decline (episodic memory task) was slower in persons with hearing loss after they began using hearing aids (mean age of hearing aid use – 62 years); slower rate of decline after hearing aid use
  – Hearing aid use may allow for better hearing input and delay cognitive decline by preventing adverse effects of auditory deprivation (e.g. depression, social engagement and self efficacy – supports cascade hypothesis)!!
WHY A SLOWER RATE OF DECLINE (Maharani, et al., 2018)?

• Hearing aids may improve audibility allowing for greater auditory input
• By reducing auditory deprivation and increasing auditory input we may prevent adverse effects such as listening fatigue, depression, social isolation which may protect cognitive function
• Hearing aid use may enhance self efficacy – individuals may believe they can succeed in self managing in selected situations

Value of Hearing Assistance Technologies

• Johns Hopkins Memory and Alzheimer’s Disease Treatment Center (i.e., Memory Clinic) and the Hopkins ElderPlus Program for All-Inclusive Care for the Elderly (i.e., PACE) (Mamo et al., 2017)
• All diagnosed with dementia: MMSE scores – 32%(24-28); 37% (18-23); 32% (0-17)
• Mean age – 77 years (caregiver, 64 years)
• Mild to moderate hearing loss
• 20 dyads of person with dementia and caregiver
HEARING CARE INTERVENTION

*Hearing screening and education regarding hearing loss
*Communication strategies overview
*Instructions in use and maintenance of assistive devices with an emphasis on caregiver education and strategies

Intervention

- AR with interventionist: One 2-hour session with patient, caregiver
- Technology – choice of

Williams Sound Pocketalker®
Sound World Solutions® CS-50

Note: 65% of participants with dementia wore the amplification device at least one hour per day
Improvement in Communication Behaviors - Qualitative

- Historical stories retold more accurately
- Questions posed in smoother sentences
- Stronger willingness to make decisions and the decisions made more sense
- Social engagement improved – listened to music more; seemed to understand what was on television (laughed or smiled at appropriate times)
- Spoke louder, asked more questions, followed conversation better, read more often
- Connected with life in a renewed way


- LONGITUDINAL OBSERVATIONAL STUDY OF COGNITIVE FUNCTION IN OLDER POST-LINGUALLY DEAFENED ADULTS 65 YEARS + WHO WERE IMPLANTED (6.8 YEARS MEAN FOLLOW-UP TIME)
  - VERBAL AUDITORY MEMORY TASKS WERE ADMINISTERED WITH VISUAL STIMULATION AND WRITTEN EXPLANATIONS
  - AN MD SPECIALIZING IN COGNITIVE DISORDERS CLASSIFIED PARTICIPANTS AS NORMAL, HAVING MCI, OR DEMENTIA
    - AVERAGE DURATION OF HEARING LOSS – 33 YEARS; DURATION OF PROFOUND LOSS- 12 YEARS
DEMENTIA VERSUS MCI

• DEMENTIA – Deficit in two or more areas of cognition with progressive worsening of memory and other cognitive functions from the tests performed pre CI plus significant impairment in social activities and ADLs

• MCI – Greater degree of cognitive decline then would be expected for their age and educational background w/o interference in daily function

RESULTS (N=70)*

• Performance on speech tests remained stable between one and seven years after CI in quiet and noise (best aided)

• Scores on measures of self-esteem, activity level, social interaction levels, speech production, sound perception scales of the Nijmegen CI Questionnaire were stable between one to seven years

• Before CI 55% had normal cognitive function and 45% of participants were classified as having MCI (perhaps due to depletion of cognitive reserve and lack of social relationships, loneliness, SI, and depression)

*participants had rehab
CI PRESERVED COGNITIVE FUNCTION

- 7 Years post CI – 61% of persons with MCI before implantation remained stable and 32% returned to normal cognitive function; Of participants with normal cognitive fx before CI 68% remained stable and 32% developed MCI; 2 people had dementia; 45% had MCI, and 56% had no cognitive impairment
- While a higher (44%) percentage of participants had MCI before CI as compared to the general population prevalence of 3 to 19% (confirms that hearing loss a risk factor for cognitive decline)
- HOWEVER there was a lower rate (6%) of progression to dementia of individuals with MCI as compared to the general population where more than 50% of persons with MCI develop dementia in five years

Conclusion-Benefit of Hearing Restoration

- By improving oral communication and reducing listening effort perhaps the CI optimized potential for improvement in social activities, reduction in SI and improved CI explaining why there was little progression in cognitive function 7 years post CI
- Substantial and sustained benefits experienced by older adults who were implanted in terms of oral communication, neurocognitive function and Q of L
- Stemmed progression from MCI to dementia
WHAT IS THE ROLE OF AUDIOLOGISTS?

HIGHLY VARIABLE CONDITION

COGNITIVE FUNCTION

Mild Cognitive Impairment (MCI)

Aging

Dementia

1

2

3
• Gatekeeper – Identify people early and contribute to efforts to improve detection, care planning and management of modifiable risk factors
• Information on cognitive function will inform management strategies and care planning
• Inter-professional collaboration and comprehensive management
  – Assist in optimal management of persons with dementia and caregivers
Case Finding

- Patients with reported or obvious memory difficulties, slowed reaction time, communication challenges
- Patients who you observe to have demonstrated behavior change including more difficulty retrieving information than in the past
- Patients who evidence memory difficulties or family member expresses concerns (history, longitudinal evidence, change from past level of performance)
- Patients in whom family member worried about memory problem but not patient (Small, 2002)

Patients Demonstrating Some of the Following Communication Behaviors

- Losing the thread of a sentence or conversation and repeating words or questions
- Family member expresses concerns
- Relevance of response to your questions
- Limited range of vocabulary being used
- Caregiver responding rather than patient
- Reported changes in reaction to sound
Behaviors To Note When Working with Patients

- Ability to learn and retain new information
- Ability to handle complex tasks
- Reasoning ability
- Trouble following a conversation
- Change in behavior, mood or personality
- Change from pre-morbid behaviors
- Difficulty performing familiar tasks
- Difficulty deciphering colors (red vs. blue)
- Forgets newly learned information

Family Expresses Concerns About Memory

- Asking the same question over and over again
- Not able to follow directions
- Gets confused about time, people, and places
- Not able to learn and retain new information
ASK QUESTIONS ABOUT MEMORY?

• “Are you worried about your memory?”
• “Have you noticed a change in your memory that concerns you?”
• “During the past few months, have you had increasing problems with your memory?”
HOW TO HELP CAREGIVER?

• Educate caregivers about hearing loss and the resources available to assist them in meeting the needs of communication partner
• Help them to recognize the signs of hearing loss as compared to dementia
• Make appropriate referrals

HOW TO HELP CAREGIVER?

• Discuss steps they should take to prevent and minimize hearing loss by reducing environmental noise
• Raise awareness about wax build up and consequences!!
• Home safety tips
TO SCREEN OR NOT TO SCREEN?

RAPID SCREENING ASSESSMENT TOOLS

• FACTORS INFLUENCING CHOICE
  – Overall goals
  – Workflow
  – Clinician style
  – Test considerations

  Practical: Brief time and effort to administer, free of charge, sensitive and specific
  Parsimonious: Provide enough information for valid referral and management planning
  Scorable: Results depicted in a single number
ASSESSMENT TOOLS (Rosenbloom, et al., 2016)

• Mini-Cog
  – Recall, Visuospatial Abilities

• General Practitioner Assessment of Cognition (GPCOG) – Patient and Informant Components
  – Orientation, Visuospatial, Executive Fx,
  Retrieval of recent information, Delayed verbal recall

ASSESSMENT TOOLS (Rosenbloom, et al., 2016)

• Mini-Cog

• General Practitioner Assessment of Cognition (GPCOG) – Patient and Informant Components

OPTIMAL DETECTION – SCREEN+INQUIRY INTO MEMORY LOSS
The Mini Cog™ (Borson, Scanlan, Brush, et al., 2000)

- Unbiased by education and language variations
- Utilized in primary care
- Simple to administer; Little training required
- High sensitivity and specificity
- Effectively increases detection of dementia and specialty referrals
- May help promote parity in access to care in under-served populations
- Assesses registration, recall, and executive function


COMPONENTS

- Three Word Registration – Recall test for memory
- Clock Drawing Test (Recall Distractor)
  - assesses cognitive function, memory, language comprehension, visual-motor skills, and executive function
  - provides a visible record of both normal and impaired performance that can be tracked over time
- Three Word Recall
RELIABILITY*

- Excellent sensitivity (.99)
- Acceptable specificity (.93)

*Most powerful element of test is three item recall but CDT increases sensitivity and diagnostic value

THREE WORD RECOGNITION

Recall Test for Memory

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<tbody>
<tr>
<td>Banana</td>
<td>Leader</td>
<td>Village</td>
<td>River</td>
<td>Captain</td>
<td>Daughter</td>
</tr>
<tr>
<td>Sunrise</td>
<td>Season</td>
<td>Kitchen</td>
<td>Nation</td>
<td>Garden</td>
<td>Heaven</td>
</tr>
<tr>
<td>Chair</td>
<td>Table</td>
<td>Baby</td>
<td>Finger</td>
<td>Picture</td>
<td>Mountain</td>
</tr>
</tbody>
</table>
Clock Drawing Test (Recall Distractor)

– assesses cognitive function, memory, language comprehension, visual-motor skills, and executive function
– provides a visible record of both normal and impaired performance that can be tracked over time

THREE WORD RECALL

• Ask the person to recall the three words you stated in Step 1
• Say: “What were the three words I asked you to remember?”
• Word List Version: _____
• Person’s Answers: __________  __________  __________
### SCORING

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>Word Recall (1 point for each word spontaneously recalled without cueing)</td>
</tr>
<tr>
<td>0 or 2</td>
<td>Clock Draw (normal clock = 2 points. A normal clock has all numbers placed in the correct sequence and approximately correct position (e.g., 12, 3, 6 and 9 are in anchor positions) with no missing or duplicate numbers. Hands are pointing to the 11 and 2 (11:02). Hand length is not scored. Inability or refusal to draw a clock (abnormal) = 0 points.)</td>
</tr>
<tr>
<td>0-5</td>
<td>Total Score = Word Recall score + Clock Draw score. A cut point of &lt;3 on the Mini-Cog™ has been validated for dementia screening, but many individuals with clinically meaningful cognitive impairment will score higher. When greater sensitivity is desired, a cut point of &lt;4 is recommended as it may indicate a need for further evaluation of cognitive status.</td>
</tr>
</tbody>
</table>

### MINI-COG SCORING ALGORITHM

- **MIN-COG**
  - **3-Item Recall = 1** → DEMENTED
  - **3-Item Recall = 1-2** → CDT ABN
  - **3-Item Recall = 3** → NOT-DEMENTED

- **CDT ABN** → DEMENTED
- **CDT NORMAL** → NOT-DEMENTED
ADMINISTRATION TIPS

COMMUNICATION TIPS

• Speak clearly and face the speaker
• Always address the person by the name he or she prefers
• Approach the person from the front and state the person’s name before starting a conversation
• Speak to the person at eye level
• Speak slowly and calmly, and use short, simple words
• Allow enough time for the person to respond (counting to five between phrases is helpful)
• Focus on the person’s feelings, not the facts (Remember their needs) and use non-verbal communication (gestures, facial expressions)
• Use multimodal cues to increase focus of attention
• Use a comforting tone of voice
• Stay of topic and provide clear transition statements
• Communicate in quiet spaces
• Make sure face is visible as seeing the speaker optimizes communication
• Break complex tasks into smaller ones
• Use gestures and body language when communicating

CONNECTING

• Be patient, flexible, understanding, supportive
• Avoid interrupting when they are speaking; they may lose their train of thought
• Allow individual to interrupt you, or they may forget what they want to say
• Limit distractions during communication (e.g. keep office door closed) and reduce noise
• Increase use of gestures and other non-verbal communication techniques
• Observe the individual to recognize non-verbal communication and their mode of communicating
• Retrofit the communication environment to include sound-absorbing acoustical tile and soft fabrics on the surfaces
• Provide tips regarding how to modify the environment for safety and security (flashing lights, etc.)

• Review how to communicate effectively and use strategies that enhance communication

• Help persons with hearing loss utilize assistive technology to facilitate communication, improve understanding, and reduce cognitive effort especially in group activities (e.g. cognitive training, physical activity) (Super Ear Plus by Sonic)

• Continuity of care is key – Keep same audiologist!!
Take Aways: Recommendations by Stage of Dementia

- **Early stage** – have memory available but have difficulty concentrating so require reminders; flattening of affect as does not want to reveal deficits they note and begins to withdraw from participation in conversations and activities; support independence; ask for preferences; plan ahead; engage a surrogate decision-maker; consent capacity still available; tips on home safety critical; schedule exams for mid-morning
- **Middle stage** – safety becomes important as memory, cognition, sequential thinking are impaired; communication capacity diminished so use multiple modalities to communicate; provide adequate time for patient to process what you are saying; speak in five- to eight-word sentences; may need to resort to yes-no rather than open-ended questions; alternate reality – validate emotional content of what has been said; do not dispute facts – not reliable reporters
- **Late stage** – complete reliance on others; cannot communicate; need to feel safe and cared for; caregiver primary role
- Preclinical or early stage likely the best starting point for efforts to prevent or treat hearing loss; hearing restoration via CI can stem the progression from MCI to dementia (Reisberg, Ferris, et al., 1982)
THANK YOU:
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References

- Weinstein, B. A Primer on Hearing and Dementia. SIG 6, Vol. 3 (Part 1), 2018.