# Assessment of Sensory Impairment in Older Adults

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## Case Study

82 yo man is brought in for a visit with his PCP by his daughter. She reports that in the past 3-4 months he seems *irritable*, less *interactive*, and more *confused* about his medications, making several medication errors. She feels he is *losing weight* and not eating well, *rarely goes out* to shop or to have coffee and play cards like he used to. He disagrees, saying she is "overreacting" and he is "just getting old."

- What do you suspect may be going on?
- What tools can you use to screen when patients or families report concerns?
- How might different team members help in the assessment/evaluation of these concerns?





#### Objectives

- Describe the impact of sensory impairments on cognition, function, social isolation, and health outcomes.
- Identify current guidelines and evidence-based tools for screening for sensory impairment in older individuals.
- Determine appropriate patients for referral to interprofessional team members



# Sensory Impairment

- Vision
- Hearing
- Smell & taste
- Tactile
  - Temperature, texture, sensation, pain
- Vestibular
  - Balance, movement
- Proprioception
  - Body position in environment



# Why is this important?

- Identification of sensory impairments (SI) in older adults is critical to aging well and optimizing accommodations
- Growing elderly population
- Interprofessional teamwork



#### Prevalence of SI

- Increases with age
- For those 65+
  - 9% blindness or visual impairment (VI) (Assi 2021)
    - 18%+ for those over 70 (Crews)
  - 50% hearing impairment (HI) (Assi 2021)
- For those 80+
  - ~15%\* report dual sensory impairment (DSI) (Hwang)

\*range 8.6-21.9%



#### Prevalence of SI

- Hearing impairment (HI)
  - Age 65-74: ~25%
  - Age 75+: ~50%
     NIH data
- Olfactory impairment (OI) (Pang)
  - 50% age 65-80
  - 80% older than 80



## Overall Impact

- Individualized and vary
  - Severity/Type
  - Occupation
  - Activity level & mobility
  - Roles in the home
  - Location/Access to care
  - Safety (ie: need to smell dangerous odors)
  - Belief systems
  - Personal choices



#### Vision Impairment

- Decreases in:
  - Leisure activities, IADL performance and social functioning (social isolation, depression)
    - Driving
  - ADL's and mobility (falls, hip fractures) (Crews)
    - Safety (kitchen, bathroom)
- Increases in:
  - Physician visits and hospitalizations
  - Mortality
  - Family stress (Crews)



# Hearing Impairment

- Decreased function and psychosocial impairments
- (Fortunato)

- Physical mobility & activity (falls)
- Social engagement (social isolation)
- Communication (QoL)
- Increased rates or risk of:
  - Depression
  - Dementia
- Uncorrected = accelerated cognitive decline in dementia (Crews)



# Dual sensory impairment (DSI)

- More functional limitations than those with 1 or no impairment (Assi 2021)
  - Decreased mobility, self-care activities and household activities (IADLs)
- Increased physical disability measured by IADLs (women), imbalance, falls, hip fracture, mortality (Crews)
- Decreased quality of life (QoL) (Crews)
- Markedly worse psychosocial factors (Hajek & Konig)
  - Life satisfaction, positive/negative affect, depressive symptoms, loneliness, social isolation, self-esteem and autonomy



# Smell & Taste (OI): Impacts

- Overall lower QoL
- Weight loss/malnutrition
  - Reduced appetite
  - Loss of joy in eating/preparing meals
    - Reduced social participation -> Depression
- Decreased safety
- 52% higher risk of all-cause mortality > ?Frailty
- Early sign of neurodegenerative disorders/cognitive decline

(Pang)



# Impact of SI on Cognition

- Cognitive inactivity, social isolation, poor diet, depression → Dementia
- Cross-sectional study of 18k age 45+ in China (Rong)
  - Word recall, orientation, serial 7s, intersecting pentagons
  - Visual and/or hearing impairments = higher risks
     of cognitive decline and depression
    - Worse performance in episodic memory, mental intactness, global cognition; worse depression symptoms
  - DSI: worse on all outcomes



#### **DSI** and Dementia

- DSI associated with cognitive impairment and dementia (Assi 2021)
- Risk factor for dementia
  - GEM study: RCT Age 75+ normal or MCI
    - Subset N= 2051 over 8 yrs (Hwang, et al)
    - 86% increased risk for all-cause dementia
    - 112% increased risk for Alzheimer's Dementia (AD)
    - Dose-response relationship



#### SI and Dementia

- HI and VI more common in people with dementia
- SENSE-Cog Field Trial (Leroi)
  - "sensory intervention" n=19 (+ study partner)
    - Hearing and vision assessment (58% had DSI)
    - Glasses/hearing aids
    - Weekly visits from sensory support therapist (subgroup)
      - Education, referrals, support, aids (glasses straps, lighting, etc)
  - QoL and sensory functional ability improved (qualitative)
    - More social engagement, less isolated, less dependent, increased communication
  - Assistance time for IADLs decreased
  - RCT coming...



## Impact on Social Isolation

"Blindness cuts us off from things, deafness cuts us off from people" - Helen Keller

- Sight loss usually visible
  - Hearing loss, taste/touch/smell impairments less visible
- Increase risk of depression, anxiety, lack of selfesteem, loneliness (Rong, Assi, Hajek & Konig)



#### Impact on Health Outcomes

- 2017 Medicare Current Beneficiary Study (65+)
  - Increased odds of dissatisfaction with
    - Quality of care (DSI)
    - Information provided (all)
    - Doctors concern with overall health (DSI and HI)
    - Ease to get to a doctor visit and out-of-pocket costs (DSI and VI)
- COVID 2022 UK Office for National Statistics (ONS)
  - Those age 30-69 with DSI ~12x as likely to die from COVID
  - Adjusted for age/residence, health status: 1.4x higher



#### Barriers

- Access to comprehensive/integrated care
  - Lack of routine eye care
  - Cost
    - hearing aids, corrective lenses
    - Specialty visits
  - Limited time in primary care visits
  - Travel
- Poor social network
- "Normal aging" normalizing
- Fear



Sensory Impairment in Older Adults

# ASSESSMENT & MANAGEMENT



# Case Study

- Age 82, lives alone in own house
- Drives to familiar places
- Daughter provides 1 meal 1x week
- PMH
  - CAD s/p CABG 14 years ago
  - HTN
  - HLD
  - BPH
  - Up to date on vaccines, last clinic visit 6 months ago (stable)
- Vitals
  - BP 140/82, HR 55, BMI 26 weight down 10 lbs
  - Has hearing aids, not wearing them





# Hearing: Causes

- Genetics
- Age
- Noise exposure/trauma
- Infections
- Medications/toxins
- Tinnitus
- Wax



## Ways to Screen Hearing

- "Do you have difficulty with your hearing?"
- Whispered Voice, Finger rub, watch tick tests
  - Tuning fork tests: Weber, Rinne
- AudioScope (Welch Allyn): handheld otoscope with built-in screening audiometer
- Audiometry apps
- Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) questionnaire
- All confirmed with pure-tone audiometry



## Hearing Loss: Ways to manage

- Audiology → Hearing aids
  - In US only 1 in 5 uses hearing aids
- Pharmacy ototoxic medications
- Telephones that use text rather than speech
  - Voice to text apps
- Flashing light doorbells
- Vibrating pager systems
- Door chimes
- Vibrating alarm clocks
- Assistance dogs
- Sign language, Lip reading



#### Vision Loss: Causes

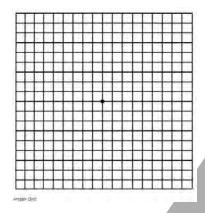
- Presbyopia most
- Uncorrected refractive errors (access)
- Cataracts
  - ~50% of US adults 75+ (USPSTF 2022)
- Diabetic retinopathy
- Glaucoma
- Macular degeneration
- Genetics
- Injury
- Substance Use



#### Ways to Screen Vision Loss

- "Do you have concerns about your vision?"
- Visual Acuity \* not sensitive or specific
  - Snellen eye chart
  - Early Treatment Diabetic Retinopathy Study (ETDRS) chart
- Visual field testing
- Fundoscopy
- Refractive error
  - Pinhole test
- Macular Degeneration
  - Amsler grid







# Vision Loss: Management

- Optometry/Ophthalmology
  - Glasses, contacts
  - Surgery cataracts
  - Laser procedures
  - Injections
  - Medications/drops
- Assistive Devices/Housing Adaptations
  - PT/OT
  - Canes
  - Lighting
  - Rugs
  - Safety



# Vision Loss: Management

- Medication Assistance Pharmacy, Nursing
- Technology/Computing
  - Audio books
  - Font enlargement/Magnifiers
  - Voice to text
  - Talking clocks, watches
  - Large button telephones
- Guide dogs
- Meals on Wheels/food prep Social Work



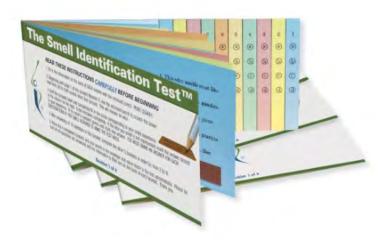
#### Smell & Taste: Causes

- Medications
- Chronic sinus disease
- Infections (URI, COVID)
- Brain injury
- Cancer



#### Ways to screen

- Open ended questions
- SNAQ
- Smell Identification Test (UPSIT)



#### SNAQ (Simplified Nutritional Assessment Questionnaire)

#### My appetite is Food tastes very poor a. very bad b. bad poor average c. average d. good good e. very good very good When I eat Normally I eat Less than one meal a I feel full after eating only a few mouthfuls b. I feel full after eating One meal a day about a third of a meal c. I feel full after eating Two meals a day over half a meal Three meals a day d. I feel full after eating most of the meal More than three meals I hardly ever feel full a day Scoring: a=1, b=2, c=3, d=4, e=5.

Scoring: a=1, b=2, c=3, d=4, e=5. A score ≤14 indicates significant risk of at least 5% weight loss within 6 months.

From Wilson et al. Am J Clin Nutr 2005;82:1074-81.

Total SNAQ Score:

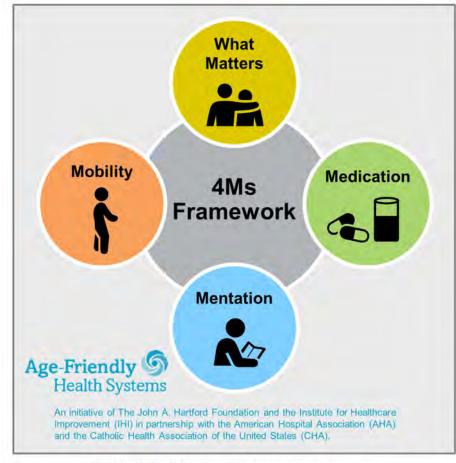


# Smell & Taste: Management

- ENT
  - Smell & taste testing
  - Tests: endoscopy, scans
  - Tx: steroids, antibiotics, surgery, smell/taste therapy
- Dietician
- Speech Therapy
- Pharmacy
- Specialists: Neurology, Oncology...
- Support: address loss to individual
  - Behavioral Health
- Identify safety risks
  - Smoke Detectors, spoiled food, etc



#### 4Ms



For related work, this graphic may be used in its entirety without requesting permission Graphic files and guidance at thi, org/AgeFriendly

#### **What Matters**

Know and align care with each older adult's specific health outcome goals and care preferences including, but not limited to, end-of-life care, and across settings of care.

#### Medication

If medication is necessary, use Age-Friendly medication that does not interfere with What Matters to the older adult, Mobility, or Mentation across settings of care.

#### Mentation

Prevent, identify, treat, and manage dementia, depression, and delirium across settings of care.

#### Mobility

Ensure that older adults move safely every day in order to maintain function and do What Matters.



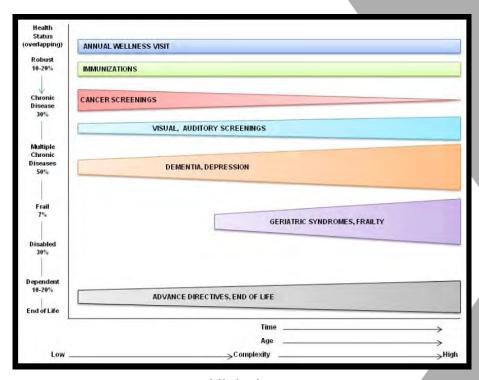
## **Cultural Humility**

- "Tell me what a normal day looks like for you..."
- "What is the most difficult task for you to accomplish?"
  - "How do you handle that?"
- "I notice you wear glasses when did you last see your eye doctor?"
- "How is your hearing? Does anyone ever say you aren't hearing well?"
- "Do you ever stay home because its too difficult to go out?"



#### Communication

- Purpose
- Effective Communication
  - Well-lit room
  - Eye contact
  - Minimal background noise
  - Underreporting
- Caregiver Input



**Nicholas** 



## History and Exam

- History
  - ADLs, IADLs
  - Comorbid health conditions
- Physical Exam
  - General
  - Eye exam
  - Ear Exam
    - Otoscope (wax), Whispered voice test, tuning fork tests
  - Nose, Mouth/Throat & CN testing
  - Cognition
  - Mobility



#### Validated Screening Tools

Problem	Screening Measure	Positive Screen
Vision	2 Parts: Ask: "Do you have difficulty driving, or watching television, or reading, or doing any of your daily activities because of your eyesight?" If yes, then: Test each eye with Snellen chart while patient wears corrective lenses (if applicable).	Yes to question and inability to read greater than 20/40 on Snellen chart
Hearing	Use audioscope set at 40 dB. Test hearing using 1,000 and 2,000 Hz.	Inability to hear 1,000 or 2,000 Hz in both ears or either of these frequencies in one ear

#### 10-Minute Geriatric Screener

- Vision
- Hearing
- Mobility Timed Get Up and Go (TUG) test
- Physical Disability 6 questions
- Urinary Incontinence, Memory, Depression, Nutrition/Weight loss



# Integrated Care for Older People (ICOPE)

#### WHO ICOPE SCREENING TOOL

Priority conditions associated with declines in intrinsic capacity	Tests	Assess fully any domain with a checked circle
COGNITIVE DECLINE	Remember three words: flower, door, rice (for example)	
(Chapter 4)	<ol><li>Orientation in time and space: What is the full date today? Where are you now (home, clinic, etc)?</li></ol>	Wrong to either question or does not know
	3. Recalls the three words?	Cannot recall all three words
LIMITED MOBILITY Chapter 5)	Chair rise test: Rise from chair five times without using arms.  Did the person complete five chair rises within 14 seconds?	No
MALNUTRITION (Chapter 6)	Weight loss: Have you unintentionally lost more than 3 kg over the last three months?	O Yes
	2. Appetite loss: Have you experienced loss of appetite?	Yes
VISUAL IMPAIRMENT (Chapter 7)	Do you have any problems with your eyes: difficulties in seeing far, reading, eye diseases or currently under medical treatment (e.g. diabetes, high blood pressure)?	Yes
HEARING LOSS	Hears whispers (whisper test) or	Fail
Chapter 8)	Screening audiometry result is 35 dB or less or	
	Passes automated app-based digits-in-noise test	
DEPRESSIVE SYMPTOMS	Over the past two weeks, have you been bothered by	Yes
(Chapter 9)	- feeling down, depressed or hopeless?	-
	- little interest or pleasure in doing things?	Yes

## HHIE-S

#### Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S)

- <u>Instructions:</u> Please check "yes," "no," or "sometimes" in response to each of the following items. Do not skip a question if you avoid a situation because of a hearing problem. If you use a hearing aid, please answer the way you hear without the aid.
- Higher score= higherprobability ofdisability
- Refer to Audiology if score 10+

	Item	Yes (4 pts)	Sometimes (2 pts)	No (0 pts)
E	Does a hearing problem cause you to feel embarrassed when meeting new people?			
E	Does a hearing problem cause you to feel frustrated when talking to members of your family?			
S	Do you have difficulty hearing when someone speaks in a whisper?			
E	Do you feel handicapped by a hearing problem?			
S	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?			
S	Does a hearing problem cause you to attend religious services less often than you would like?			
E	Does a hearing problem cause you to have arguments with family members?			
S	Does a hearing problem cause you difficulty when listening to TV or radio?			
E	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?			
S	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?			



## Rapid Geriatric Assessment (RGA)

- St. Louis University \*No copyright
- Components:
  - FRAIL questionnaire frailty
  - SARC-F sarcopenia
  - SNAQ appetite/taste (OI), weight loss
  - Rapid Cognitive Score
    - 5 object recall
    - Clock draw
    - Story/memory
  - Advance Directive Y/N



#### Saint Louis University Rapid Geriatric Assessment\*



\*There is no copyright on these screening tools and they may be incorporated into the Electronic Health Record without permission and at no cost.

IDM: \_\_\_\_Sex: \_\_\_Age: \_\_\_Primary Care Provider Y / N
Ethnicity (circle): African/Am Asian Caucasian Hispanic Non-Hispanic

#### The Simple "FRAIL" Questionnaire Screening Tool

Eatigue: Are you fatigued?

Resistance: Cannot walk up one flight of stairs?

Aerobic: Cannot walk one block? Illnesses: Do you have more than 5 illnesses?

Loss of weight: Have you lost more than 5% of your weight in the last 6 months?

#### Scoring: 3 or greater = frailty; 1 or 2 = prefrail

From Morley JE, Vellas B, Abellan van Kan G, et al. J Am Med Dtr Assoc 2013;14:392-397.

Total FRAIL Score: \_\_\_\_\_

### SNAQ (Simplified Nutritional Assessment

Food tastes

a. very had

c. average

e. very good

Normally I eat

One meal a day

Two meals a day

Three meals a day

More than three meals

Less than one meal a

d. good

b. bad

## My appetite is a. very poor b. poor c. average d. good e. very good

### When I eat a. I feel full after eating

- only a few mouthfuls
  b. I feel full after eating
  about a third of a mea
- I feel full after eating over half a meal
- d. I feel full after eating most of the meal
- e. I hardly ever feel full

Scoring: a-1, b-2, c-3, d-4, e-5.
A score ≤14 indicates significant risk of at least 5% weight loss within 6 months.

From Wilson et al. Am J Clin Nutr 2005;82:1074-81.

Total SNAQ Score:

#### SARC-F Screen for Sarcopenia (Loss of Muscle)

Component Question

Strength How much difficulty do you have In

lifting and carrying 10 pounds?

Scoring: None = 0 Some = 1 A lot or unable = 2

Assistance in How much difficulty do you have
Walking walking across a room?

Scoring: None = 0 Some = 1 A lot, use aids or unable = 2

Rise from a How much difficulty do you have Chair transferring from a chair or bed? Scoring: None = 0 Some = 1 A lot or unable without

Climb states How much difficulty do you have climbing a flight of ten states?

Scoring: None = 0 Some = 1 A lot or unable = 2
Falls How many times have you

fallen in the last year?

Scoring: None = 0 1-3 Falls = 1 4 or more falls = 2

Total score of 4 or more indicates Sarcopenia

From Malmstrom TK, Morley JE. J Frailty and Aging 2013;2:55-6.

Total SARC-F Score: \_\_\_\_\_\_

#### Rapid Cognitive Screen (RCS)

#### Please remember these five objects. I will ask you what they are later. [Read each object to patient using approx. I second intervals.] Apple Pen Tie House Car

- [Give patient pencil and the blank sheet with clock face.] This
  is a clock face. Please put in the hour markers and the
  time at ten minutes to eleven o'clock
  . [2 pixtle markers ok; 2 pixtlime correct]
- What were the five objects I asked you to remember? [1 pt/ea]
- I'm going to tell you a story. Please listen carefully because afterwards, I'm going to ask you about it.

Jill was a very successful stockbroker. She made a lot of money on the fock market. She then met Jark, a devastatingly handsome man. She married him and had there children. They lived in Chicago. She then topped work and stayed at home to bring up her children. When they were teneagers, she went book to work. She and Jack lived happily ever after.

What state did she live in? [1 pt]

#### 8-10...... 6-7.......

Normal Mild Cognitive Impairment Dementia

From Malmstrum TK, Voss VB, Cniz-Oliver DM et al. J Nair Health Aging 2015;19:741-744.

Total RCS Score: \_\_\_\_

<sup>\*</sup>no specific HI or VI screening

## Guidelines: WHO 2019

- Screen for declines in intrinsic capacity
  - ICOPE Screening Tool
    - Includes hearing loss, visual impairment
- Prevention
  - Vision
    - Optimize HTN, DM2, steroid use
    - Adapt home: lighting, contrasting colors, remove hazards
  - Hearing
    - If abnormal audiology → hearing aids/refer
    - Emotional support, auditory aids (phone, doorbell)



### Recommendations

### USPSTF

- Hearing loss: Insufficient evidence (2021)
- Vision loss: Insufficient evidence
  - · Visual acuity or glaucoma in older adults
  - Consider more frequent exams in patients at higher risk for glaucoma (African-American, Hispanic)
- Others
  - AAFP agrees with USPSTF recommendation I
  - American Academy of Ophthalmology
    - Comprehensive exam q 1-2 years in patients 65+
  - American Optometric Association
    - Yearly exam 65+



### Medicare

- IPPE
  - Screen for depression
  - Direct observation or screener
    - ADLs, Fall risk, Hearing Impairment, Home safety
  - Exam: visual acuity
- Annual Wellness Visit (AWV)
  - Health Risk Assessment (HSA)
    - As above in IPPE plus:
      - Psychosocial risks (life satisfaction, social isolation..)
      - IADLs
      - Cognitive function (brief test)



# Interprofessional Team

- PCP MD, DO, PA, NP
- Audiologist
- Optometrist/Ophthalmologist
- ENT
- Dentist
- Nursing
- Therapists: OT, PT, ST
- Pharmacy
- Social Worker
- Behavioral Health
- Dietician
- Specialists





# Caregivers

- Critical to implementation of the plan
- Day to day activities
- Support
- Caregiver Stress





## When to Refer



- Concerns
  - Self-reported or caregiver/family
  - PCP or other team members
  - Atypical presentation
- Falls, injuries, accidents (driving)
- Cognitive Decline
- Poor self-care
- Socially isolating
- Mood change: depression, anxiety, irritability
- Weight loss/Malnutrition





# Case Study

82 yo man is brought in for a visit with his PCP by his daughter. She reports that in the past 3-4 months he seems *irritable*, less *interactive*, and more *confused* about his medications, making several medication errors. She feels he is *losing weight* and not eating well, *rarely goes out* to shop or to have coffee and play cards like he used to. He disagrees, saying she is "overreacting" and he is "just getting old."

- What do you suspect may be going on? How would a SI impact his health?
- What tools can you use to screen when patients or families report concerns?
- How might different team members help in the assessment/evaluation of these concerns?



# Case Study

- Clinic visit
  - ICOPE or 10-minute geriatric screener
    - PHQ9, GDS, or other mood assessment
    - SNAQ or other nutrition assessment
    - MoCA, SLUMS, or other cognitive assessment
  - Medication review
  - Exam
    - Vision
    - Hearing "Tell me more about your hearing aids...."
    - Weight loss
  - 4Ms
  - Caregiver input/support
- Referrals
- Follow up



## Summary

- Describe the impact of sensory impairments on cognition, function, social isolation, and health outcomes.
- Identify current guidelines and evidence-based tools for screening for sensory impairment in older individuals.
- Determine appropriate patients for referral to interprofessional team members



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