Improving outcomes of hospitalized older persons

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Rocky Mountain Geriatrics Conference
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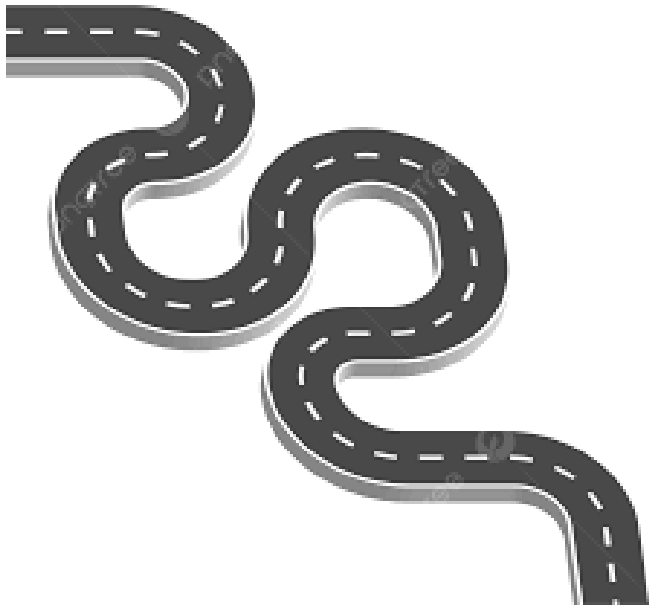
Objectives:

- Identify patient and family priorities for improving hospital care
- Identify best practices in care transitions
- Identify strategies to improve hospital care team effectiveness

3 topics:

- What are people's priorities for improving hospital care?
  - Data from 2 research agenda projects
- What are best practices for care transitions?
  - Program components
  - Implementation realities
- System level interventions
  - RESET
  - Collaborative care
- Implications for practice



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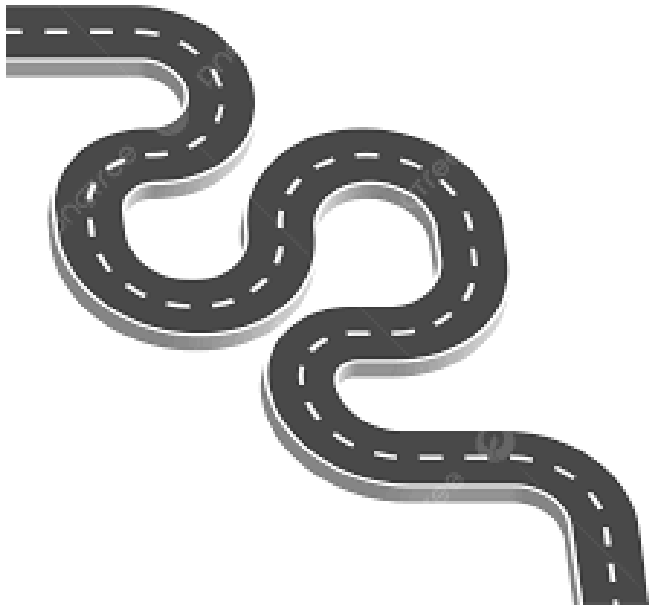


Acute Care of Older Persons Priority Setting Partnership

&

Improving Hospital Outcomes through Patient Engagement

Challenges in the Acute Care of Older Patients

Disproportionately suffer from “hazards of hospitalization”

Atypical disease presentations

Often excluded from trials

Outcomes of interest unstudied

Functional and cognitive impairments complicate decision-making and transitions

Limited life expectancy alters risk-benefit analysis

Methodology for both projects

Convene

Consult

Collate

Prioritize

Disseminate

http://www.lindalliance.org/JLA_Method.asp

Stakeholders

- Alzheimer's Association
- American Academy of Neurology
- American Association of Retired Persons
- American College of Cardiology
- American College of Emergency Physicians
- American College of Surgeons
- American Geriatrics Society
- American Hospital Association
- Centers for Medicare and Medicaid Services
- Gerontological Society of America
- John A Hartford Foundation
- National Alliance for Caregiving
- National Association of Social Workers
- National Coalition on Healthcare
- National Institutes on Aging, NIH
- National Partnership for Women and Families
- Nurses Improving the Care of Healthsystem Elders
- Society of Critical Care Medicine
- Society of Hospital Medicine

Respondents (n=580)

- 77% female
- 85% white
- 65% 45-65 years old
- 26% patient / caregiver / advocate
- Represent 17 stakeholder organizations

Topic	Question
Advanced care planning	What approaches for ***determining and communicating goals of care*** across and within healthcare settings are most effective in promoting goal-concordant care?
Delirium	What practices are most effective for consistent ***recognition, prevention, and treatment of delirium*** subtypes?
Dementia	Does ***universal assessment of hospitalized older adults for cognitive impairment*** lead to more appropriate application of geriatric care principles and improve patient centered outcomes?
Depression	Does ***identifying depressive symptoms and initiating a therapeutic plan*** prior to discharge improve patient-centered and/or disease specific outcomes?
Medication	What systems interventions improve ***medication management*** for older adults in hospital and post-acute care?
Models of care	For which populations of hospitalized older adults does ***systematic implementation of geriatric care principles/processes*** improve patient-centered outcomes?
Care Transitions	What is the comparative effectiveness of ***transitional care models*** on patient-centered outcomes?
Surgery	What ***perioperative strategies*** can be used to optimize care processes and improve outcomes?
Physical Function	What is the comparative effectiveness of interventions that ***promote mobility, improve and preserve physical function***, and reduce falls?
Training	What is the most effective approach to ***training hospital-based providers*** in geriatric and palliative care competencies?

Society of Hospital Medicine

8 Research Committee Members & 7 PFAC Partners

shm
Society of Hospital Medicine

Empowering hospitalists.
Transforming patient care.

Stakeholder Partner Organizations

Agency for Health Research and Quality Evidence Based Practice Centers Scientific Resource Center

Alzheimer's Association

American Academy of Hospice & Palliative Medicine

American Academy of Neurology

American Academy of Physical Medicine & Rehabilitation

American Association of Neurological Surgeons

American Association of Nurse Practitioners

American College of Clinical Pharmacy

American Geriatrics Society

American Nurses Credentialing Center

American Society of Plastic Surgeons

Community First Health Plans

Congress of Neurological Surgeons

Health Hats

Health Research & Educational Trust - American Hospital Association

Institute for Healthcare Communication

Institute for Healthcare Excellence

Institute for Patient and Family Centered Care

Living Beyond Breast Cancer

Louise H. Batz Patient Safety Foundation

Minnesota Hospital Association

National Alliance for Caregiving

Partnership to Improve Patient Care

Patient Centered Outcomes Research Institute Ambassador Program

Planetree International

Society for Post-Acute and Long-Term Care Medicine

Society of General Internal Medicine

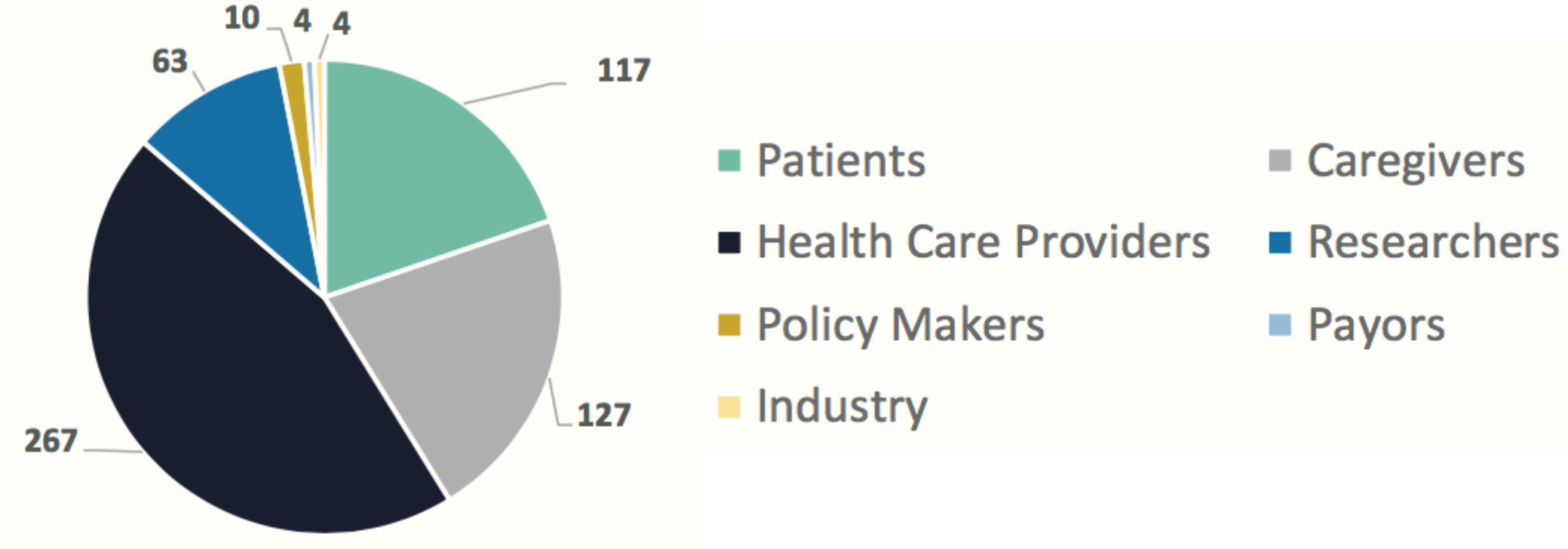
Society of Medical Decision Making

US Department of Veterans Affairs, Hospitalist Field Advisory Committee

US Department of Veterans Affairs, Health Services Research & Development

Who Submitted Questions?

499 respondents submitted 789 questions



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i-HOPE

Prioritized Research Questions In original wording

1	How can we ensure shared decision-making and that patients and families are included in treatment decision-making and goals of care discussion?
2	How can the hospital discharge hand off to other care facilities, primary care providers and specialists be made smoother?
3	How can education on medications, medical conditions, hospital care and discharge be better coordinated by the care team, and not so confusing and overwhelming to patients?
4	How can patients, family members, other caregivers and heath care teams work together to create effective discharge experiences that allow patients to feel empowered to manage their health once they get home?
5	How do we ensure that information provided by the care team during hospitalization and at discharge was clearly understood and clearly communicated by patients and caregivers?
6	How can we use telemedicine technology to improve transitions of care and reduce re-hospitalization?
7	Who do I call if I have any questions after I have been discharged?
8	Did your health-care providers explain to you what your problem or diagnosis is, what steps were done to further explore that condition, what treatment was undertaken, and what will still need to be done after discharge?
9	What are patient expectations related to the treatment of pain/chronic pain?
10	Which interventions improve medication reconciliation at key time points of the care trajectory (hospital/home, admission/discharge) and what are each intervention's outcomes?
11	Can hospital staff be more transparent about hospital practices (e.g. parking, cafeteria, entering patient rooms, rounds, sleep)?

Common Themes

- Care Transitions
- Assessing people's goals of care
- Communication across sites
- Medications – often functionally subsumed in the above topics

- Dementia was the most frequently mentioned chronic condition

3 topics:

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  - Data from 2 research agenda projects

- **What are best practices for care transitions?**
  - **Program components**
  - **Implementation realities**

- System level interventions
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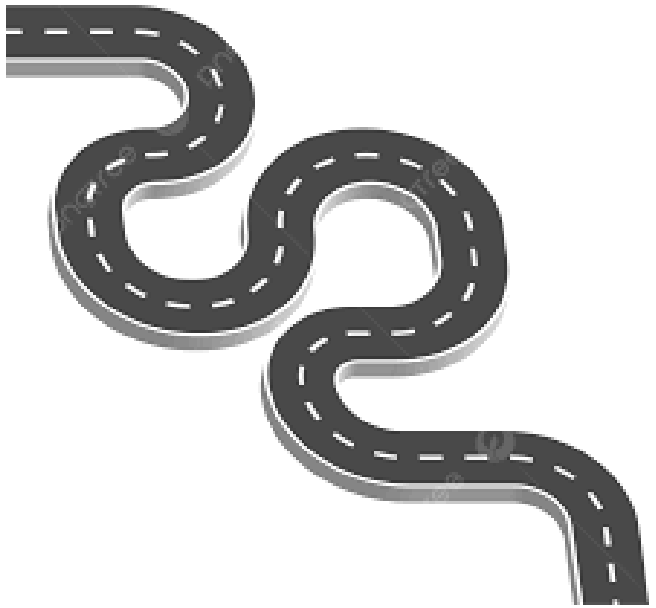
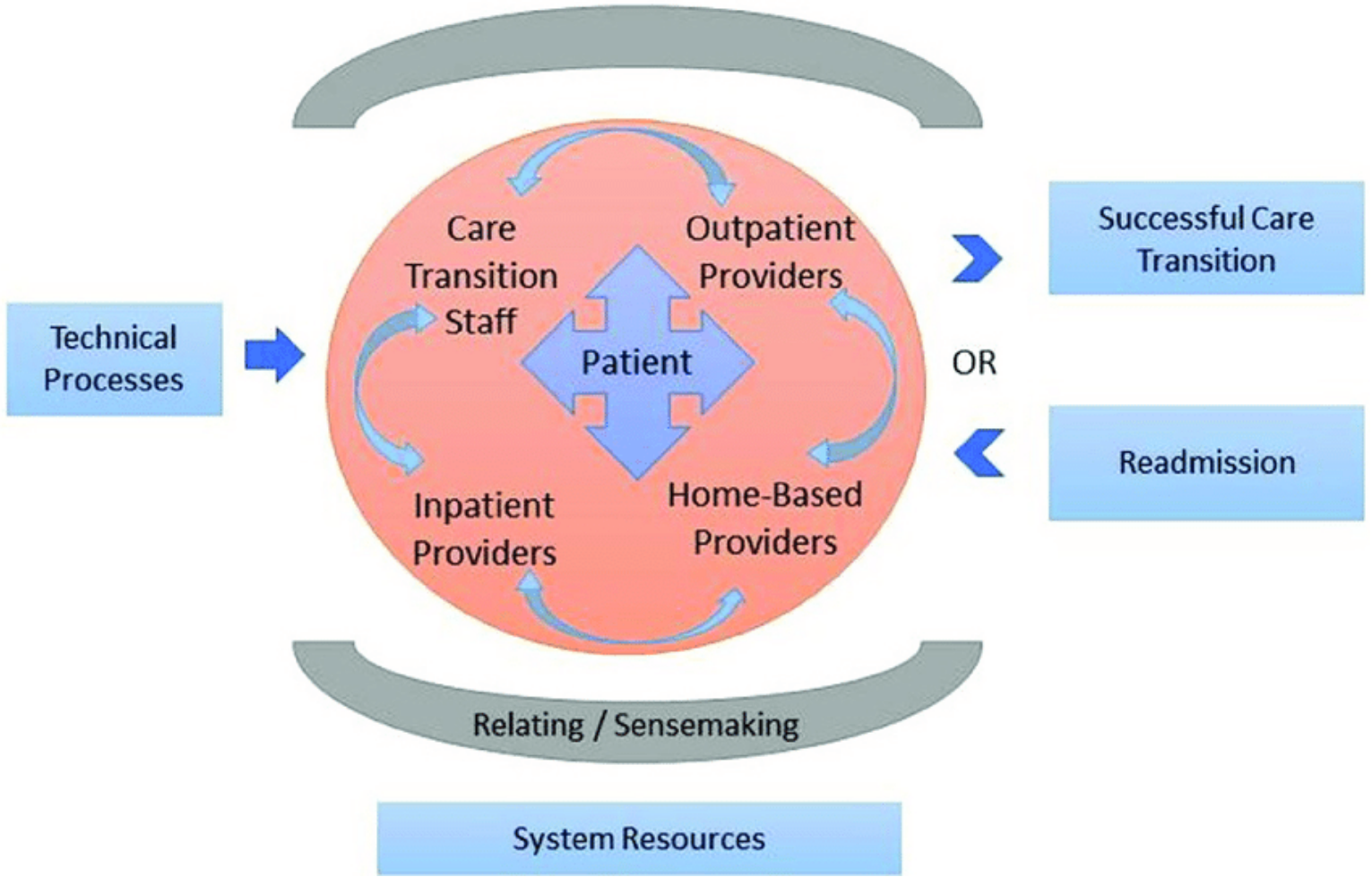


Care Transitions



What does a ***successful*** care transition look like?

- Post-hospital plan clear & understood
- Medications updated
- Follow-up appointments made
- Points of contact identified

- From a person / caregiver perspective:
  - I know what to do
  - I know who to call
  - I don’t need to go back!

Everyone is on the same page about what is going on

How can this be achieved?

Project BOOST

Assessing the 8 Ps
Problems with medications
Psychological
Principal diagnosis
Physical limitations
Poor health literacy
Poor social support
Prior hospitalization
Palliative care

Project BOOST

Assessing the 8 Ps	Potential Interventions
Problems with medications	Medication reconciliation
Psychological	Address behavioral health issues
Principal diagnosis	Assess guidelines / education
Physical limitations	DME, home supports
Poor health literacy	Education, tools for adherence
Poor social support	Home & community-based supports
Prior hospitalization	Care plan, appointments
Palliative care	Consultation

Re-Engineered Discharge

Language Assistance
Follow-up Appointments
Follow-up Lab Results
Post-discharge services / DME
Medications
Reconcile discharge plans with guidelines
Teach written discharge plan
Educate patient about diagnosis
Assess understanding of discharge plan
Review what to do if a problem arises
Send discharge summary
Telephone reinforcement of discharge plan

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Assess understanding of discharge plan
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Send discharge summary
Telephone reinforcement of discharge plan

What is the Evidence?

Project BOOST Increases Patient Understanding of Treatment and Follow-up Care

May 26, 2021

Multicenter Study > J Hosp Med. 2013 Aug;8(8):421-7. doi: 10.1002/jhm.2054. Epub 2013 Jul 22.

Project BOOST: effectiveness of a multihospital effort to reduce rehospitalization

Luke O Hansen [1], Jeffrey L Greenwald, Tina Budnitz, Eric Howell, Lakshmi Halasyamani, Greg Maynard, Arpana Vidyarthi, Eric A Coleman, Mark V Williams

Affiliations + expand

PMID: 23873709 DOI: 10.1002/jhm.2054

Magnitude of benefit:
2% reduction in readmission rates

J Healthc Qual. Author manuscript; available in PMC 2016 Nov 9.
Published in final edited form as:
J Healthc Qual. 2016 Mar-Apr; 38(2): 116–126.
doi: 10.1097/JHQ.0000000000000005

PMCID: PMC5102006
NIHMSID: NIHMS824746
PMID: 26042743

How Hospitals Reengineer Their Discharge Processes to Reduce Readmissions

Suzanne E. Mitchell, Jessica Martin, Sally Holmes, Carol van Deusen Lukas, Ramon Cancino, Michael Paasche-Orlow, Cindy Brach, and Brian Jack

Journal of Patient Experience

J Patient Exp. 2017 Dec; 4(4): 185–190. Published online 2017 Jun 16. doi: 10.1177/2374373517714454

PMCID: PMC5734517 | PMID: 29276765

Project RED Impacts Patient Experience

Ramon S Cancino, MD, MSc,[1] Chris Manasseh, MD,[2] Lana Kwong, MPH, CPH,[3] Suzanne E Mitchell, MD, MSc,[2] Jessica Martin, MPH,[2] and Brian W Jack, MD[2]

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What does this look like in practice?

Pre-discharge education	Printed follow-up instructions
Teach back	Follow-up appts
Patient education	Direct communication with PCP
Communication of medical plan	Assessment of need for rehab
Discharge checklist	Advanced care planning
Readmission risk assessment	Home & community support
Discharge planning rounds	Post-discharge hotline
Medication reconciliation	Post-discharge home visits
Pharmacist review of meds	Post-dc phone call from hospital
Care transition case manager	Post-dc phone call from PCP

What does this look like in practice?

Pre-discharge education	✔	Printed follow-up instructions	✔
Teach back		Follow-up appts	
Patient education		Direct communication with PCP	
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What does this look like in practice?

Pre-discharge education	✔	Printed follow-up instructions	✔
Teach back	⟺	Follow-up appts	⟺
Patient education		Direct communication with PCP	⟺
Communication of medical plan	⟺	Assessment of need for rehab	⟺
Discharge checklist	⟺	Advanced care planning	⟺
Readmission risk assessment		Home & community support	✔
Discharge planning rounds	✔	Post-discharge hotline	⟺
Medication reconciliation	✔	Post-discharge home visits	
Pharmacist review of meds	✔	Post-dc phone call from hospital	
Care transition case manager	⟺	Post-dc phone call from PCP	⟺

Association with readmissions

- Number / consistency of care transitions practices associated with readmission rates ($p<0.015$)

- Four specific practices associated with readmission rates:
  - Communication of plans in front of patients
  - Pharmacist involvement in med rec
  - Enlisting home / community-based supports
  - Post-discharge hotline

What about Interprofessional Teams / Rounds?

Interprofessional Rounds

- Pannick
  - Some evidence to support improved patient safety, but no difference in LOS
- Bhamidipati
  - Some evidence to support improved LOS and staff satisfaction but little data on patient safety or satisfaction
- Ratelle – Bedside Interprofessional Rounds
  - Small improvement in patient experience, no improvement in patient knowledge

Pannick S et al. JAMA Intern Med. 2015.
Bhamidipati VS et al. J Hosp Med. 2016
Ratelle JT et al. BMJ Qual Saf. 2019.

Limitations to Prior Efforts to Improve Teamwork

- Interventions implemented in isolation
- Don’t address all contributing factors
- Interventions that are complementary and mutually reinforcing may be more effective

Where do we go from here?

System-level interventions to improve hospital care

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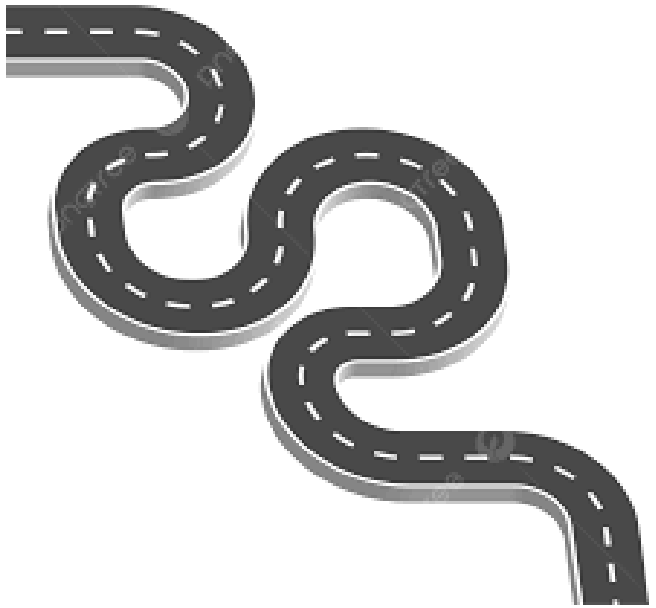
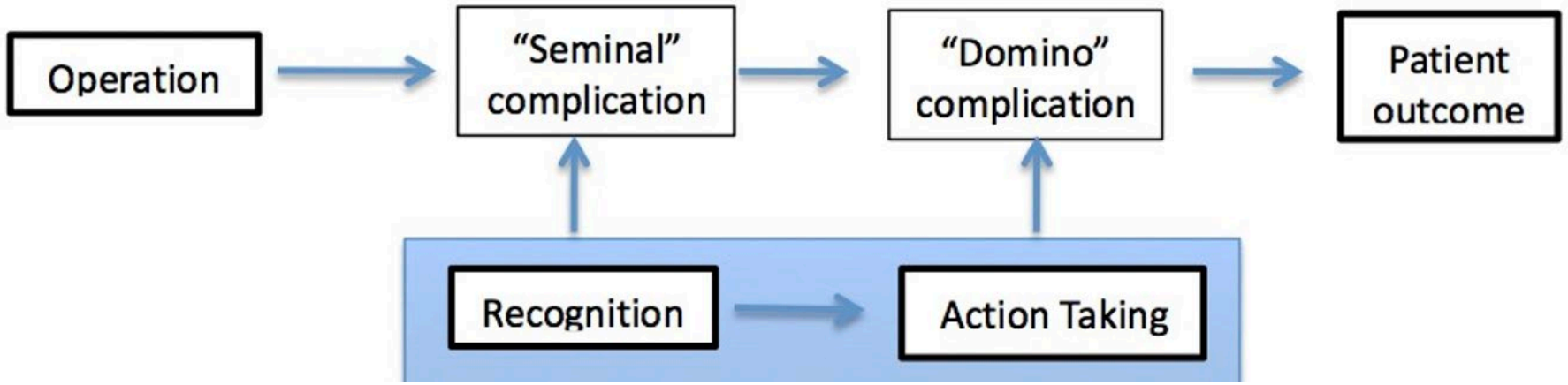


What happens on effective teams?

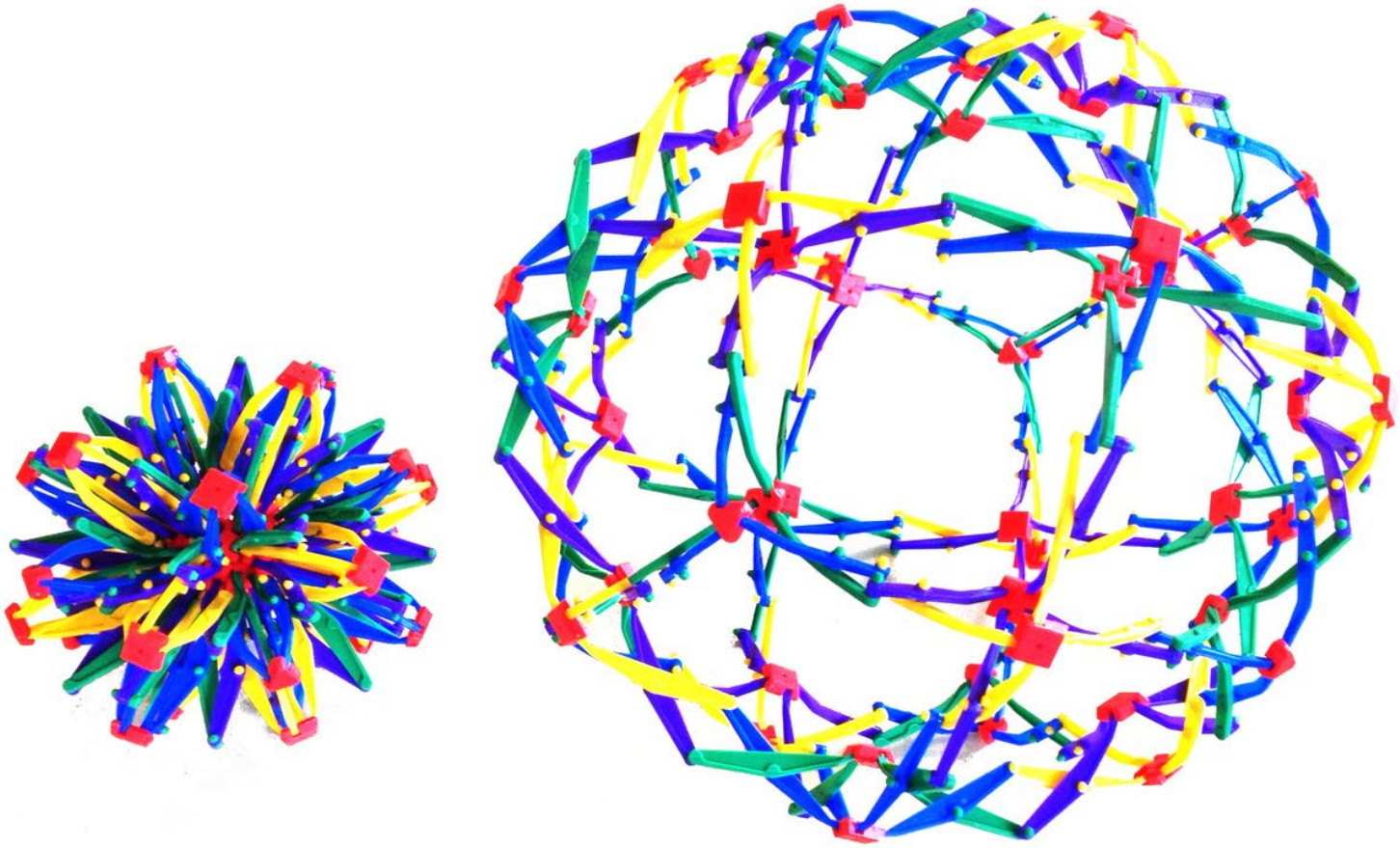
"Failure to rescue"



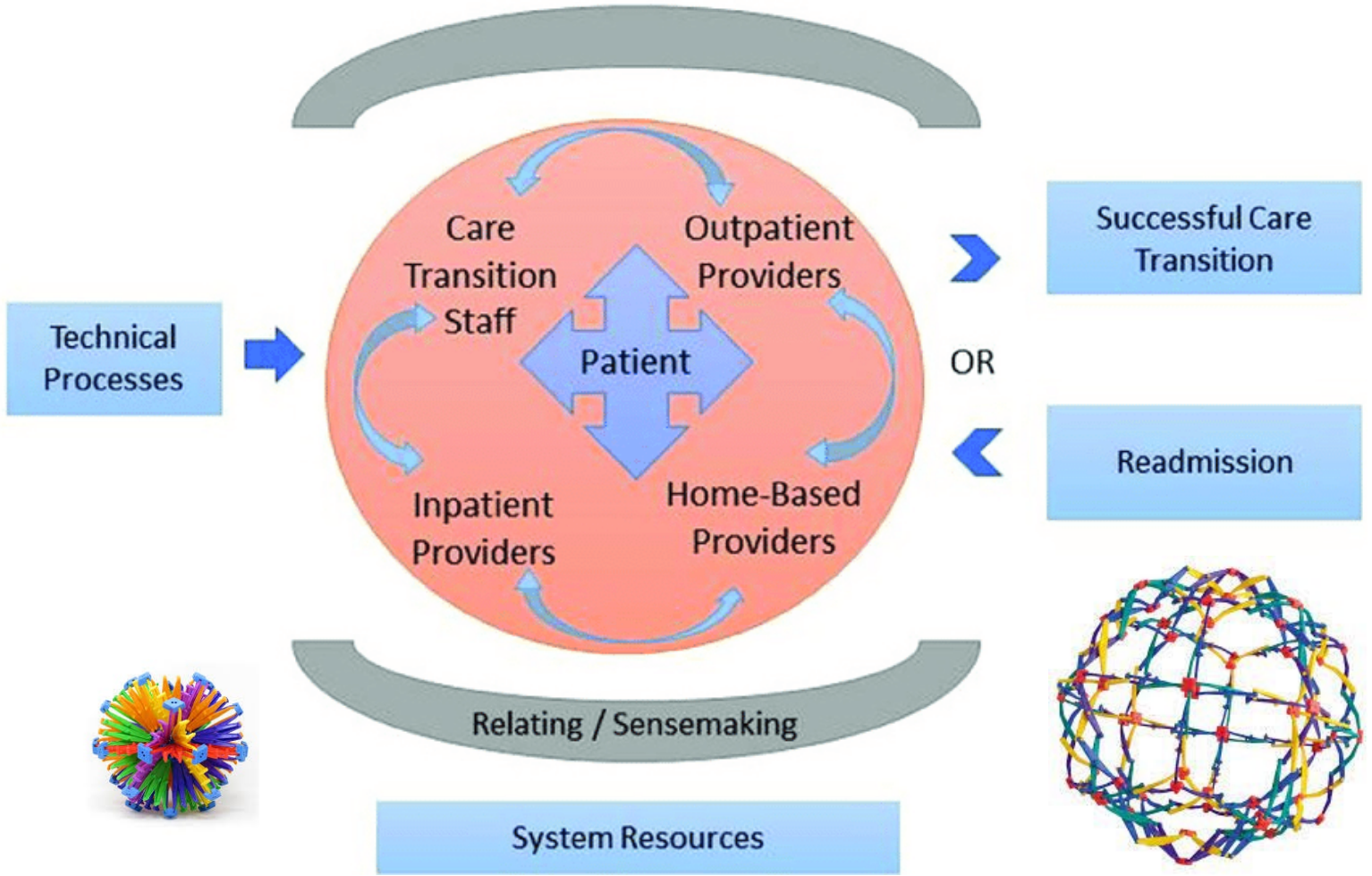
We want people to have a low threshold for raising concerns

Ghaferi A, Annals of Surgery 2009

Shared knowledge & understanding



Care Transitions



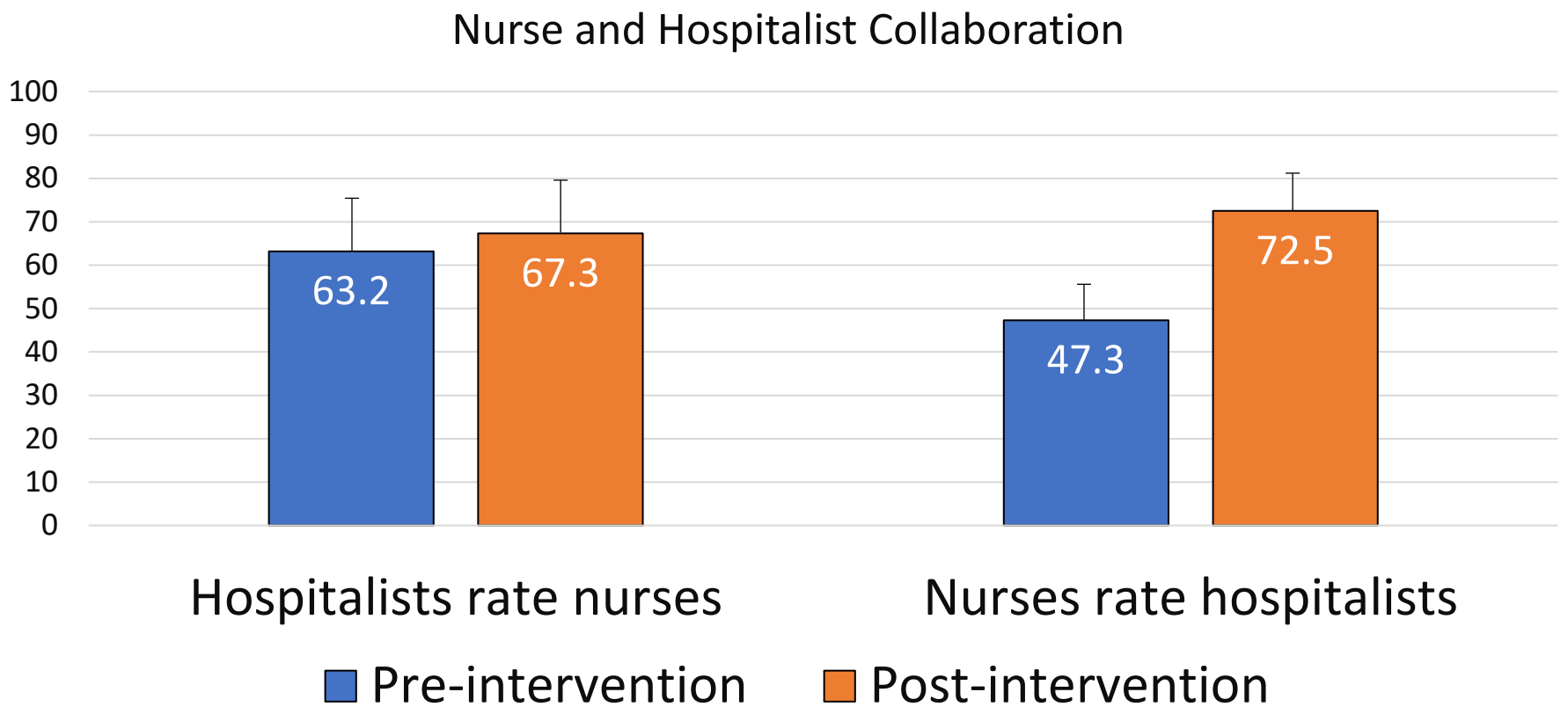
REdesigning SystEms to Improve Teamwork and Quality for Hospitalized Patients

Advanced and Integrated MicroSystems (AIMS) Interventions

- Unit-based Physician Teams
- Unit Nurse-Physician Co-leadership
- Enhanced Interprofessional Rounds
- Unit-level Performance Reports
- Patient Engagement Activities

AIMS

Ratings of Quality of Collaboration



Graphs show % rating quality of collaboration with other as high or very high

Change in ratings of nurses by hospitalists not significant

Change in ratings of hospitalists by nurses significant ($p<0.01$)

	Control unit				Intervention unit				
Outcome	**Pre-intervention (n=1097)**	**Post-intervention (n=789)**	**Unadjusted pre-post effect (IRR or OR)**	**Adjusted pre-post effect (IRR or OR)**	**Pre-intervention (n=1084)**	**Post-intervention (n=803)**	**Unadjusted pre-post effect (IRR or OR)**	**Adjusted pre-post effect (IRR or OR)**	**Adjusted DiD p value**
Adverse Events (AE), No. (AEs per 100 days)	24 (0.52)	33 (0.98)	1.87 (1.10-3.17) [a]	1.98 (1.16, 3.36) [a]	38 (0.82)	31 (0.85)	1.04 (0.65-1.68) [a]	1.08 (0.67, 1.75) [a]	p = 0.10
Presence of one or more AE, No. (%)	24 (2.2%)	30 (3.8%)	1.77 (1.03-3.06) [b]	1.87 (1.07, 3.27) [b]	36 (3.3%)	30 (3.7%)	1.14 (0.69-1.85) [b]	1.12 (0.67, 1.85) [b]	p = 0.18

O'Leary et al. Annals in press

Collaborative Care

How are people currently organized?

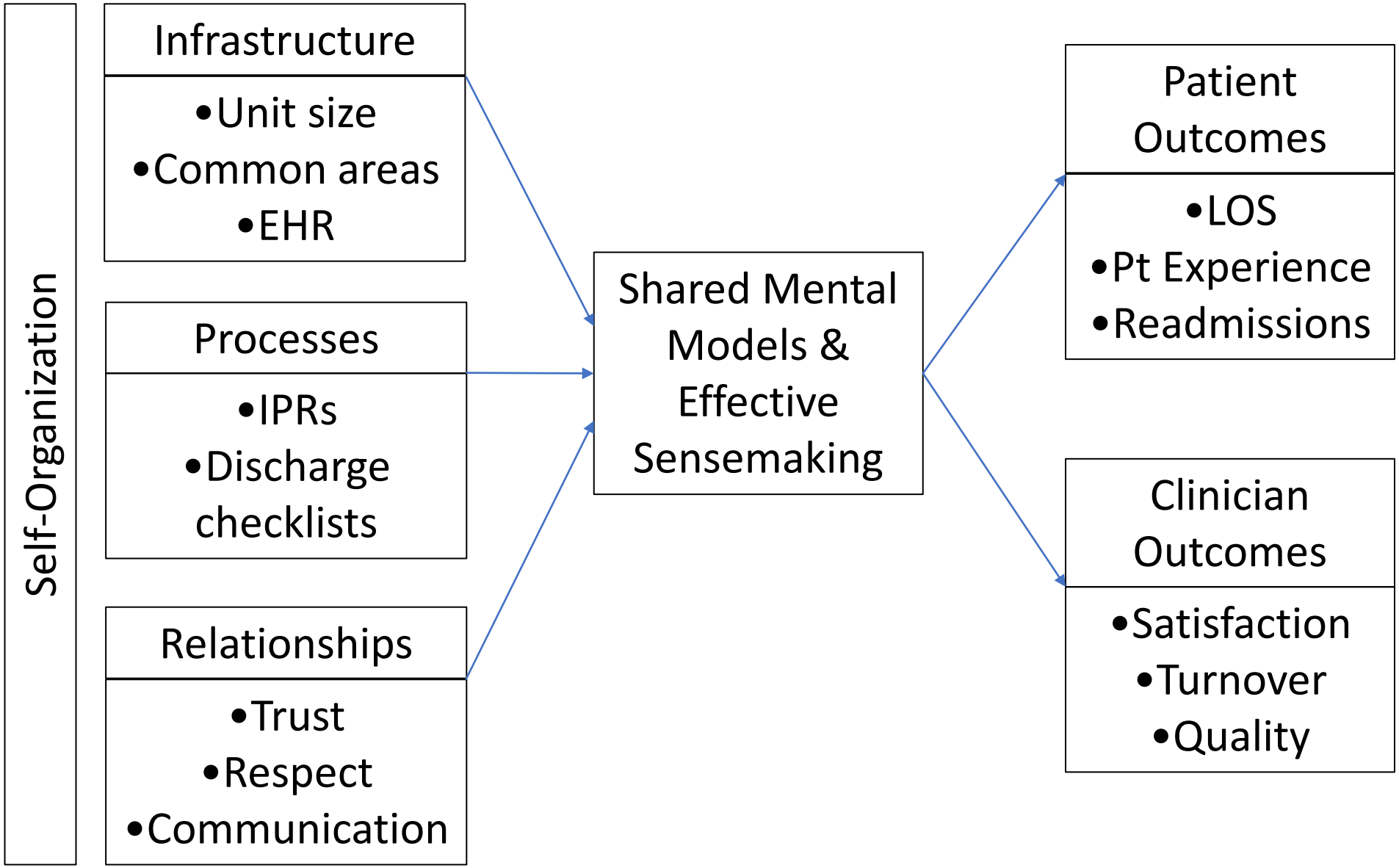
System Interdependencies

Infrastructure

Processes

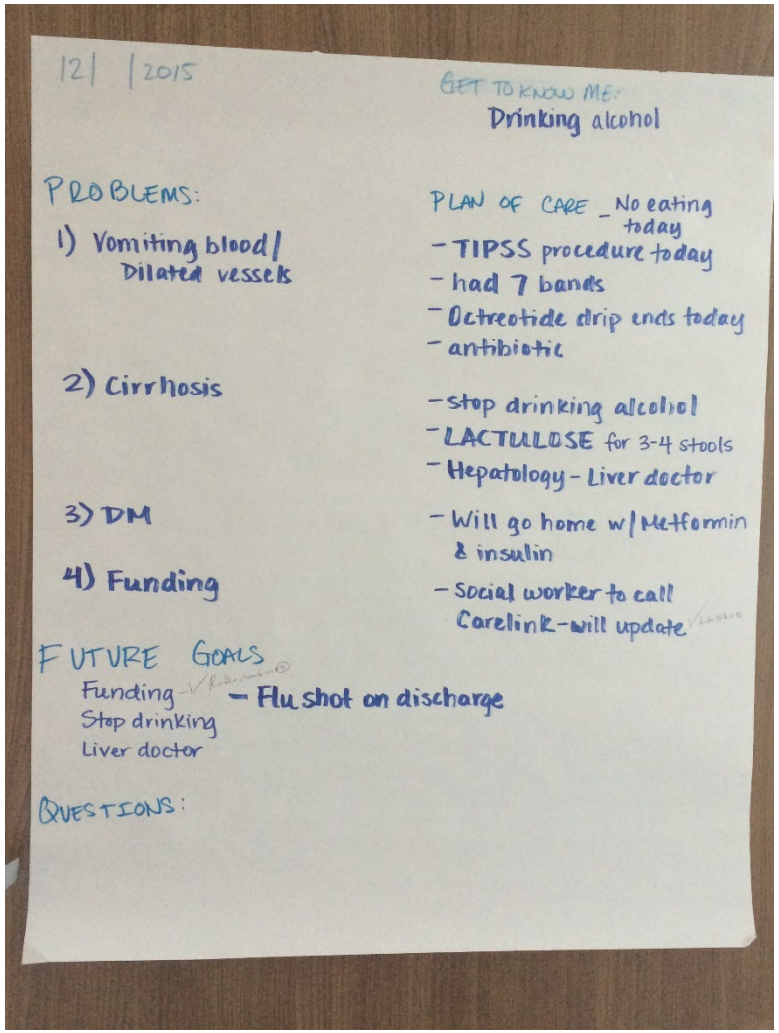
Relationships

Self-organization


Self-Organization
Infrastructure
•Unit size
•Common areas
•EHR
Processes
•IPRs
•Discharge checklists
Relationships
•Trust
•Respect
•Communication
Shared Mental Models & Effective Sensemaking
Patient Outcomes
•LOS
•Pt Experience
•Readmissions
Clinician Outcomes
•Satisfaction
•Turnover
•Quality

Infrastructure

- Geography
- Team member stability
- White Boards -> Post its



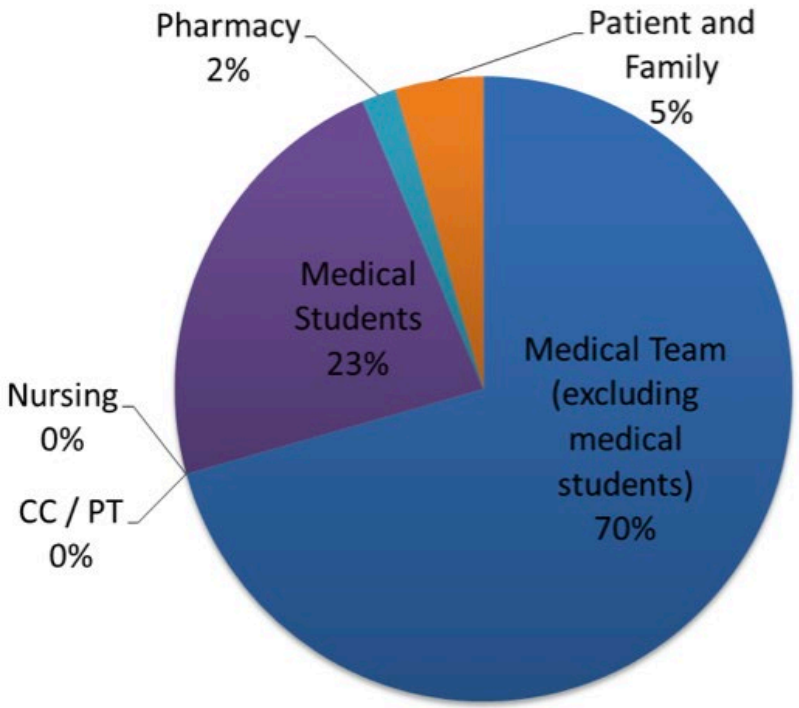
Processes - Workflow

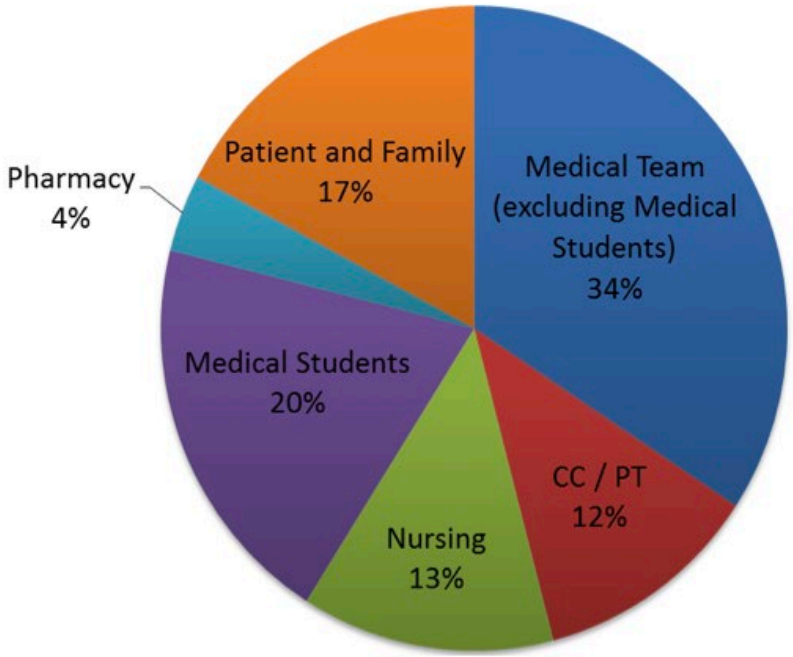
Time	Students / Interns*	Resident*	Attending*	Nurse	Care coordination	Physical therapy	Pharmacy
6:00-7:00	Data gathering. Determine sick patients	See intern's patients if intern off	Not present	Completing overnight work	Not present		
7:00-7:30	Bedside signout with nursing	See overnight admissions	Reviewing charts, seeing sick patients	Bedside signout with students / interns			
7:30-8:00	Review patients and plans			Begin daily work			
8:00-8:30	Complete data gathering	Speak re: sick patients, discharges, confirm with nursing			Begin daily work, take care of discharge needs	Begin new patient and follow-up assess-ments	Begin patient assessments
8:30-9:15	Morning report		See sick patients / discharges				
9:15-11:30	Collaborative bedside rounds						
11:30-1:30	Learner conferences Continue work	Seeing patients, notes	Daily work lunch	Daily work	Daily work	Daily work	Daily work
1:30 - 2:00	Collaborative team meeting						
2:00-5:00	Additional collaborative care rounds / family meetings as needed Wrap up work Anticipate discharges				Additional rounds, complete work	Additional rounds, complete work	Additional rounds, complete work

Relationships: Conversation & Reflection

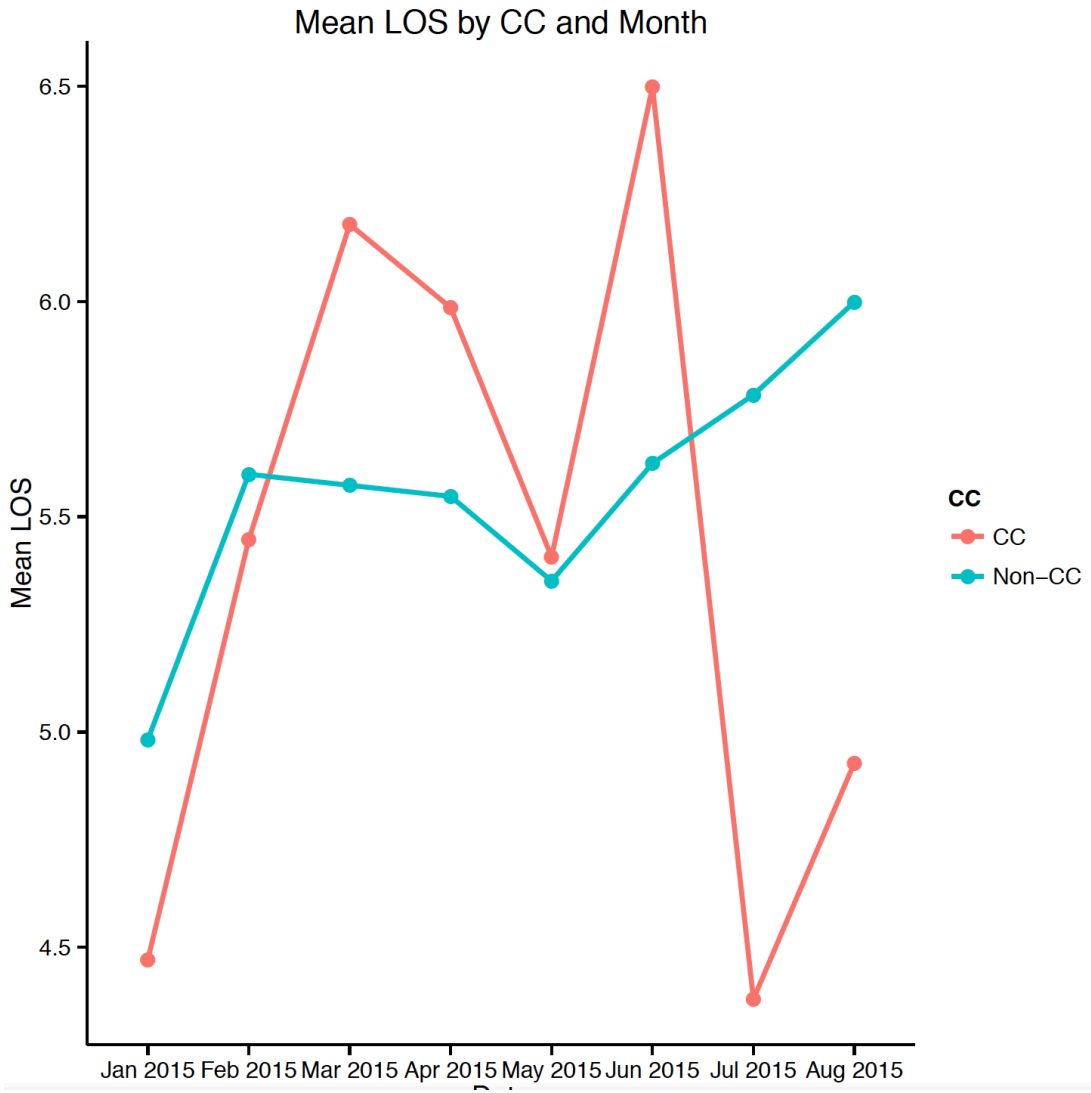
- Interprofessional rounds
- Daily reflection sessions
- Weekly steering committee meetings
- Monthly PFAC meetings

Look who's talking!





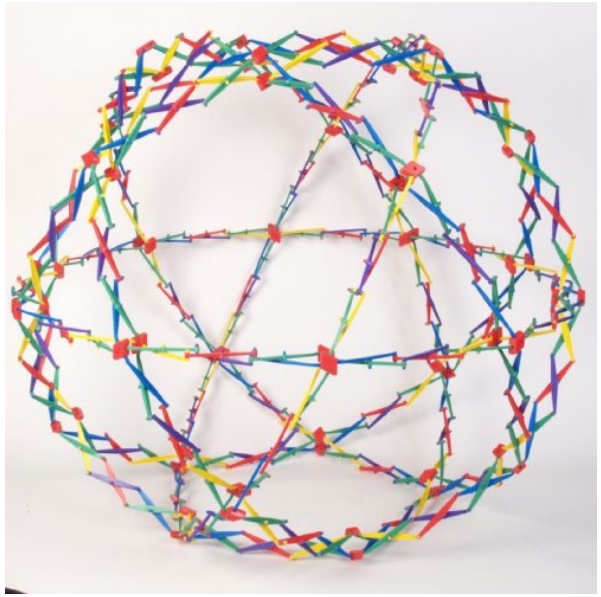
Length of Stay



What started happening in June & July?

- Repeat attendings!

- More consistency among the rest of the team.



Length of Stay / Unnecessary LOS

With faculty experience, LOS ↓ 0.75 days

ULOS decreased by 0.66 days

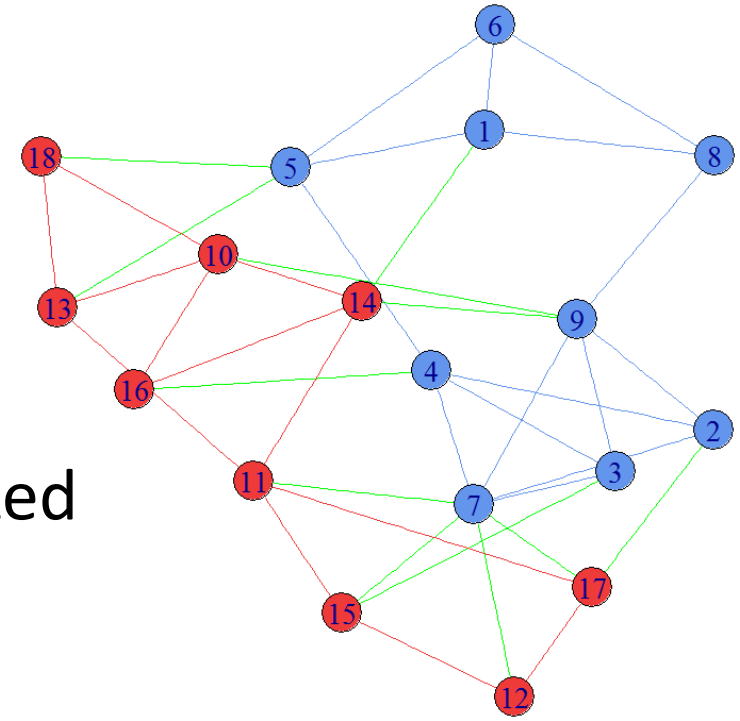
- > 5,000 bed days of care
- ~ 950 more patients
- $2.5 million cost avoidance
- $5.9 million potential revenue

HCAHPS item	CC Mean (%)	Usual Care Mean (%)	p value
Your care from doctors			
Doctors listened carefully to you	83.2	81.4	<0.001
Treated w/courtesy and respect by Doctors	91.7	86.3	<0.001
Doctors explained things understandably	80.4	77.6	<0.001
Your care from nurses			
Nurses listened carefully to you	83.7	82.1	<0.001
Treated w/courtesy and respect by Nurses	89.0	86.5	<0.001
Nurses explained things understandably	84.2	76.1	<0.001
Overall			
Rating of hospital	83.3%	78.2%	<0.001

Putting this all together…

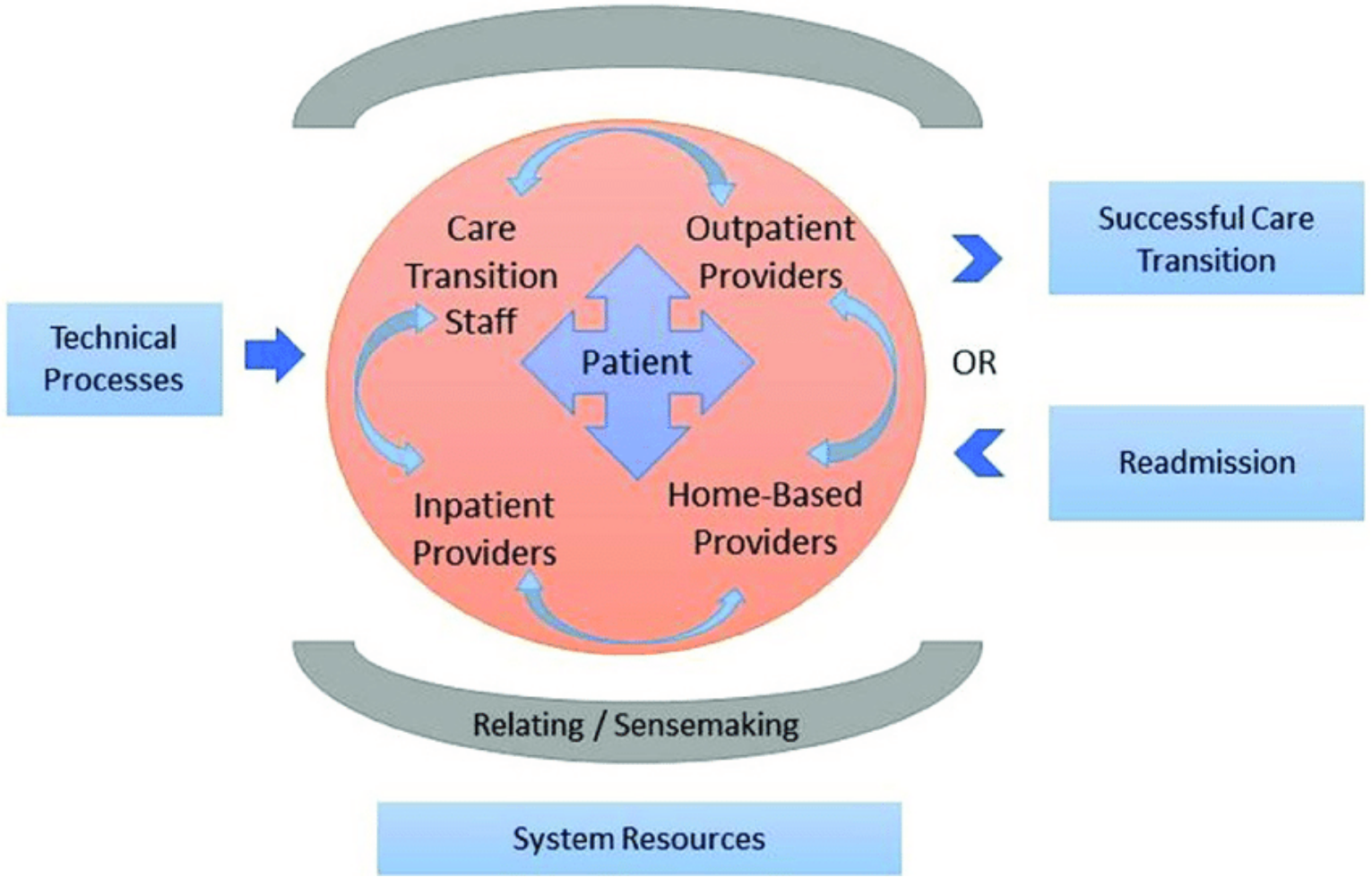
- Hospitalization is challenging for older persons and their families
- People often don’t understand what to do
- Efforts to improve care transitions have mixed outcomes
- Attempts to improve team-based care also have mixed outcomes

A systems approach



- We are trying to promote shared understandings
- We should pay attention to how people are organized
  - Relationships
  - Processes of care
  - Infrastructure
- Complimentary approaches that bring people together

Care Transitions



RESILIENCE: THEORETICAL UNDERPINNINGS AND PRACTICAL APPLICATIONS

CAROLINE STEPHENS, PHD, RN, GNP, FGSA, FAAN

TIMOTHY W. FARRELL, MD, AGSF

NATALIE SANDERS, DO

ROCKY MOUNTAIN GERIATRICS CONFERENCE

SEPTEMBER 26, 2023

DISCLOSURES

- Dr. Stephens is supported by the Substance Abuse & Mental Health Services Administration
- Dr. Farrell is supported by the Health Resources and Services Administration.
- Dr. Farrell and Dr. Sanders are supported by the John A. Hartford Foundation to disseminate Patient Priorities Care.

SAMHSA
Substance Abuse and Mental Health Services Administration

The John A. Hartford Foundation

UTAH GERIATRIC EDUCATION CONSORTIUM
UGEC

GOALS FOR THIS MORNING…

- Challenge and expand your thinking about resilience (& resistance) in aging – theoretically and practically
- Demonstrate the alignment of resilience with Age-Friendly Health Systems
- Identify ageism as a threat to resilience
- Discuss Patient Priorities Care as a strengths-based approach to elicit what matters and to better understand resilience

PART 1: RESILIENCE

WHAT DOES RESILIENCE MEAN TO YOU?

WHAT ABOUT HOW IT RELATES TO AGING?

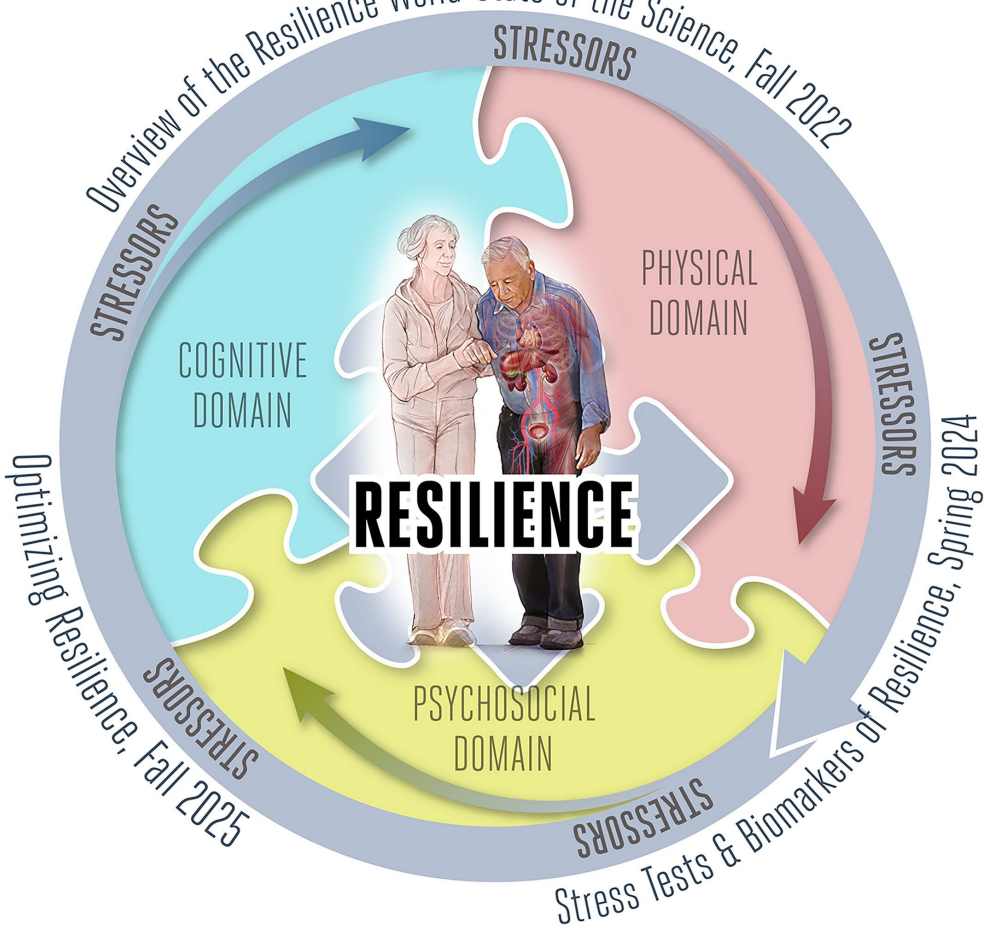
re·sil·ient/Adjective

1. (of a substance or object) Able to recoil or spring back into shape after bending, stretching, or being compressed.

2. (of a person or animal) Able to withstand or recover quickly from difficult conditions.

OLDER ADULTS & RESILIENCE: EVOLVING CONCEPTUALIZATIONS

- Resilience, which relates to one's ability to respond to stressors, typically declines with age and the development of comorbid conditions in older organisms.
- Across disciplines, there are differing conceptualizations of resilience and its multicomponent dimensions in response to physical, cognitive, and social stressors.



Abadir et al (2023). JAGS 71(8):2381-2392.

A TALE OF TWO LADIES

Mrs. A

- 65 y/o female
- Hx HTN, DM, afib, hyperlipidemia
- Day 3 s/p left-sided CVA w/right-sided HP, mild dysarthria & unsteady gait

Mrs. C

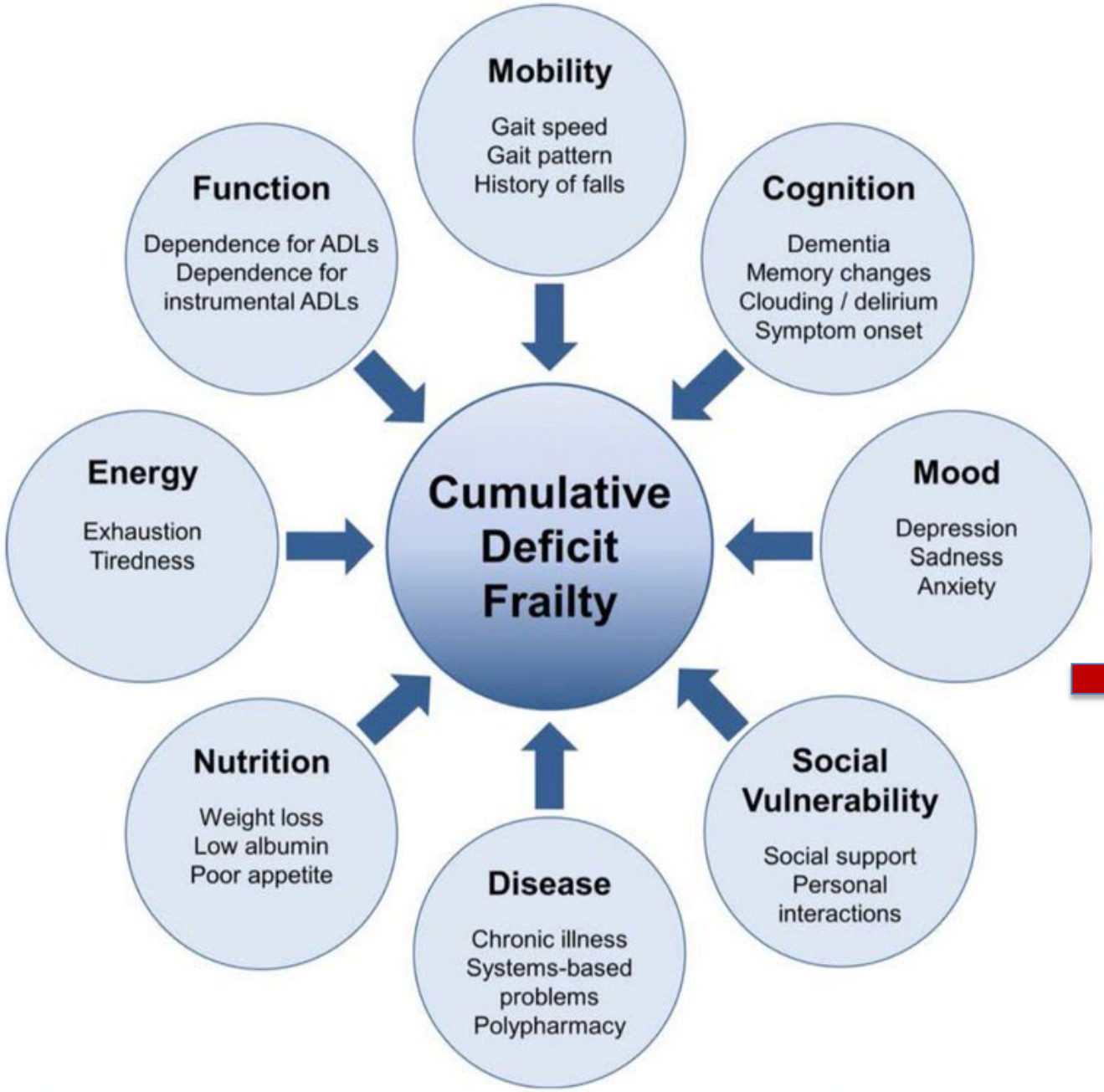
- 92 y/o female
- Hx HTN, DM, afib, hyperlipidemia
- Day 3 s/p left-sided CVA w/right-sided HP, mild dysarthria & unsteady gait

A TALE OF TWO LADIES…SAME CLINICAL PROFILE, SAME DEFICITS…BUT 3 DAYS S/P CVA…

Mrs. A (65)

Mrs. C (92)

Deficit Accumulation Model



The more things that are wrong with them the more likely they are to be frail.

BUT…need to also consider the abilities & resources of older adults

FIGURE 3. The Cumulative Deficit Model of Frailty, Which Proposes That the Accumulation of Medical, Social, and Functional Deficits Over a Person's Lifetime Leads to a Nonspecific, Age-Associated Vulnerability, or Frailty. ADLs indicates activities of daily living. Figure adapted from: Robinson TN, Walston JD, Brummel NE, et al. Frailty for surgeons: review of a National Institute on Aging conference on frailty for specialists. *J Am Coll Surg*. 2015;221:1083-1092.[13]

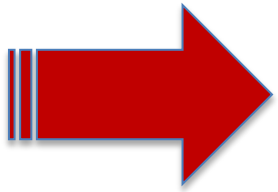
SO…IS PHYSICAL RESILIENCE SIMPLY THE OPPOSITE OF FRAILTY?

- Short answer – no. (Dr. Whitson will elaborate!)
- Clearly there are points of conceptual overlap.
- **Frailty** is influenced by the resources available to a system, whereas **resilience** is the extent to which this complex system can *recruit those resources* when challenged by a stressor.

Whitson et al. (2018). J Am Geriatr Soc. Aug;66(8):1459-1461.

EVOLVING MODELS WITHIN THE CONTEXT OF MULTIMORBIDITY

"Successful aging"
(Rowe & Kahn, 1997)



"Resilient to various challenges"

…even in the face of advanced age, chronic illness, and reduced function

(DiPietro et al, 2012)

Older adults have differing abilities to maintain (resist) or regain function after encountering a health stressor

“The Castle Under Siege”

Whitson et al (2018). JAGS Aug; 66(8): 1459–1461.

FRAILTY VS RESILIENCE

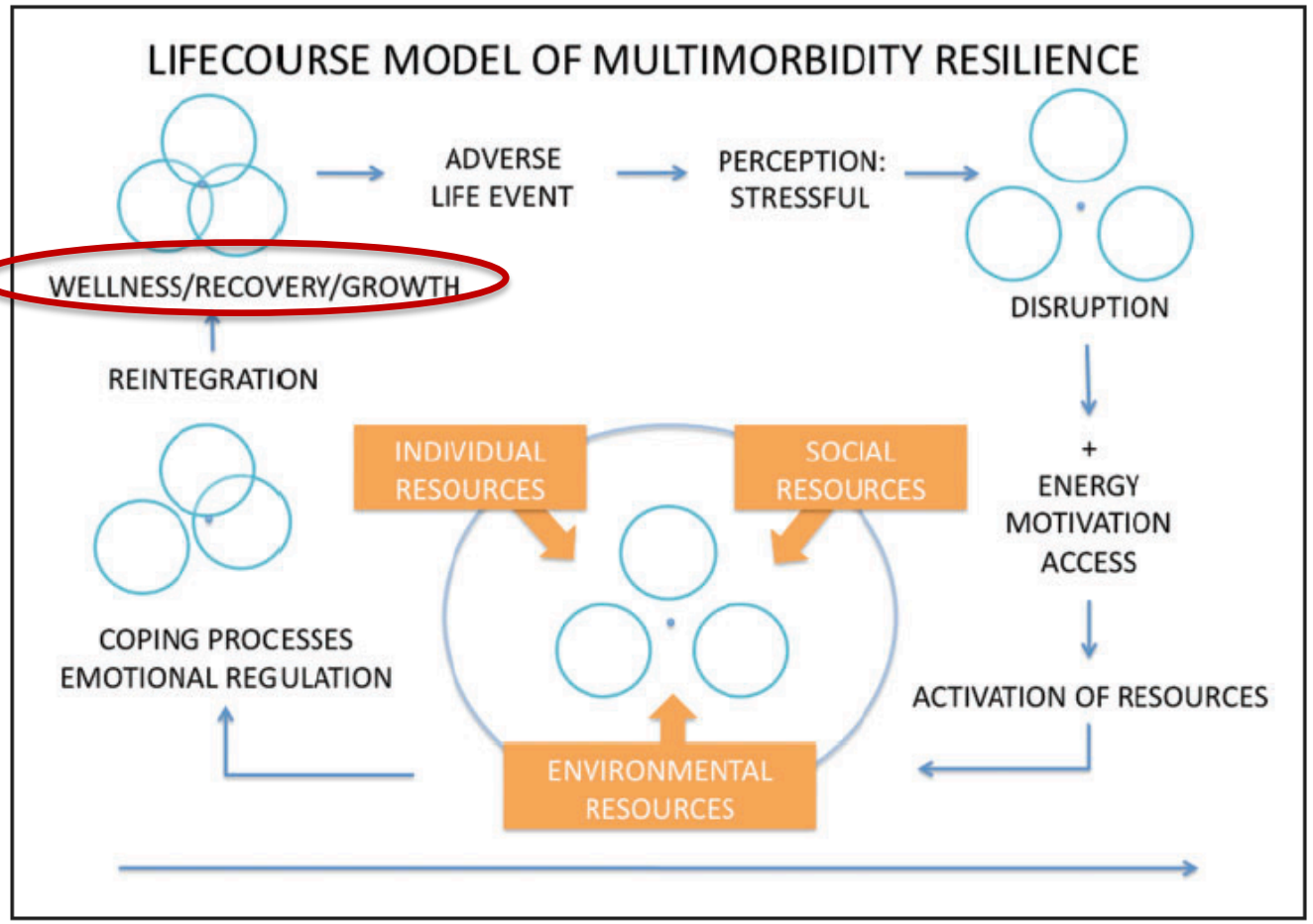
	Resilience	Frailty
Spectrum	Lifespan	Compressed/Towards End of Life
Observation	Multiple Points in Time	Snapshot
Viewpoint	Strengths Approach	Deficit Approach

"If the spectrum from robustness to frailty reflects the amount of physiological potential one has to react to stressors, physical resilience refers to the actualization of that potential."

J Am Geriatr Soc. 2018 August ; 66(8): 1459–1461.

LIFECOURSE MODEL OF MULTIMORBIDITY RESILIENCE (WISTER ET AL, 2016)

Identifies 3 valuable consequences of resilience



Interventions need to focus on the most mutable points in the illness resilience cycles to maximize management of competing conditions within the context of multimorbidity

Int J Aging Hum Dev 82(4) 290–313

RESILIENCY DEBATE CONTINUES…

- A unifying definition of resilience that incorporates its physiological, cognitive, psychosocial and other domains has not been established.
- AGS/ NIA R13 Bench-to-Bedside Conference Series, "Overview of the Resilience World – State of Science" held October 2022
  - discussed working definitions of resilience across the 3 domains
  - compared and contrasted resilience, resistance, reserve, and compensation.

JOURNAL OF THE AMERICAN GERIATRICS SOCIETY
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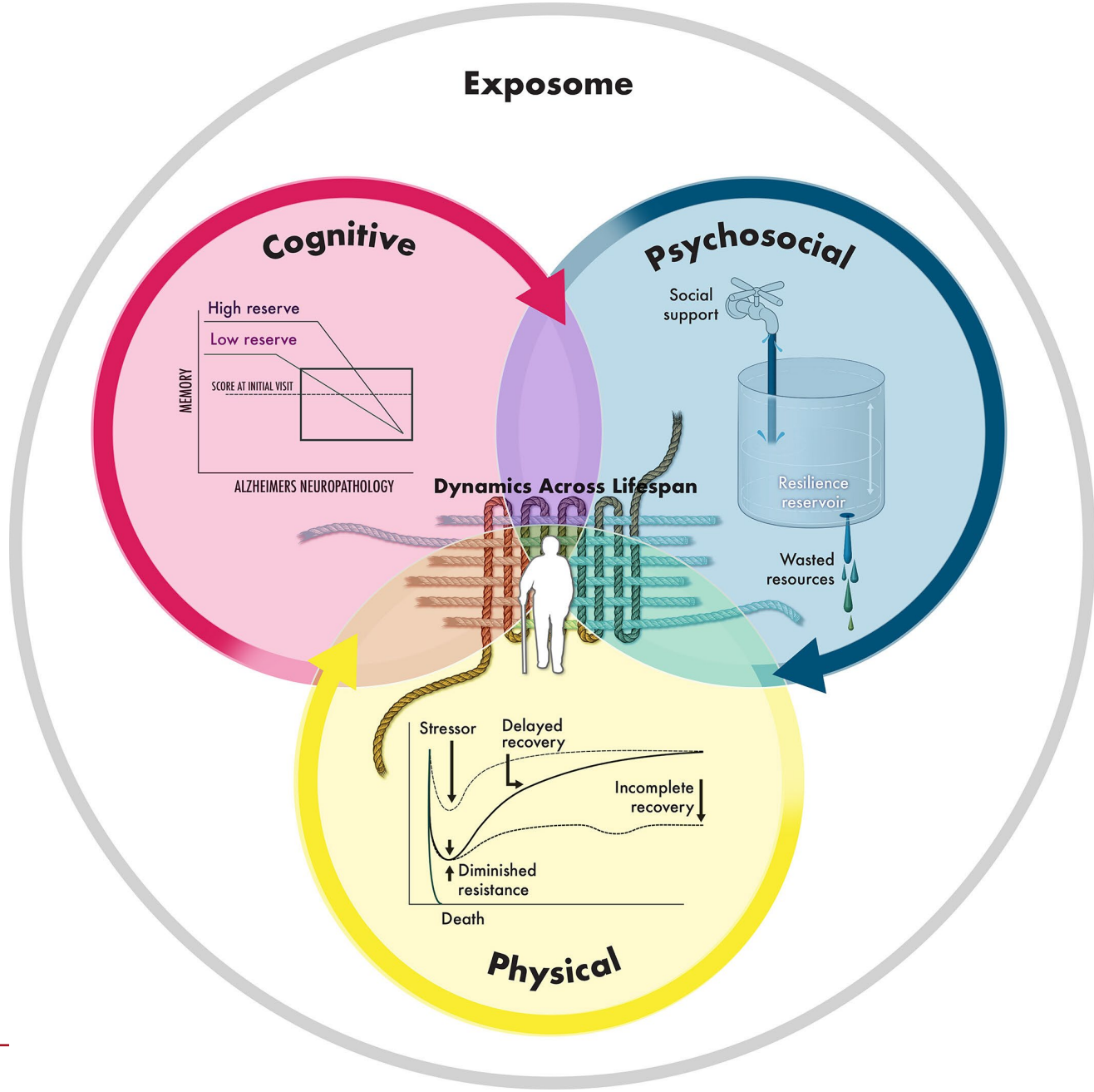
VOLUME 71 ■ ISSUE 8

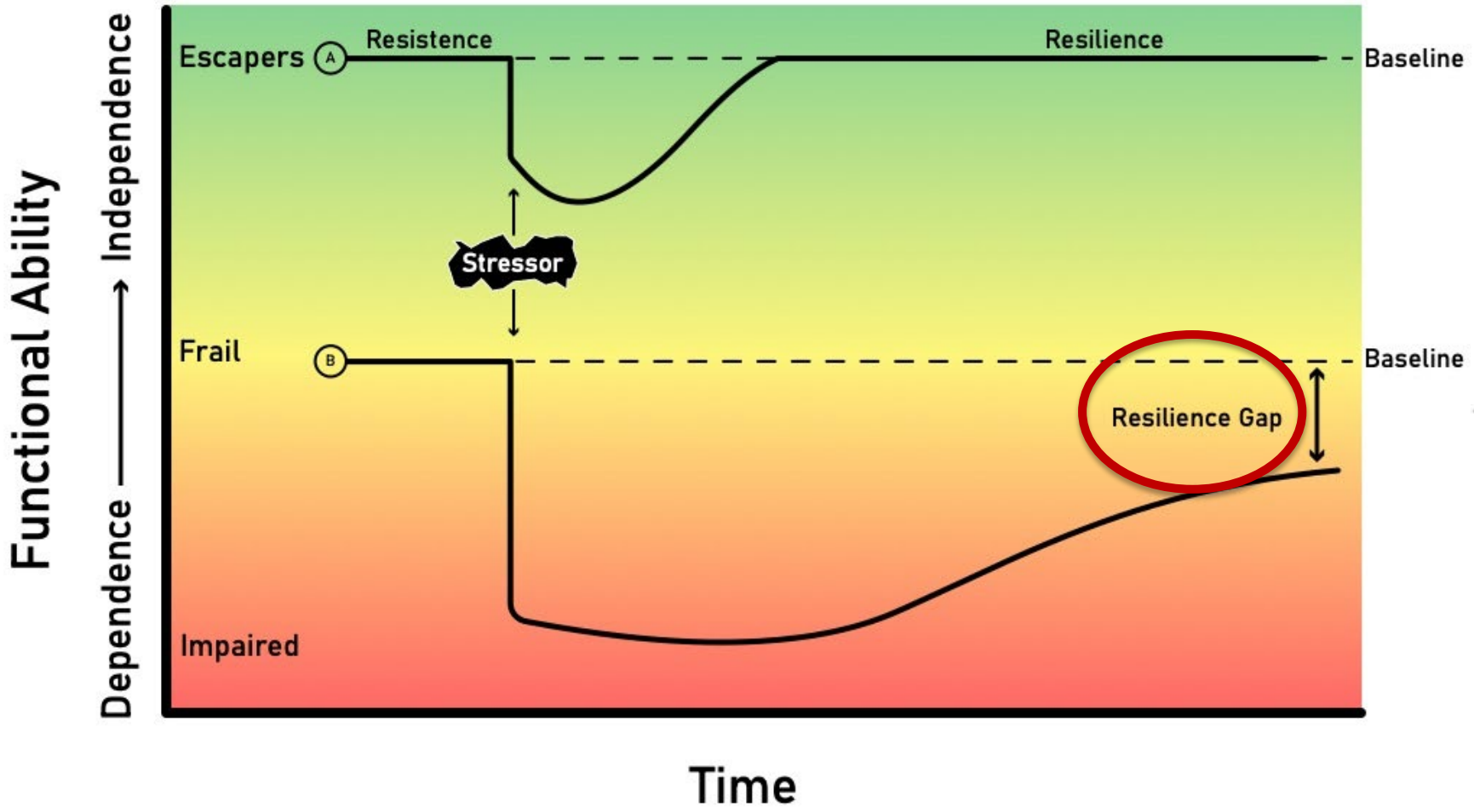
Trans-NIH Resilience working group definition: "*Resilience can be defined as a system's capacity to resist, recover, recover better (grow), or adapt in response to a challenge or stressor*"



The ability to identify frailty AND the multicomponent aspects of resilience can provide clues about how to optimize health for both of these ladies.

Mrs. C

Mrs. A



TAKE HOME POINTS

- **Frailty** is influenced by the resources available to a system, whereas **resilience** is the extent to which this complex system can recruit those resources when challenged by a stressor.
- Clinical interventions, health systems and health policies need to be (re)designed to help older adults *resist, recover, recover better (grow), or adapt in response to a challenge or stressor*.
  - Adopting a strengths-based approach to care can promote resilience
- Recognize that there may be differences between what the care team, care partner and/or patient deem as a "good outcome" – need to determine *what matters most* to the patient.

Wrinkles should merely indicate where smiles have been.




PART 2: AGE-FRIENDLY HEALTH SYSTEMS, AGEISM, AND RESILIENCE

ORIGIN OF AGE-FRIENDLY HEALTH SYSTEMS - 1

JOURNAL OF THE AMERICAN GERIATRICS SOCIETY

SPECIAL ARTICLES

The Age-Friendly Health System Imperative

Terry Fulmer, PhD, RN, Kedar S. Mate, MD,†‡ and Amy Berman, BSN**

Age-Friendly Health Systems - Founding Organizations

- Institute for Healthcare Improvement
- The John A. Hartford Foundation
- American Hospital Association
- Catholic Health Association of the United States

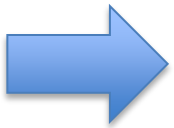
Fulmer T, Mate S, Berman A. J Am Geriatr Soc 2018; 66(1): 22 – 24.

ORIGIN OF AGE-FRIENDLY HEALTH SYSTEMS - 2

Table 1. Seventeen Care Models with Level 1 or 2a Evidence of Impact.

1. ACE Unit
2. CM+
3. Care Transitions Program
4. Center to Advance Palliative Care
5. Geriatric Emergency Department
6. Geriatric Interdisciplinary Team Training
7. GRACE
8. Guided Care
9. HomeMeds
10. Hospital at Home and Mount Sinai's MACT
11. HELP
12. IMPACT
13. NICHE
14. Patient Priority Care
15. PACE
16. TCM
17. University of California at Los Angeles Alzheimer's and Dementia Care Program

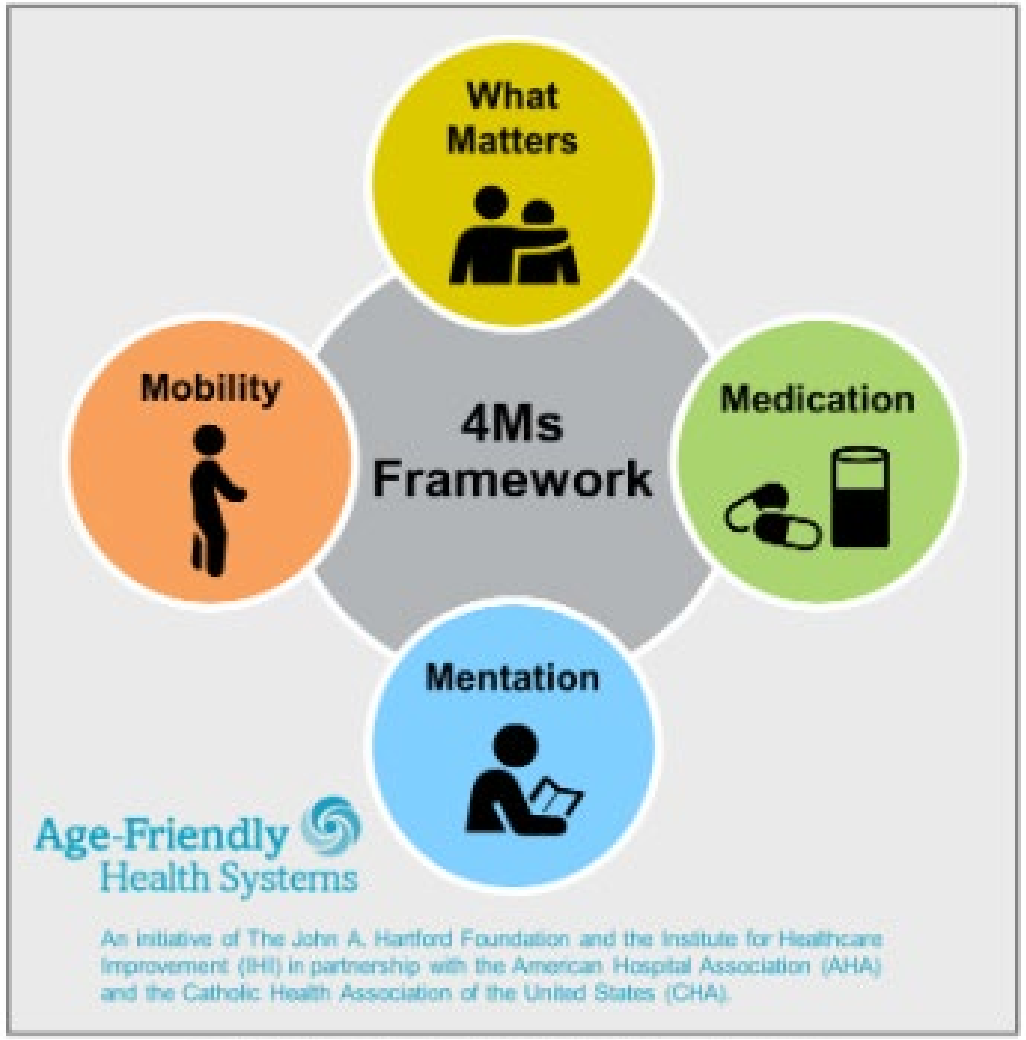
Note. ACE = Acute Care for Elders; CM+ = Care Management Plus; GRACE = Geriatric Resources for Assessment and Care of Elders; MACT = Mobile Acute Care Team; HELP = Hospital Elder Life Program; IMPACT = Improving Mood–Promoting Access to Collaborative Treatment; NICHE = Nurses Improving Care for Health System Elders; PACE = Program for All-Inclusive Care of the Elderly; TCM = Transitional Care Model.



Distilled to 4 elements or "4Ms" that should be reliably provided to all older adults, regardless of the care setting or specialty

Mate K et al. J Aging Health 2021.

THE 4MS OF AGE FRIENDLY HEALTH SYSTEMS



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

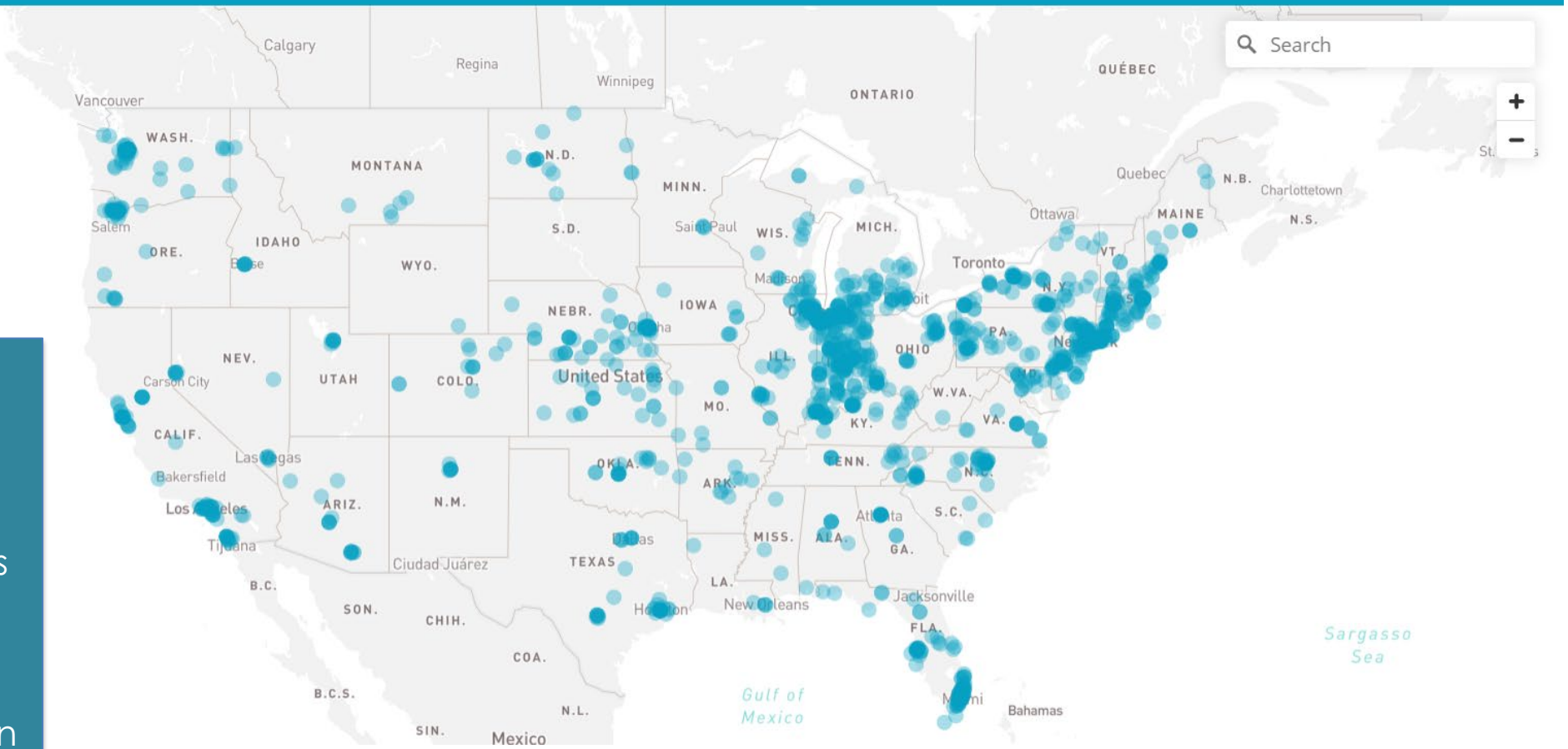
Ensure that older adults move safely every day in order to maintain function and do What Matters.

What Is an Age-Friendly Health System? | IHI - Institute for Healthcare Improvement

Age-Friendly Health Systems

Participant Sites

learn more



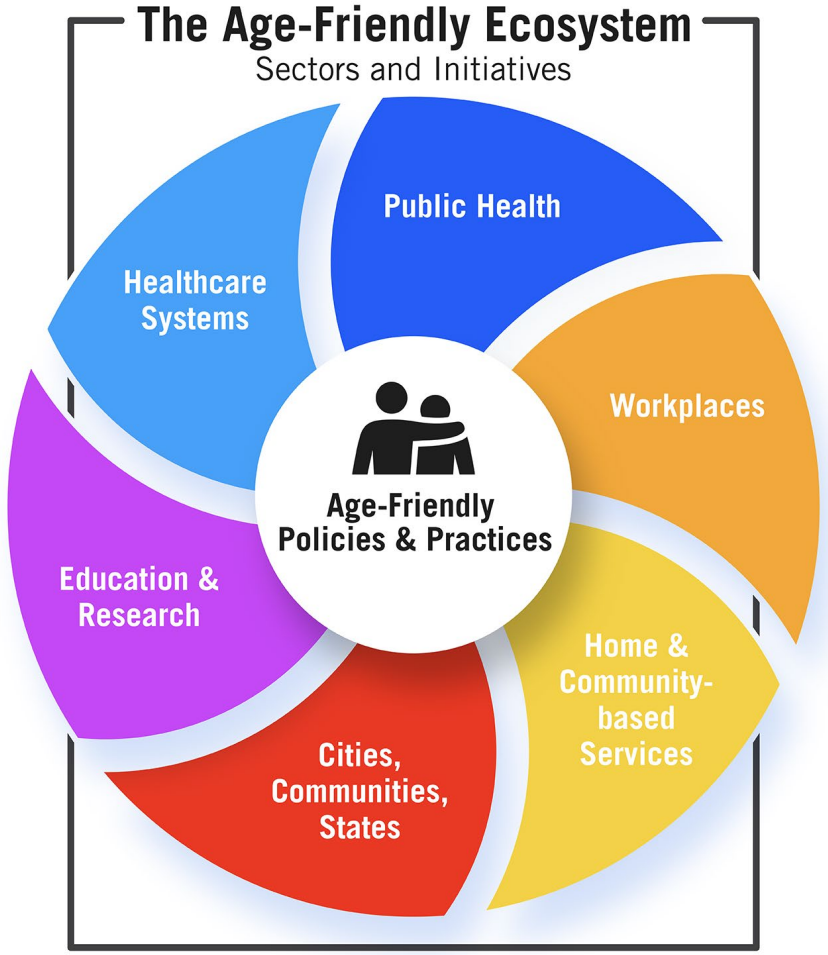
As of July 2023:

~3000 participating hospitals and practices

1,939 achieved "Committed to Care Excellence" designation

Age-Friendly Health Systems sites (johnahartford.org)

DEVELOPING AGE-FRIENDLY ECOSYSTEMS

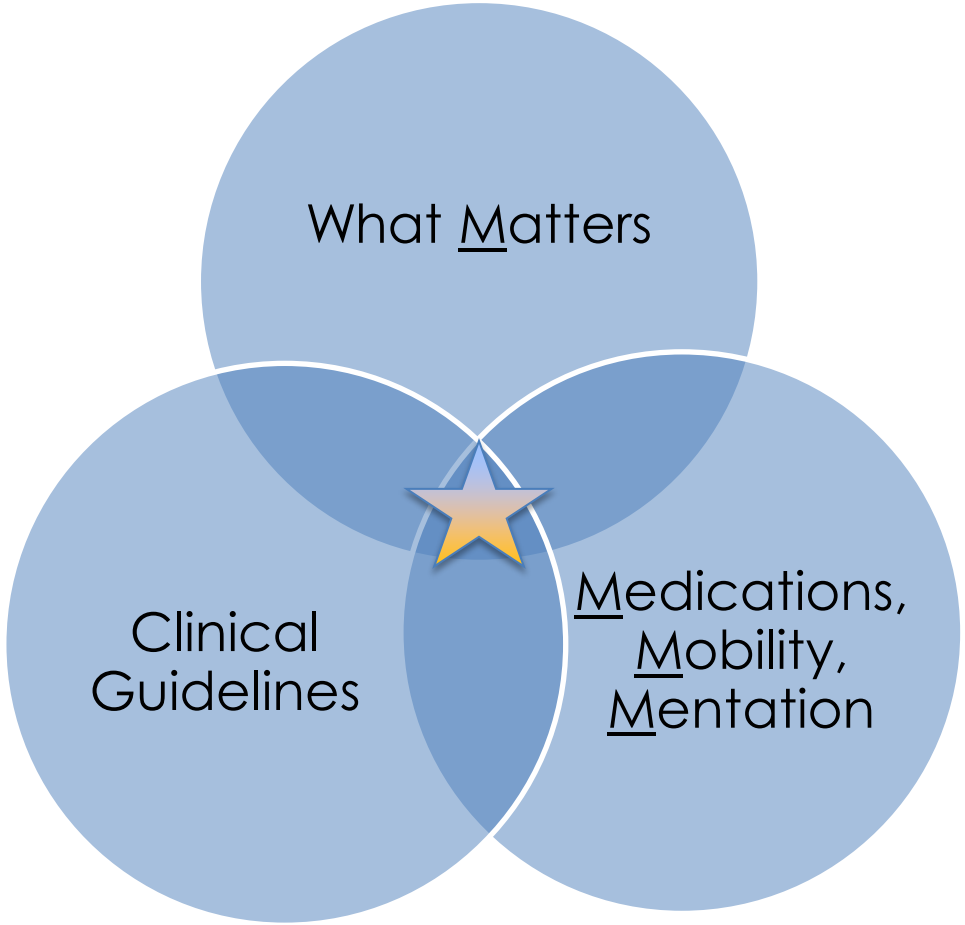


https://www.johnahartford.org/grants-strategy/current-strategies/age-friendly/age-friendly-ecosystem

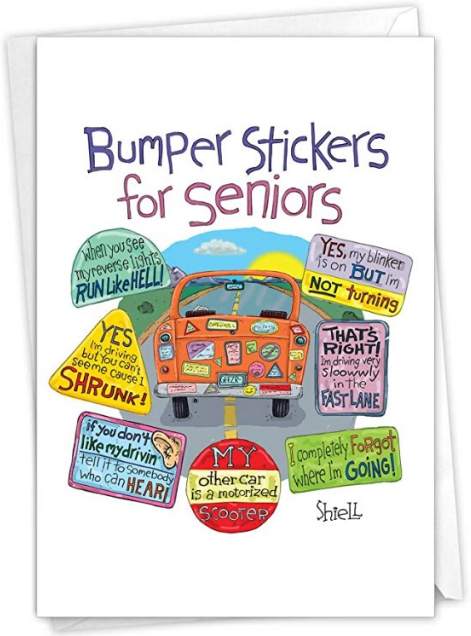
CHARACTERISTICS OF AGE-FRIENDLY ECOSYSTEMS

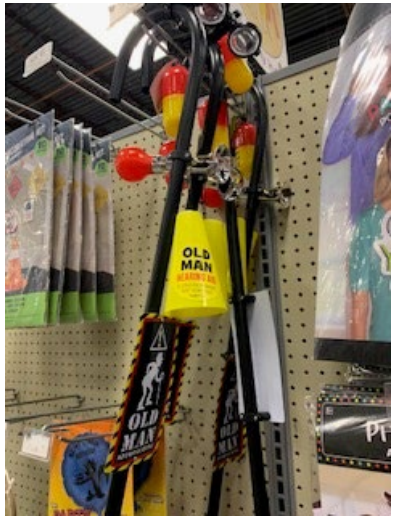
- Requires recognition of the heterogeneity of older people
- What works to address older adults' functional needs likely works for younger adults as well

THE 4MS OF AGE-FRIENDLY CARE: FINDING THE SWEET SPOT



AGEISM





(from Amazon.com : NobleWorks - 1 Funny Greeting Card for Birthdays - Funny Cartoons and Comics, Bday Celebration Notecard - Senior Bumper Stickers C2649BDG : Office Products

AGEISM

"Ageism is the only "-ism" in which we act against our future selves"

– Laura Mosqueda, MD

DEFINITION OF AGEISM

- Discriminating against a person solely based on age

AGEISM: THE INVISIBLE "-ISM"

- 93.5% of US adults age 50-80 experience microaggressions about age
- Yet, ironically, ageism is often overlooked in diversity, equity, and inclusion efforts

ADVERSE EFFECTS OF AGEISM

- Reduced life expectancy by 7.5 years*
- In the US, 1 of 7 dollars spent on health care every year for the eight most expensive illnesses was due to ageism†

*World Health Organization. https://www.who.int/news-room/questions-and-answers/item/ageing-ageism

†Levy BR et al. Gerontologist 2018.

ADDITIONAL MANIFESTATIONS OF AGEISM IN HEALTH CARE

- Exclusion of older people from clinical trials
- Unjust resource allocation strategies during COVID (e.g. age-based cutoffs)
- Lack of residency training in geriatrics
  - Only required in FM, IM, IM/pediatrics, neurology, and psychiatry

Farrell TW, Hung WW, Unroe KT. J Am Geriatr Soc 2022.

AGEISM AS A BARRIER TO ELICITING WHAT MATTERS MOST

- Act of commission
  - E.g. using patronizing terminology (“sweetie, honey”)
- Act of omission
  - E.g. addressing all questions to a younger care partner instead of the older adult
- When an older adult’s values, goals, and preferences are minimized or ignored, what matters most to them is not elicited

Farrell TW. J Am Geriatr Soc 2023.

PRACTICAL STRATEGIES TO ADDRESS AGEISM: REFRAMING AGING

Instead of:	Say this instead:
"Elderly" or "senior citizen"	"Older person" or "older adult"
"Silver tsunami" or "graying of the population"	"The increasing number of older people presents opportunities to do X"
"Struggle," "battle" or "fight" ageing	"As we age, we accumulate wisdom, insight, and rich experiences"
"Conflict between older and younger generations"	"In a just society, all people are treated equally"

PRACTICAL STRATEGIES TO ADDRESS AGEISM: INCLUSIVITY

- Include anti-ageist efforts in DEI efforts
- Include geriatrics training in all health professions programs
- Include geriatrics health care professionals and older adults when formulating policies that affect older adults

INTERSECTION OF AGEISM AND RACISM

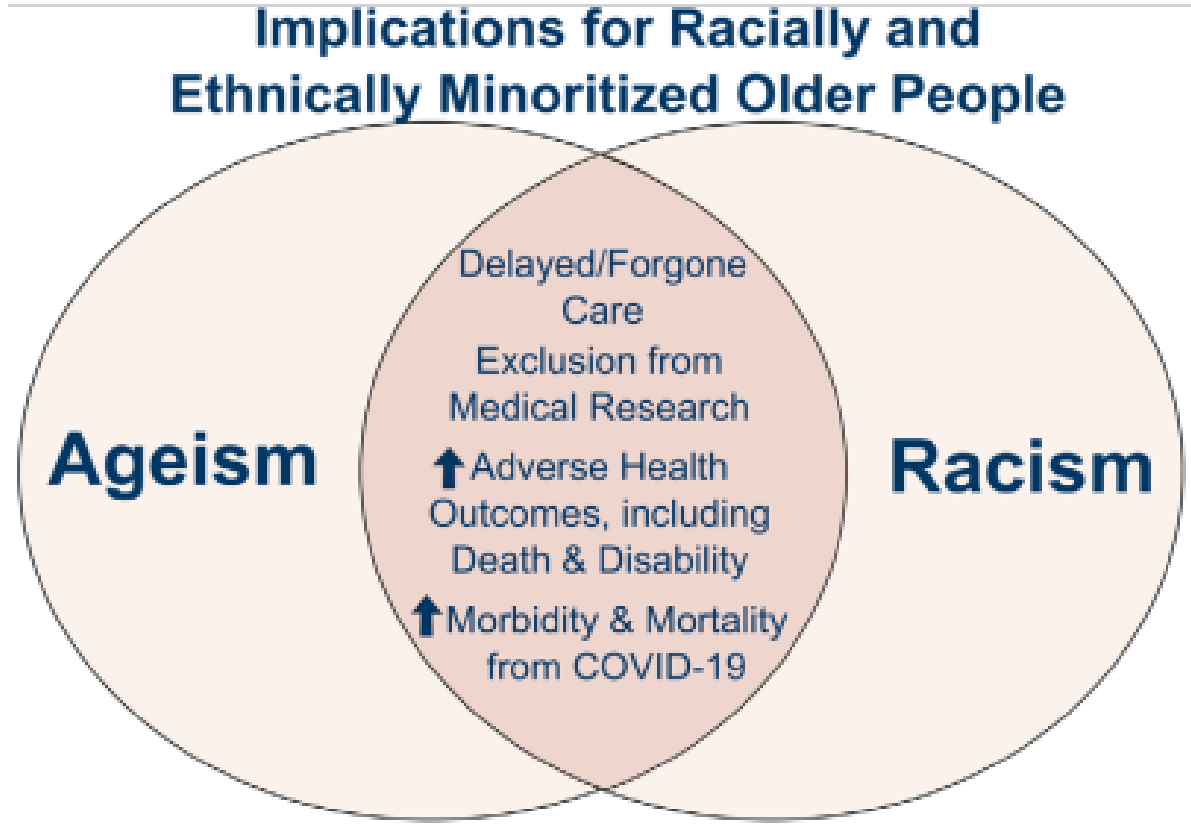


FIGURE 1 Intersection of ageism and racism in healthcare: a double disadvantage

Farrell TW, Hung WW, Unroe KT. J Am Geriatr Soc 2022.

INTERSECTION OF AGEISM AND RACISM: NEGATIVE IMPACT ON RESILIENCE

- "Double jeopardy" hypothesis
- Cumulative inequality theory
- "Weathering" hypothesis

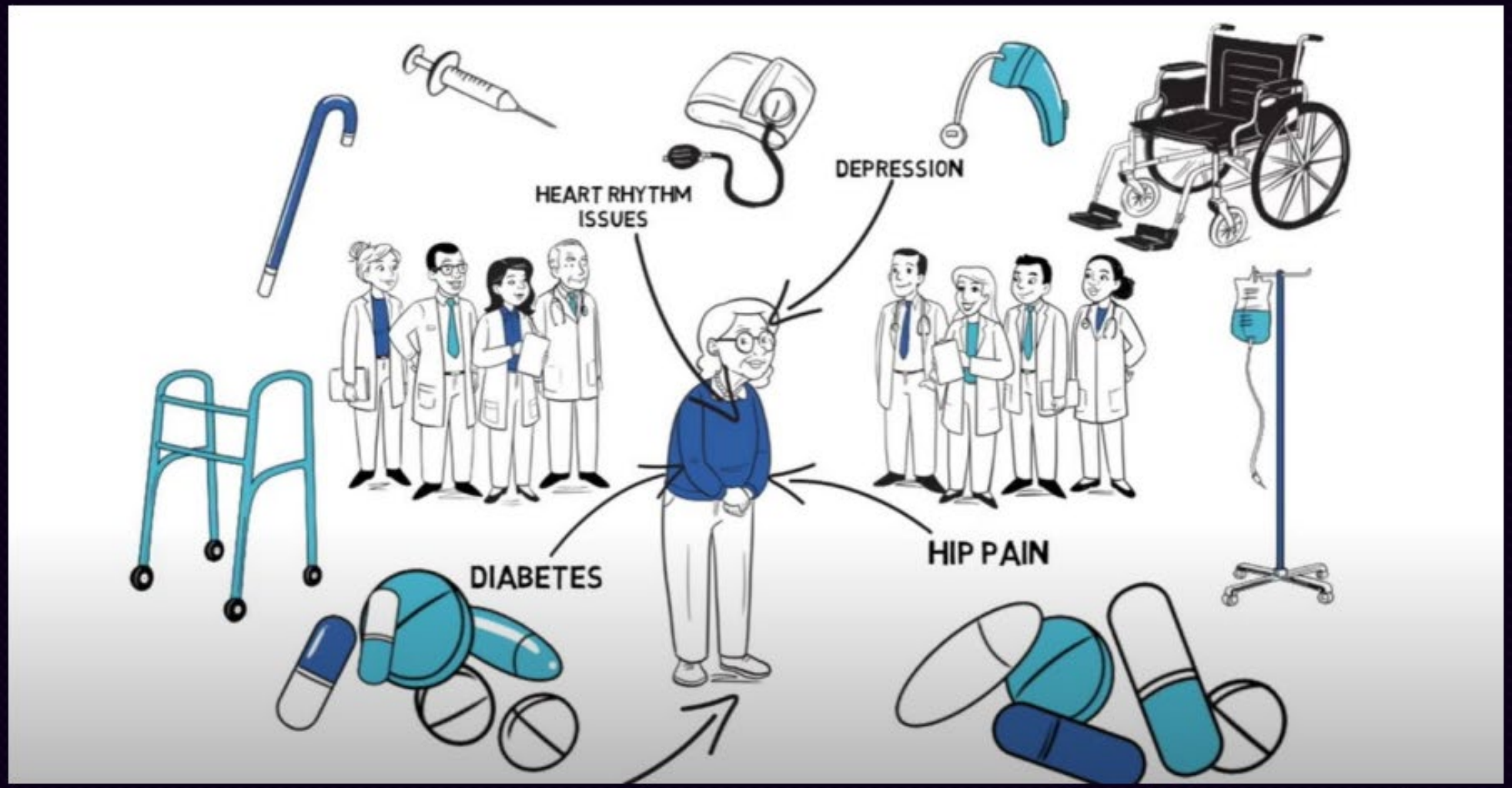
PART 3: PATIENT PRIORITIES CARE

- What is Patient Priorities Care?
- Why talk about this at a Resilience Conference?
- Take Home Points PPC and Current Projects

WHAT IS PATIENT PRIORITIES CARE?

- https://patientprioritiescare.org/patient-facing-materials/
- https://patientprioritiescare.org/
- https://geripal.org/mary-tinetti-poatient-priorities-care/

Complexity Typically Increases with Aging



PPC slides courtesy of Mary Tinetti, MD

patient priorities care

THE END RESULT

- Uncertain benefit
- Unintentional harm
- Burdensome to the patient
- Frustrating for clinicians → Burnout
- Not aligned with What Matters Most

patient priorities care

IDENTIFY HEALTH PRIORITIES

- Values (What Matters most to the patient)
- Actionable, specific, realistic health outcome goals
- Health care preferences (which care the patient finds helpful and which burdensome) and any tradeoffs
- "One Thing" - the health problem (burdensome symptom, health care task, or medication) the patient most wants to address to help them achieve their health goal.

ALIGN CARE WITH HEALTH PRIORITIES

Consider if current and potential care is:

- Consistent with health outcome goals including patient's "One Thing"?
- Consistent with care preferences?

Use the patient's priorities:

- As the focus for communication with the patient
- As the goal for serial trials to start, stop or continue interventions
- To prioritize care decisions, especially where differing perspectives exist

Update components as needed

INTRODUCING MR. C

- 86 y/o male, retired lawyer
- Heart Failure, reduced ejection fraction
- Atrial fibrillation on chronic anti-coagulation
- Recurrent VT s/p CRT-D
- Lumbar spondylosis
- Bladder paralysis – requiring intermittent self catheterization
- Hearing Loss
- Bilateral Inguinal Hernias
- Mild cognitive impairment MoCA 2018 26/30

Date	Event
Oct 2021	Largely Independent; Weight loss, stopped amiodarone → Increased Atrial fibrillation and atrial flutter
Jan 2022	Worsening HF→ empagliflozin added
Feb through Aug 2022	Monthly follow up with cardiology; mobility worsening; various complaints – fatigue, neuropathy in hands, home health off and on
Aug 2022	ER visit abdominal pain; CT bilateral inguinal hernias with possible low grade obstruction; able to be reduced; New finding: nodular liver cirrhosis; surgery consult – high risk candidate
Sept 2022 RPV w/ me	Goals: Values mental acuity; if unable to engage thoughtfully in conversations or decision, this would be considered a poor quality of life for him; Recognizes he has been ““living on borrowed time;” willing to adjust to physical limitations that may present themselves as long as he is still able to" have his mental acuity".

January 2023	Admission for Heart Failure, NSTEMI; declines SNF admission; inguinal hernias so large → foley catheter placement
RPV w/ me later January	Decreased mobility, weight loss, foley catheter removed mid February
2/24 -3/9/23	Admission Heart Failure → milrinone for palliation
March 2023	Goals: Primary goal is extending life as long as he maintains mental capacity. Secondary goals are to be alive for another 5 years to see grandkids graduate high school, watch football and basketball seasons, and play golf at a tournament in April. Also wants to go home as much as he can to be with his family and dog and tie up loose ends at his law practice/finance managing practice. Discussed code status repeatedly; patient would like to be full code but he would appreciate further palliative care discussions.
May 2023	Another HF Admission, EF 19%
June 20, 2023	ER for strangulated right inguinal hernia

DOES THIS PATIENT GET SURGERY?

- Decline over 18 months (21# weight loss)
- Worsening mobility
- Fatigue
- 4 hospitalizations
- Multiple office visits

FRAILTY VS RESILIENCE

	Resilience	Frailty
Spectrum	Lifespan	Compressed/Towards End of Life
Observation	Multiple Points in Time	Snapshot
Viewpoint	Strengths Approach	Deficit Approach

"If the spectrum from robustness to frailty reflects the amount of physiological potential one has to react to stressors, physical resilience refers to the actualization of that potential."

J Am Geriatr Soc. 2018 August ; 66(8): 1459–1461.

CASE CONTINUED

- Outcome of Case
- Had we not identified what matters to this patient, we might have dismissed him as
- “too old”
- “too frail”

PPC PROJECTS AND NEXT STEPS

- Utilize PPC as the framework to addressing the What Matters M in Age Friendly Care
- Integrate PPC training into the required geriatrics rotation for University of Utah internal medicine interns
- Collaborating with Yale to align the University of Utah PPC training with the Yale PPC training as a roadmap for national dissemination of this curriculum
- https://patientprioritiescare.org/

The John A. Hartford Foundation

CONCLUSIONS

- Frailty and Resilience are not the same concept
- All health care professionals should be familiar with the age-friendly 4Ms
- Ageism is insidious, often invisible, and associated with harms including reduced life expectancy
- Age Friendly Care is patient centered and focuses on reducing frailty and increasing resilience
- Patient Priorities Care is a framework that can be used to address the What Matters "M" of Age Friendly Care

Q&A

When One Needs Care, Two Need Help: How Providers Manage Caregiver Needs

Kate Nederostek, MGS, CDP
Kristy Russell, MHL, CHES

Utah Department of Health & Human Services

Objectives

- Recognize the challenges and needs of the family caregiver/care partner
- View care partners/caregivers as a valuable resource and seek to incorporate them into the care team
- Understand the role you play in setting patients/caregivers up for success
- Overview of supportive resources

Caregivers are the Backbone of our Healthcare System

- By 2040, there will be over 80 million Americans 65+
- More than 1 in 5 are providing unpaid caregiving services to their family and friends
    - Over 41 million (79% of all caregivers) are supporting someone 50+

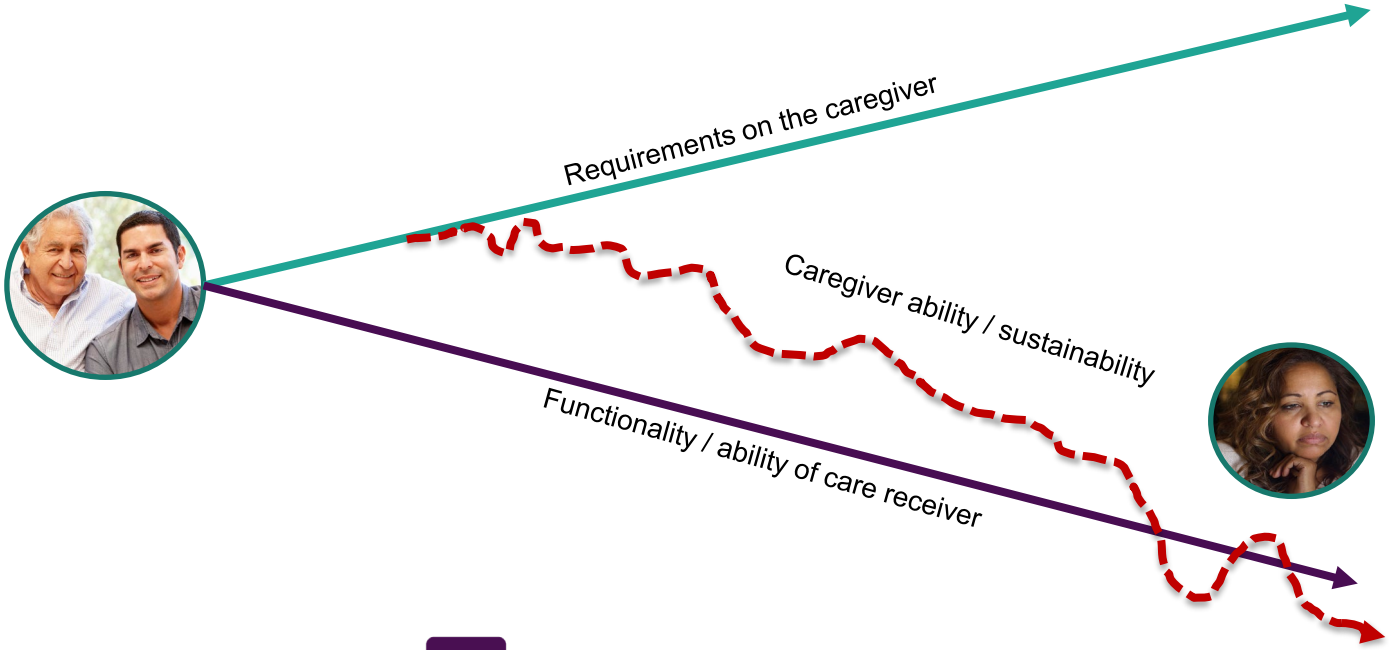
Caregivers are the Backbone of our Healthcare System

- Caregivers/care part of older adults
  - 61% help with at least 1 ADL
  - 43% help with 2 or more ADLs
  - On average help with 4.4 IADLs
  - 59% assist with medical/nursing tasks
  - 72% monitor severity of the care receivers condition
  - 66% communicate with health care professionals
  - 56% advocate with providers, services, agencies

Caregivers are the Backbone of our Healthcare System

- As the need for family caregivers is increasing, so too is an awareness that they will **need both support and training**

The Caregiving Continuum



Utah Department of
Health & Human
Services

Impact of Caregiving

- 6 in 10 consider their caregiving situation **stressful**
- 1 in 5 report high **physical strain** due to caregiving duties
- Caregivers spend on average **26% of their income** on caregiving activities
- 18% cut back on **their own healthcare** spending
- 1 in 4 say it is difficult to get **affordable services** for their care recipient
- 61% of caregivers **employment situations have been negatively effected**

Effects on the Care Receiver

When family caregivers are in **distress/crisis** the care receiver is affected as well

- Increased institutionalization rates
- Exacerbated behavioral and psychological challenges
- **Increased risk of abuse**

Caregivers and Healthcare Professionals

- 6 in 10 could **use more information and support**
- 55% of caregivers **rely on healthcare professionals** for information about providing care
  - 29% of caregivers have conversations with providers about what they need to care for care receiver
  - 13% have conversations about what they need to care for themselves

Caregivers are Vital to Better Care

- Partner with family caregivers/care partners because they:
  - Often **know their loved one better** than anyone else
  - Know their own capacity and limitations in providing care safely in the home
- Utilizing family caregivers results in:
  - **Better care, better health, and quality of life for patient**
  - **Lower costs**
  - **Easier and more meaningful work**

Community Supports and Resources

Utah Department of
Health & Human
Services

Support Throughout the Caregiving Journey

- Training on medical tasks
- Develop caregiving skills (assisting someone with ADLs)
- Medical equipment/supplies that could be helpful
- Education on condition
  - Dementia, MS, Diabetes, mental health, etc.
- Referrals to community resources
  - Transportation, food banks, legal, financial, chore services
- Points of contact for crisis

Support Throughout the Caregiving Journey

- Keeping care receiver safe at home
  - Driving, falls
- How to choose/arrange/solve problems with LTC/service providers
  - In-home, residential communities
- Advocating for care receiver
- Help navigating forms, paperwork, and eligibility for services
  - Power of attorney, advanced directives, guardianship, etc.
  - County financial programs, VA services
- Preparing for and managing end of life
  - Grief/loss

Support Throughout the Caregiving Journey

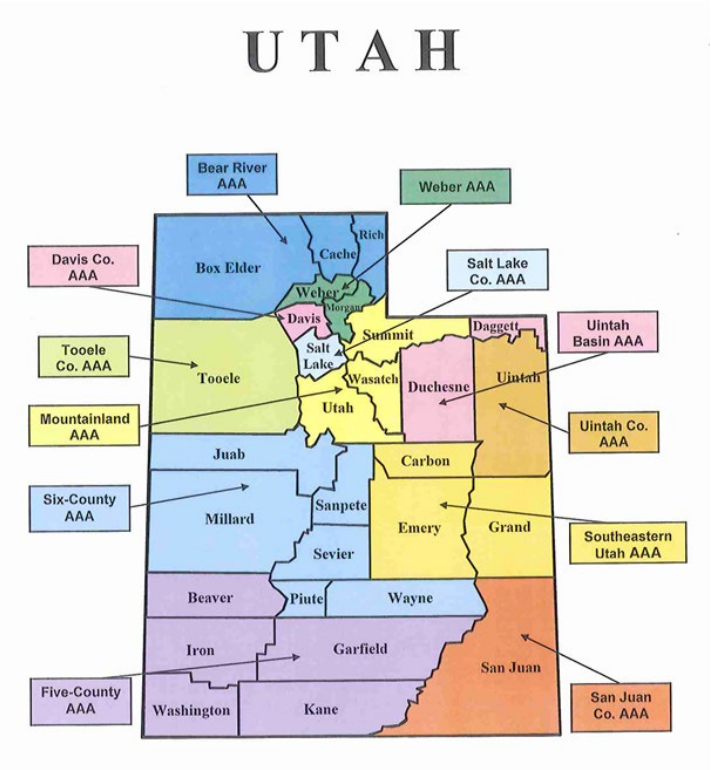
- Managing new relationship with care receiver
  - Keeping personal relationships while caregiving
- Discussion of caregiver needs and capability to provide care
  - Managing caregiver stress, self care, setting boundaries
- How to build informal networks of support
  - Coordinating services, communication
- Connection with peers
  - Support groups, engaging in activities/social events
- Respite services/options

Area Agencies on Aging (AAA)

To promote positive aging and assist seniors in maintaining health, independence, and quality of life

- Information and resources
- Advocacy
- Plan, coordinate, and provide services

Find your local AAA:
https://eldercare.acl.gov/ or UtahAging.Org



Utah Department of Health & Human Services

AAA Services

- Information & Resources
- Nutrition; Meals on Wheels
- Medicare Insurance Counseling
- **Caregiver Support Program**
- In-Home Services Programs
- Evidence-Based Health Programs
- Long-term Care Ombudsman
- Transportation
- Senior Centers
- And so much more …

To find your local AAA: https://eldercare.acl.gov/ or UtahAging.Org

Caregiver Support Program

- Information about available community resources
- Assistance in gaining access to supportive services
- Care consultation & case management
- Support groups
- Caregiver education/training
- Respite care (relief for caregivers)
- Supplemental services (Emergency Response System, grab bars, incontinence supplies, etc.)

Caregiver Support Program

As a result of receiving caregiver services:

- 85% able to provide care for a longer period of time than would have been possible without these services
- 76% have delayed placement in an assisted living or nursing home
- 88% able to be more self-reliant

VA Caregiver Support Program

VA Caregiver Support Line:
855-260-3274
www.caregiver.va.gov

- Resource and Referral: assistance navigating VA services
- Counseling
- Education, Training, and Support
- May also qualify for:
  - In-Home Care
  - Respite Care
  - Equipment & Supplies

VA Caregiver Support

National Dementia Organizations

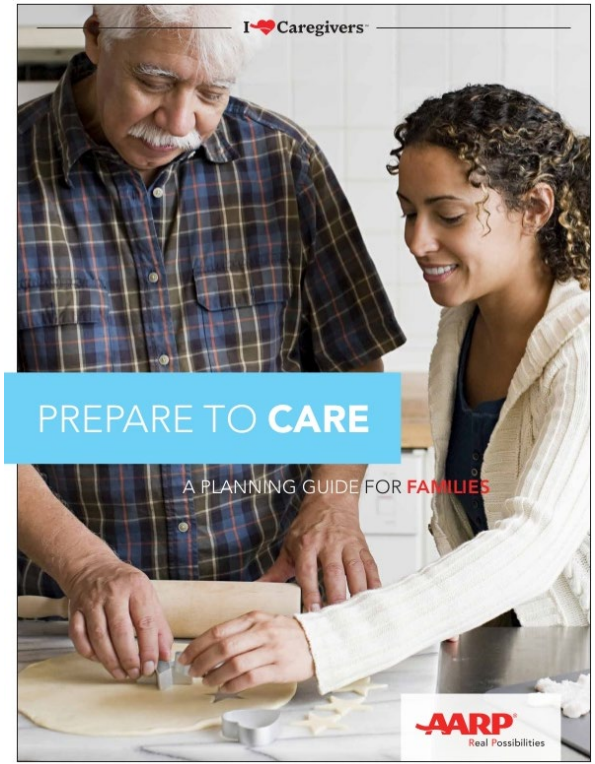
- **Alzheimer's Association**
  www.alz.org
  Helpline: 800-272-3900
- **Association for Frontotemporal Degeneration**
  www.theaftd.org
  Helpline: 866-507-7222
- **Creutzfeldt-Jakob Disease Foundation**
  www.cjdfoundation.org
  Helpline: 800-659-1991
- **Huntington's Disease Society of America**
  www.hdsa.org
  Helpline: 800-345-4372
- **Lewy Body Dementia Association**
  www.lbda.org
  Lewy Line: 800-539-9767
- **Parkinson's Foundation**
  www.parkinson.org
  Helpline: 800-473-4636

National Dementia Organizations

- Information about and referral to community resources
- Support groups
  - Individuals in the early stages of dementia
  - Family caregivers
- Caregiver education programs (in-person or online)
- Educational material

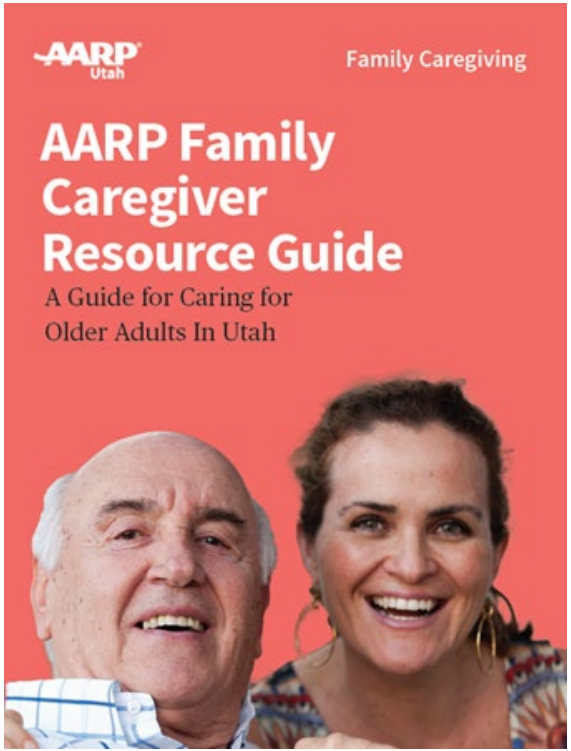
National Resources

- **AARP Caregiver Resource Center**
  www.aarp.org/caregiving
  1-877-333-5885
- **American Cancer Society**
  www.cancer.org
  800-227-2345
- **American Diabetes Association**
  www.diabetes.org
  800-342-2383
- **American Heart Association**
  www.heart.org
  800-242-8721
- **Eldercare Locator**
  www.eldercare.gov
  800-677-1116
- **National Indian Council on Aging**
  www.nicoa.org
- **National Resource Center on LGBT Aging**
  www.lgbtagingcenter.org
- **National Multiple Sclerosis Society**
  www.nationalmssociety.org
- **National Respite Network**
  www.archrespite.org
- And many more...



FINANCIAL WORKBOOK FOR FAMILY CAREGIVERS

A PRACTICAL GUIDE FOCUSED ON HEALTH, HOUSING, AND MONEY MANAGEMENT



AARP Publications

https://www.aarp.org/caregiving

Select Language
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Welcome to UtahAging.org

The Utah Commission on Aging (UCOA) sponsors and manages UtahAging.org as Utah's official statewide virtual resource center for older adults. UCOA convenes expert stakeholders to share resources and best practices from our communities, public policy, education, and research to help Utahns navigate the opportunities and challenges of the aging experience.

Utah Master Plan on Aging Survey

Your input is requested and valued.

Survey coming soon...

LEARN TO REDUCE YOUR RISK OF DEMENTIA

ALZHEIMER'S DISEASE AND RELATED DEMENTIAS

Select Language
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Explore Aging

Advance Care Planning

ADVANCE CARE

Age-Friendly Communities

AGE-FRIENDLY COMMUNITIES

Ageism

AGEISM

Alzheimer's Disease and Related Dementias

ADRD

Arts and Aging

ARTS AND AGING

Brain Health and Mental Acuity

BRAIN HEALTH AND MENTAL ACUITY

Caregiving and Care Partnering

CAREGIVING AND PARTNERING

Diverse Communities

DIVERSE COMMUNITIES

Emergency Preparedness

EMERGENCY PREPAREDNESS

Employment

EMPLOYMENT

Elder Abuse

ELDER ABUSE

Falls Prevention

FALLS PREVENTION

Financial Security

Financial Fraud and Scams

Food Security

Guardianship and Conservatorship

What Providers/ Health Systems Can Do

- **Bring care partners/caregivers into the conversation as early as possible**
- Not everyone identifies as a “caregiver”
    - Ask “who else needs to be involved in these meetings/discussions?”
- Ensure your **intake process** has the option to **list a family caregiver** or someone who supports their care
- **Ensure your entire team recognizes** the important role caregivers play so they don’t get lost along the way

What Providers/ Health Systems Can Do

- Speak with the caregiver to **understand their challenges**
- Ask questions such as:
  - What can I help you with at home that you are not able to accomplish?
  - What else do you have on your plate?
  - What stresses do you have at home that you are struggling with?

What Providers/ Health Systems Can Do

- Connect caregivers to resources in their local area
- Have **information packets/one-pagers** ready to go to hand to family caregivers
- **Follow up** that those resources are helpful

Takeaways

- Care partners/caregivers are a valuable resource
- You and your team play a vital role in connecting patients/caregivers to resources and encouraging their self-advocacy
- Without being directed to community resources/supports, caregivers will struggle/fail
- **Eldercare.acl.gov** will get you to an Area Agency on Aging near you, which will open the door to all other resources

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Utah Department of
Health & Human Services
Aging & Adult Services

I don’t bounce back like I used to: The Science of Resilience to Health Stressors

HEATHER E. WHITSON, MD, MHS

PROFESSOR OF MEDICINE (GERIATRICS), OPHTHALMOLOGY, NEUROLOGY, HEAD & NECK SURGERY AND COMMUNICATION SCIENCES

DIRECTOR, DUKE AGING CENTER

CO-DIRECTOR, DUKE/UNC ALZHEIMER’S DISEASE RESEARCH CENTER

DUKE SCHOOL OF MEDICINE/DURHAM VA GRECC

Disclosures

National Institute on Aging: P30AG028716-11, UH3AG056925, P30-AG064201-02, R01-AG062623-01A1, U13 AG054139, R33-AG057806, P30AG072958-01

Veterans Administration – Durham VA GRECC

AGS Board of Directors

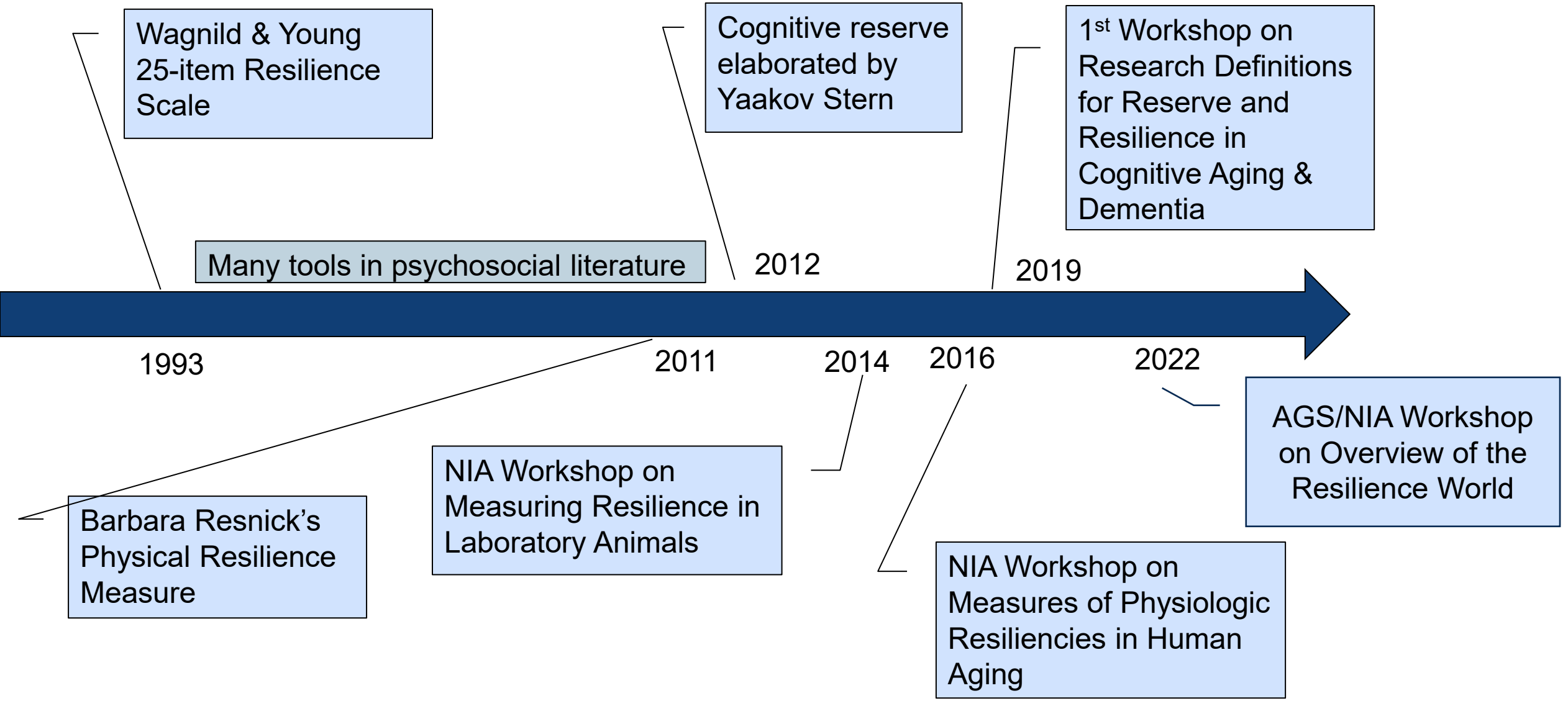
Outline for Today's Talk

1) The importance of **resilience to stressors** in overall human health
2) The role of aging in health-related resilience
3) Duke Pepper Center Framework for Physical Resilience
4) Examples of resilience research in the Duke Pepper Center

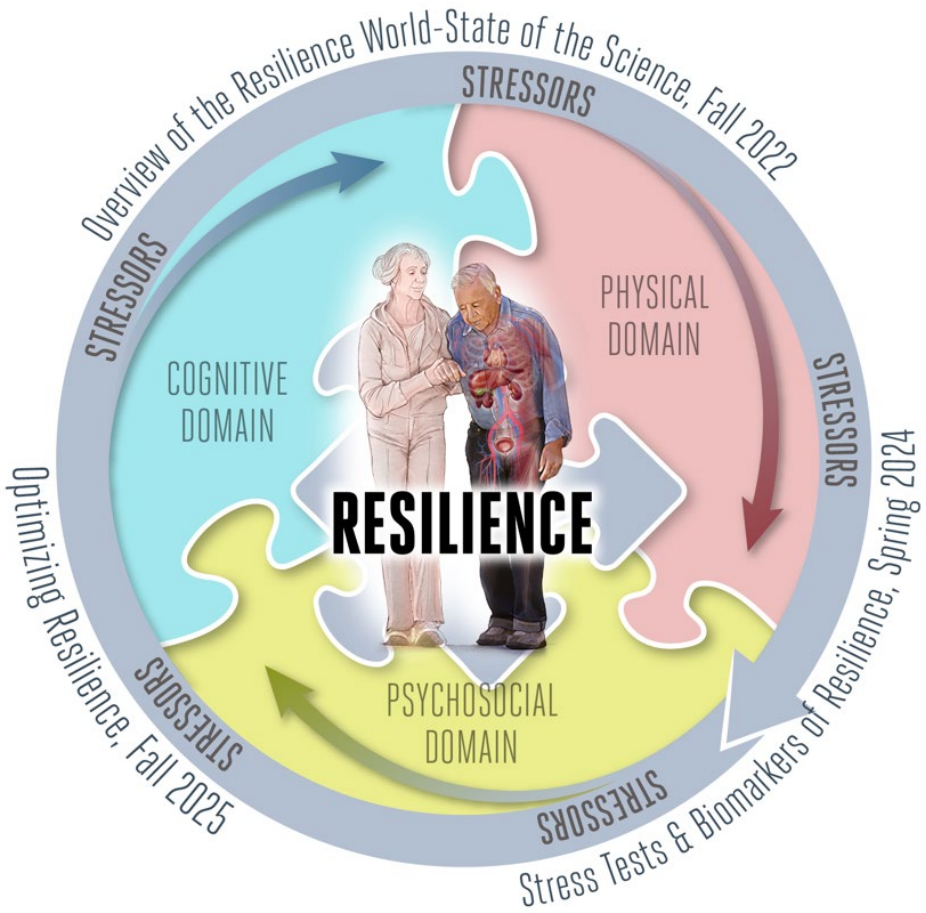
“I don’t bounce back like I used to”

DukeHealth

A Brief (and surely incomplete) History of Resilience in Aging Research



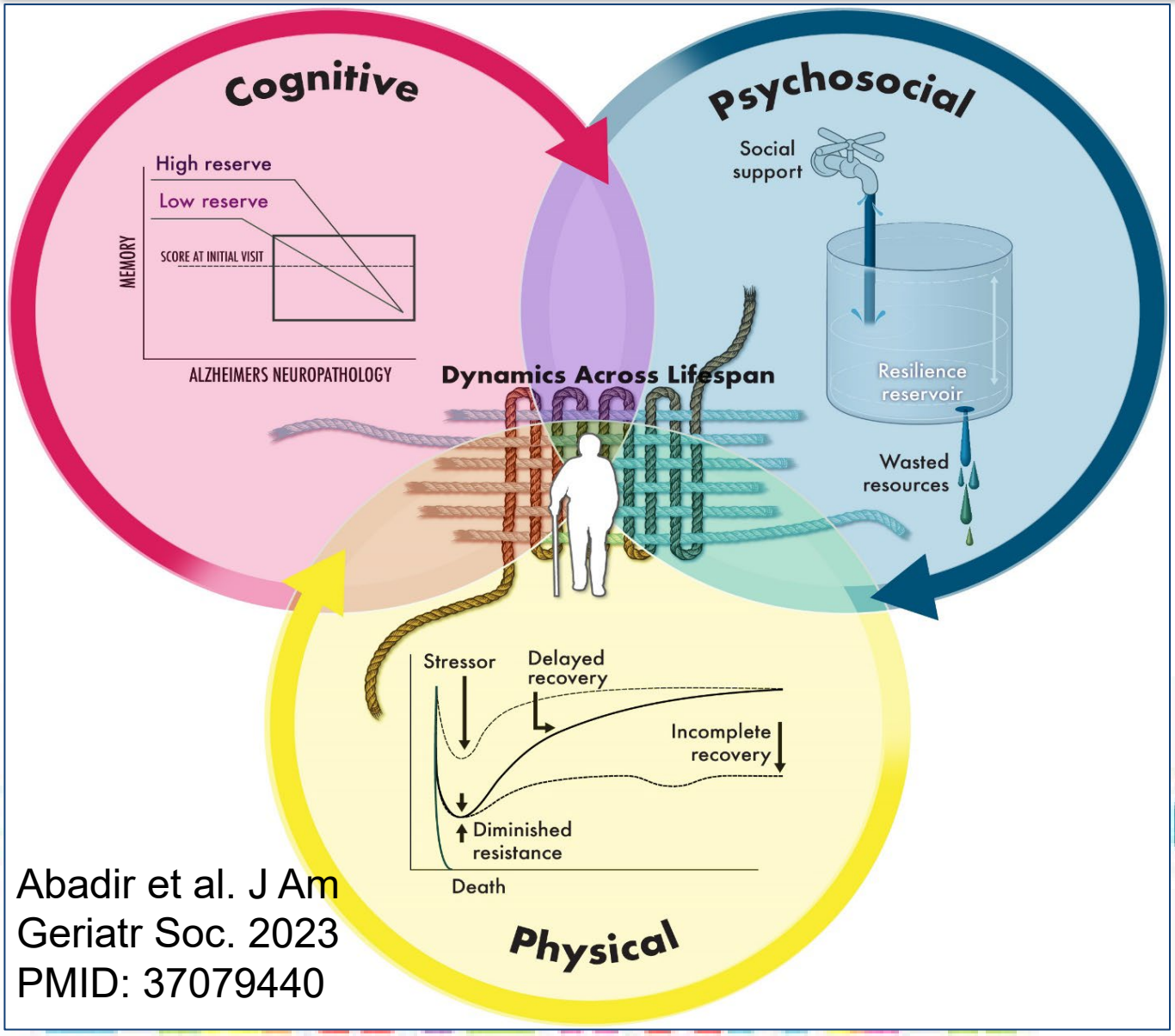
Overview of the Resilience World: State of the Science



Abadir et al. J Am Geriatr Soc. 2023
PMID: 37079440

NIA/AGS Conference
October 12-13, 2022 Washington, DC

A cosmopolitan appreciation of “resilience” in health research



Abadir et al. J Am Geriatr Soc. 2023
PMID: 37079440

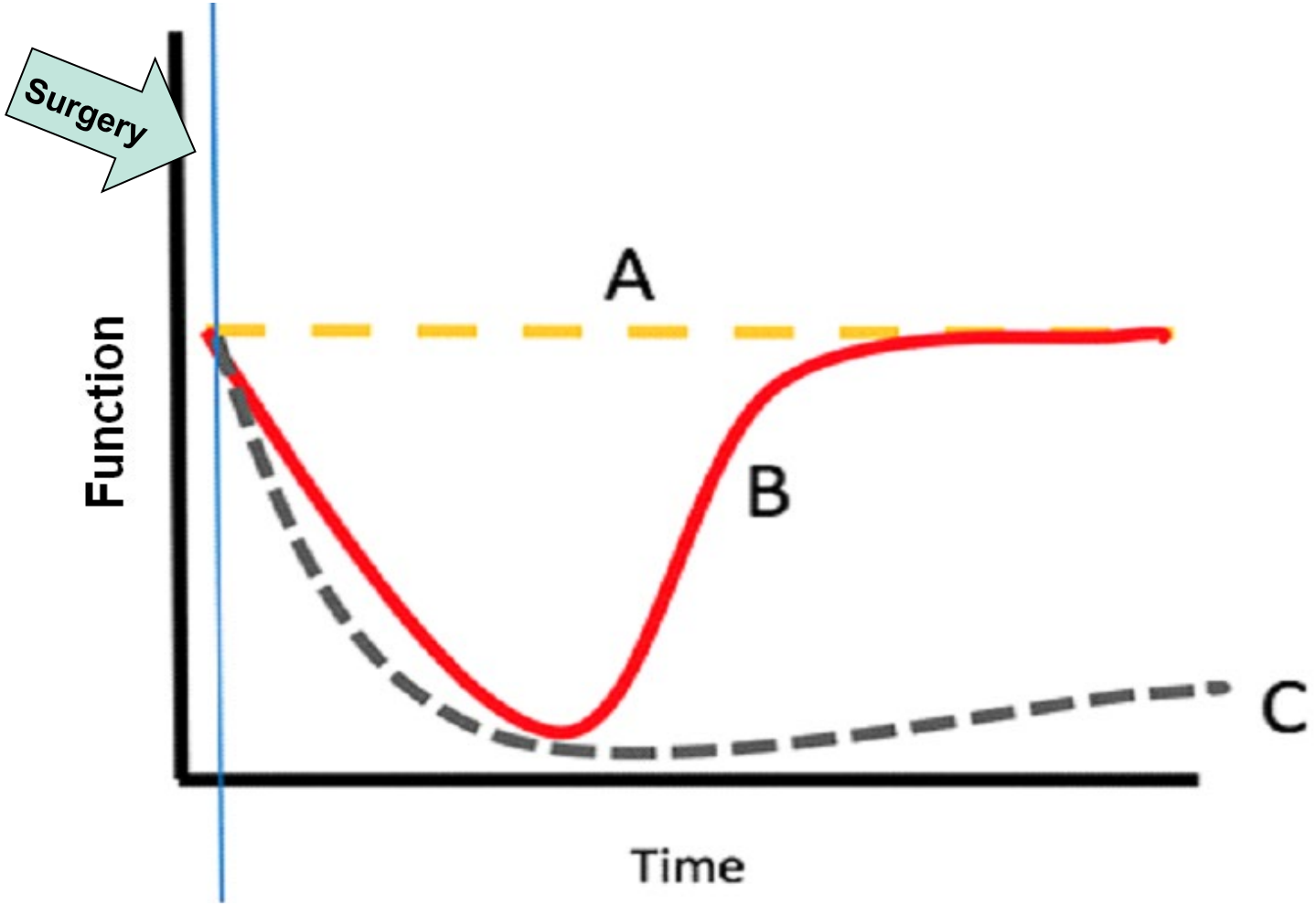
- Many fields have developed their own theoretical models and definitions for resilience
- Generally, resilience entails a positive or adaptive response to a stressor
- It is important to specify how **you** define resilience and to recognize that others may be familiar with a different framework

Consider two patients being evaluated as candidates for total knee replacement.

76 year old woman who is a caregiver for her husband. She has obesity, depression, sedentary life style, and history of coronary artery disease treated with a stent in 2015. She had gall bladder surgery and a hysterectomy, each more than 10 years ago.

75 year old man with well-controlled hypertension and glaucoma who plays golf and tennis weekly and has a supportive wife and two daughters nearby. He has never had a surgery.

Much of Successful Aging Depends on "Bouncing Back" After Health Stressors



Every person is a complex dynamic system

Interconnected Systems and Sub-systems constantly moving, transitioning, and adapting to changing environments and new stressors

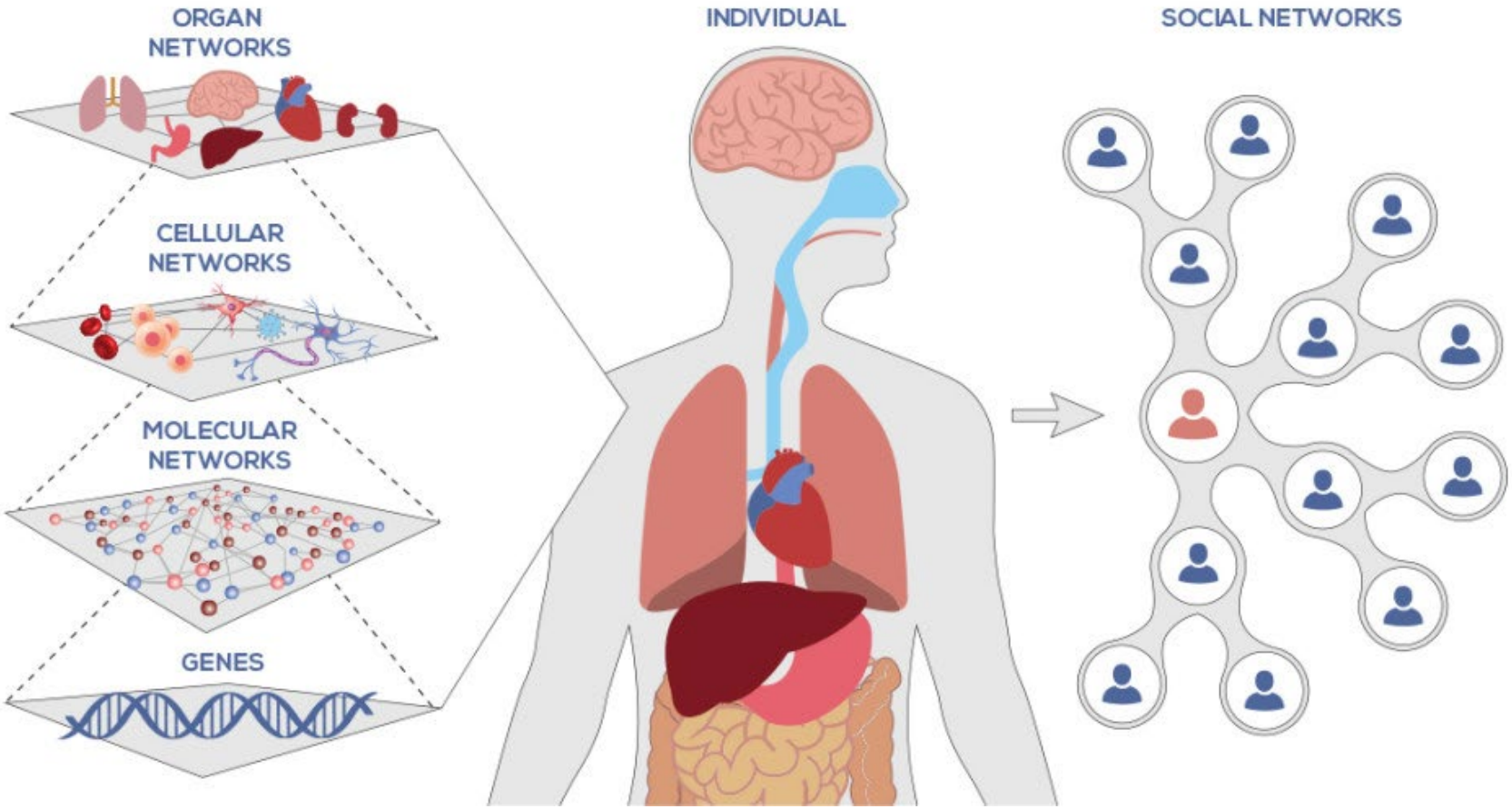
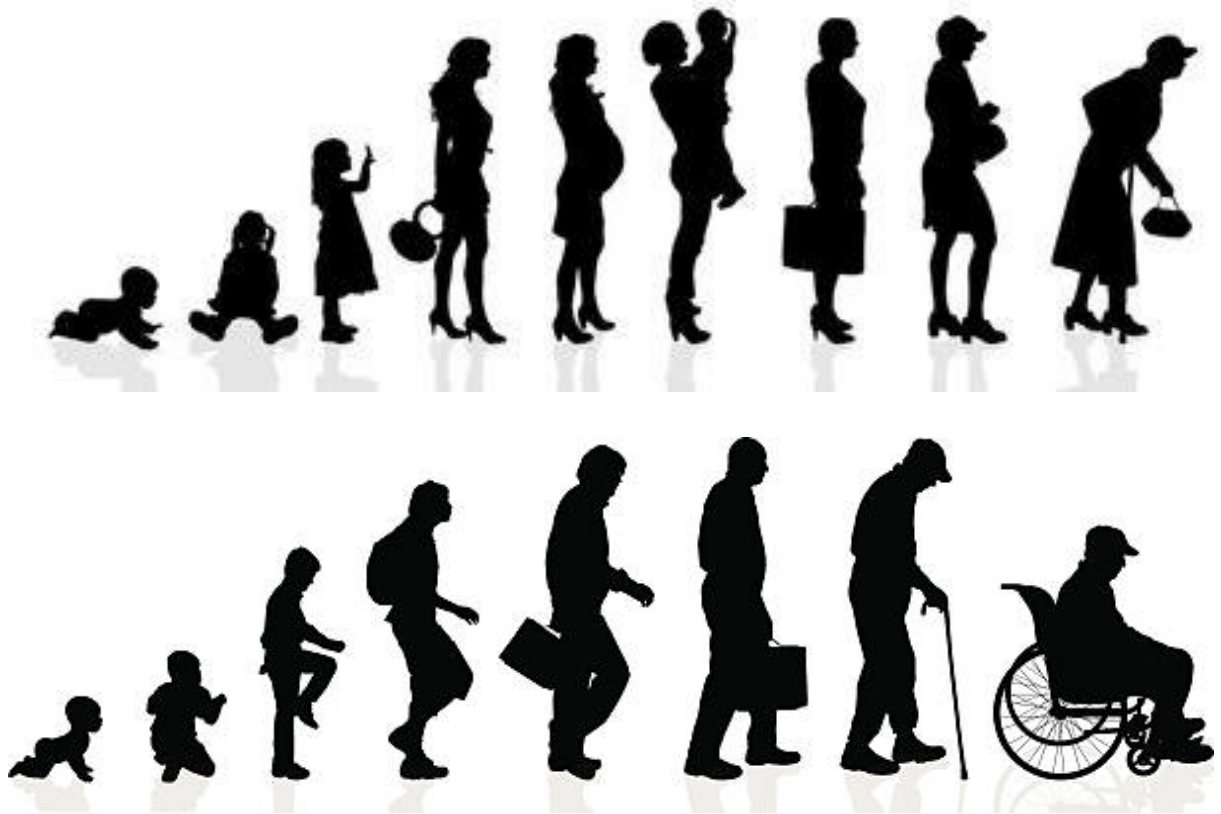


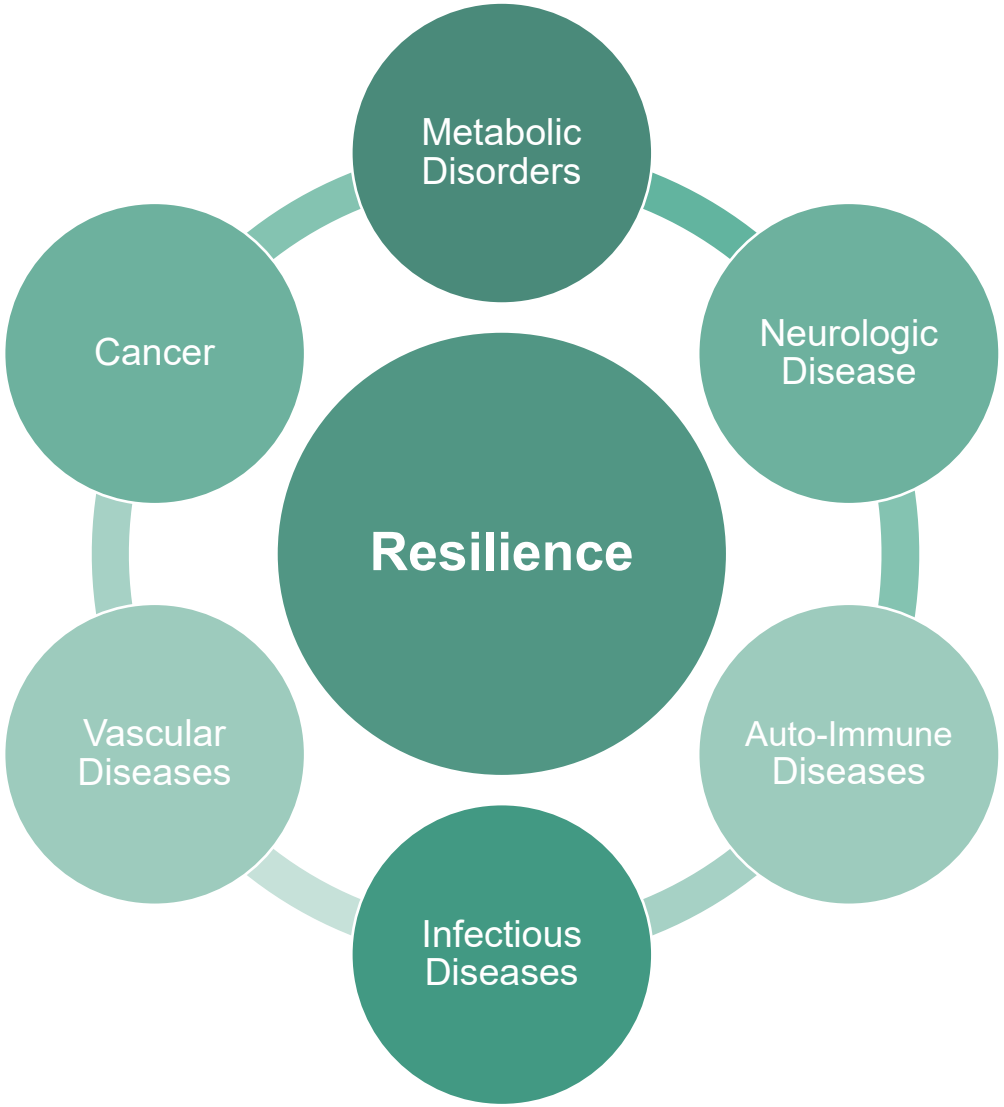
Image by: Institute for Systems Biology, Seattle, WA

With age, our ability to respond briskly and adaptively to perturbation declines.



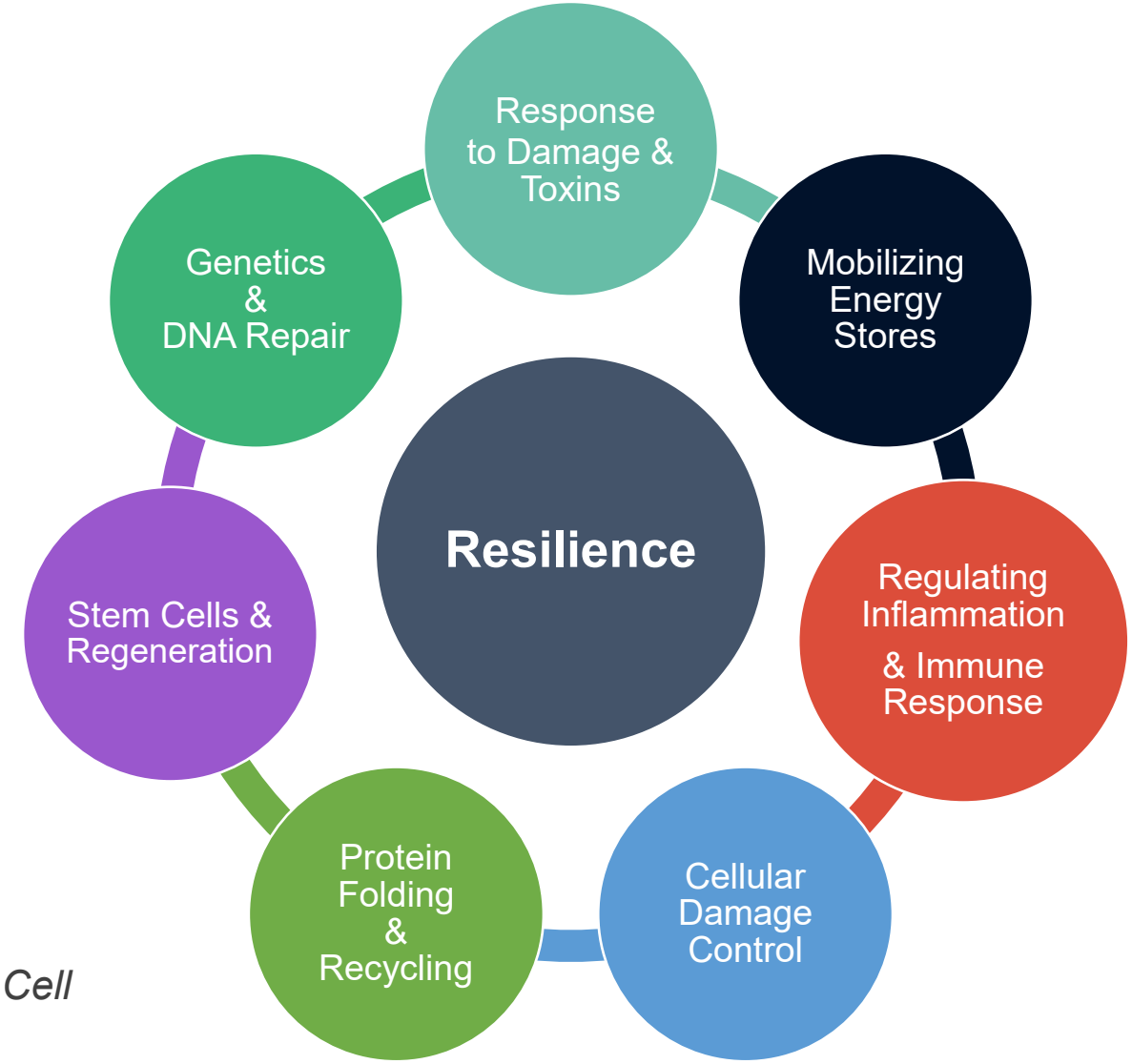
A vicious cycle

Diseases can diminish biologic resilience…



and lower resilience makes us vulnerable to the next disease…

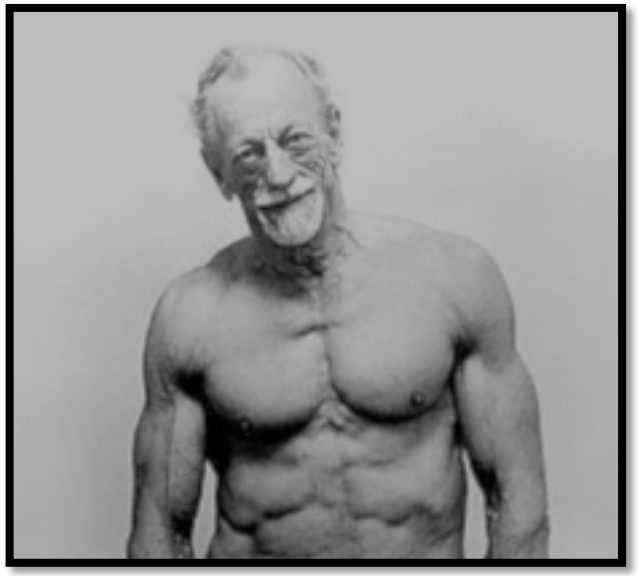
Geroscience: Biological resilience has a molecular basis



…and all of these molecular pathways exhibit decline with age (over time), even in the absence of serious disease.

Adapted from Kennedy et al. *Cell* 159; 2014

But the rate of decline is not the same for everyone. Why?

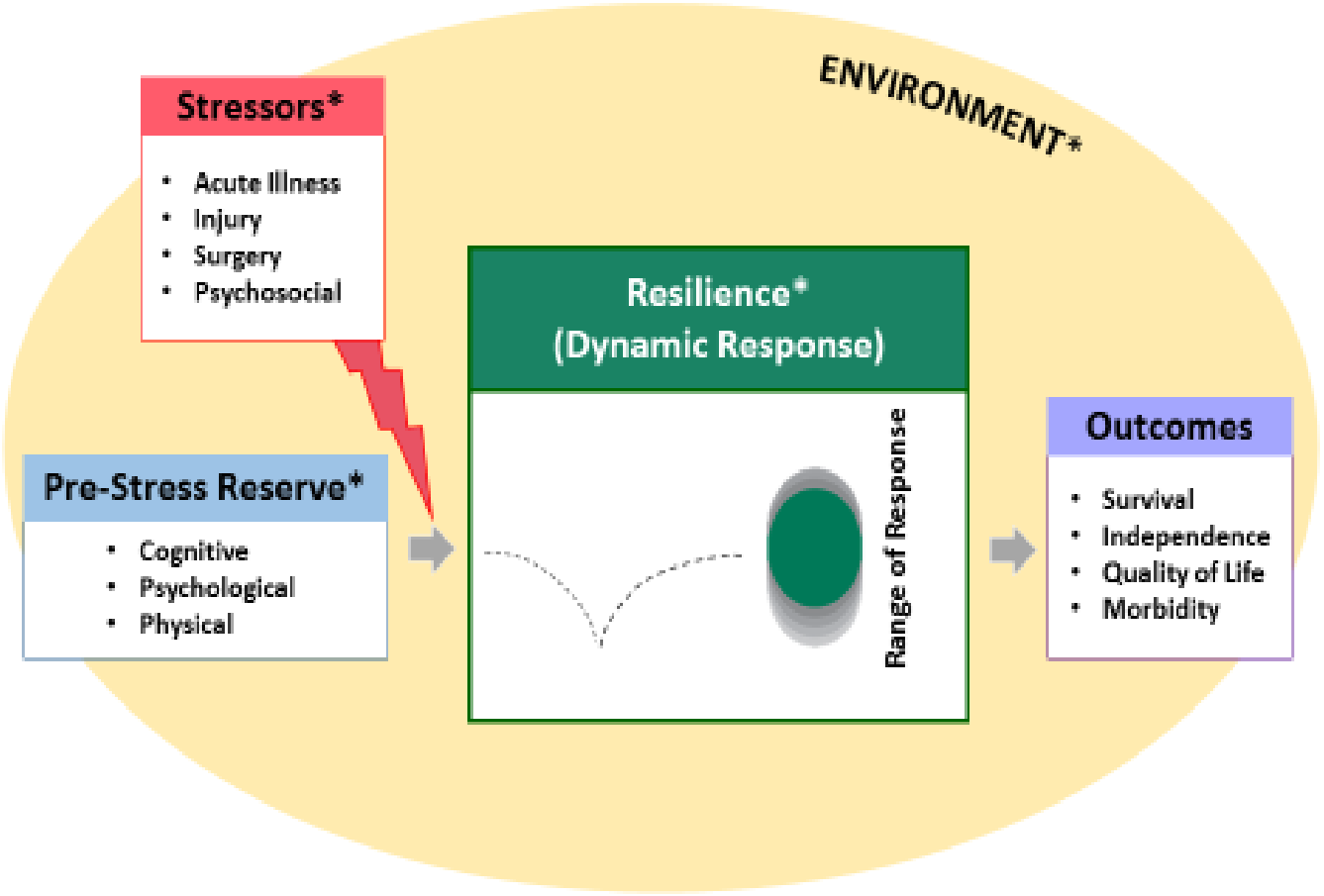


And sometimes our patients really surprise us…

Can we get better at predicting and promoting physical resilience to health stressors?

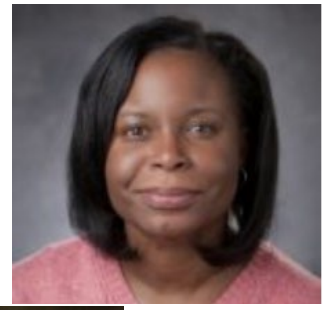
Step 1: We have to decide what to measure

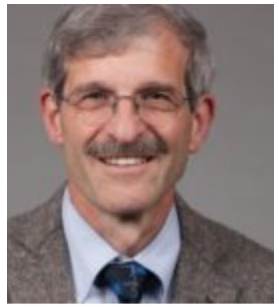
Duke Pepper Center Conceptual Model of Physical Resilience

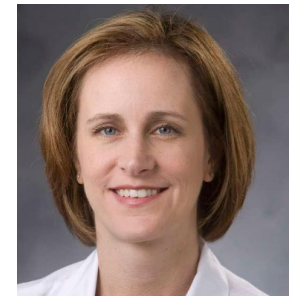


*Opportunities to intervene

Duke Pepper Center Resilience Leadership Team







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Sheng Luo
Lisa Hobson-Webb
Jaime Hughes
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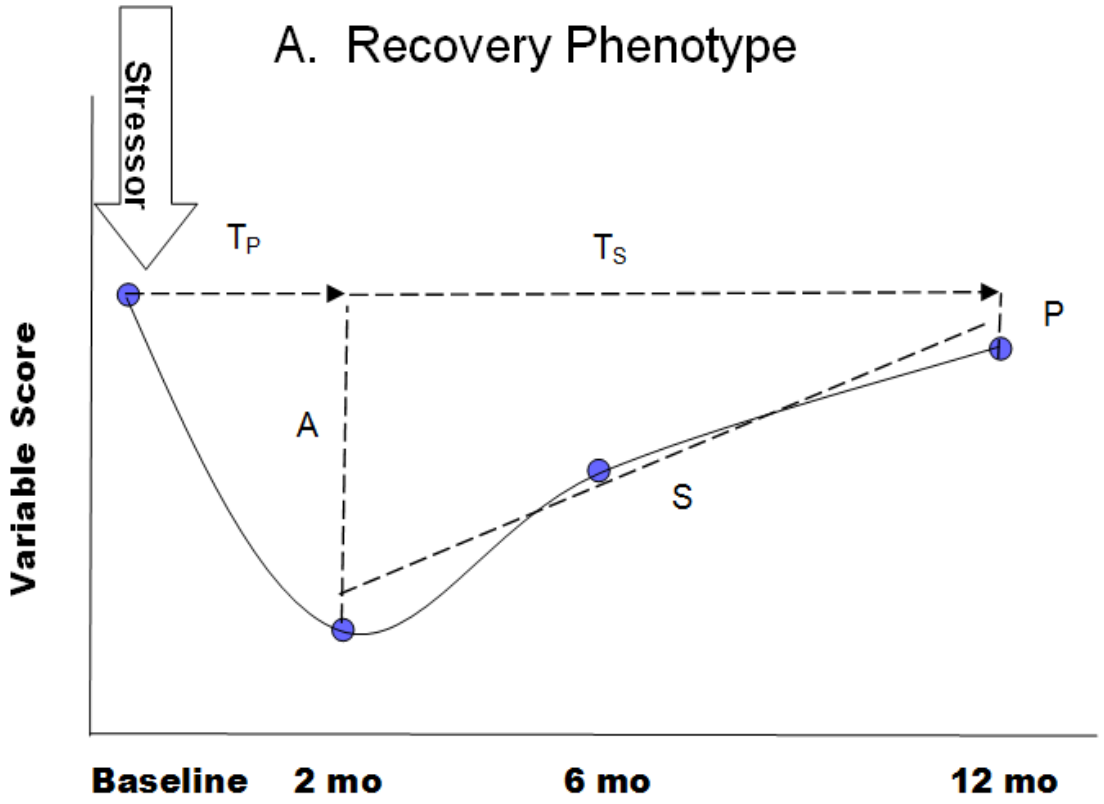
How might we quantify “resilience” after a stressor?

Two Key Clinical Questions

1. What is the pattern of recovery my patient will experience across health measures that matter?
2. How much better/worse will my patient do than expected, given their age and pre-stressor status?

Recovery Phenotype Approach



- Descriptive
- Can quantify multiple parameters (slope, % recovery, etc)
- Can summarize multiple outcomes simultaneously
  - ❖Latent Class Trajectory Analysis
  - ❖Factor Analysis
  - ❖Principle Components Analysis
- Driven by age, comorbidities, pre-stressor function

J Gerontol A Biol Sci Med Sci. 2020 Mar 9;75(4):731-738.

What are Appropriate Health Measures to Capture Resilience?

Duke Pepper Center Health and Mobility Measures Core

- Provides consultation and training, develops standard protocols, and creates or adapts innovative new measurement approaches across the adult lifespan

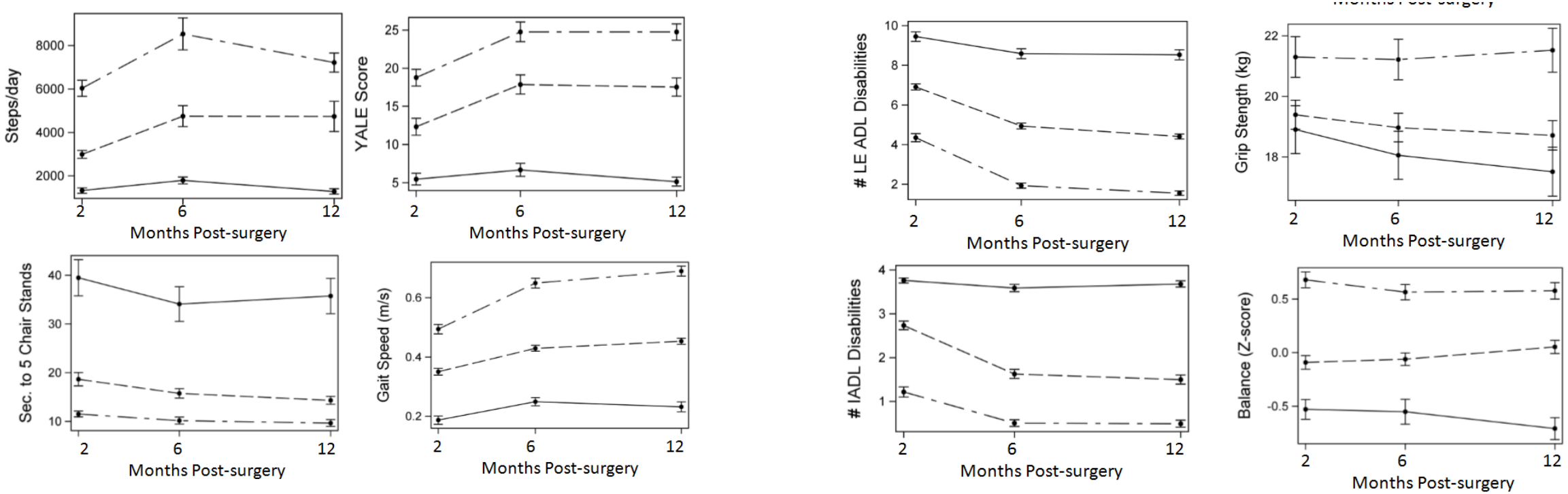
They maintain websites with curated lists of measures:

https:// agingcenter.duke.edu/functional-assessment

https:// agingcenter.duke.edu/psychosocial-resilience

Katherine Hall &
Amy Pastva

Example: Recovery phenotype approach after hip fracture

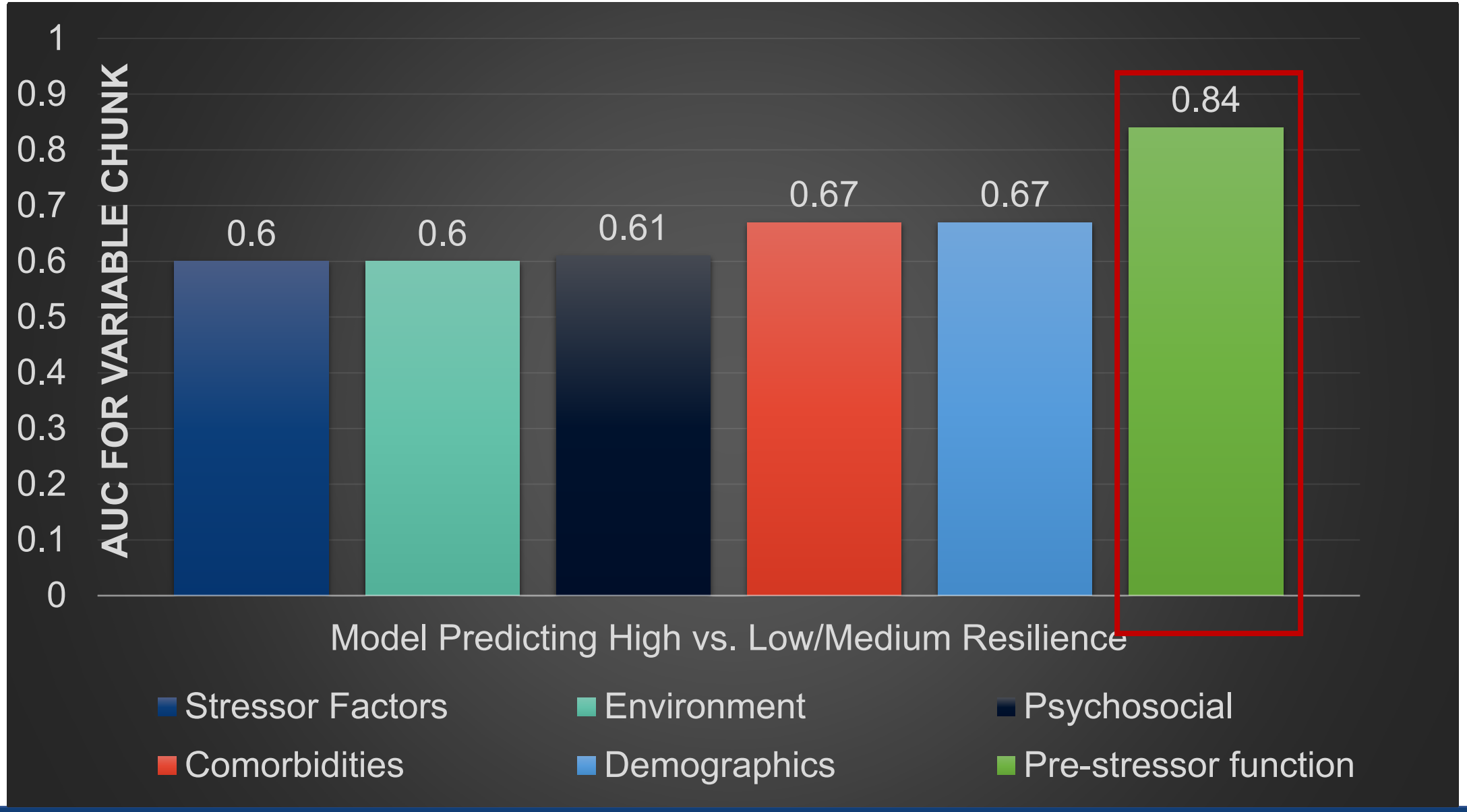


Latent Profile Analysis trajectory group

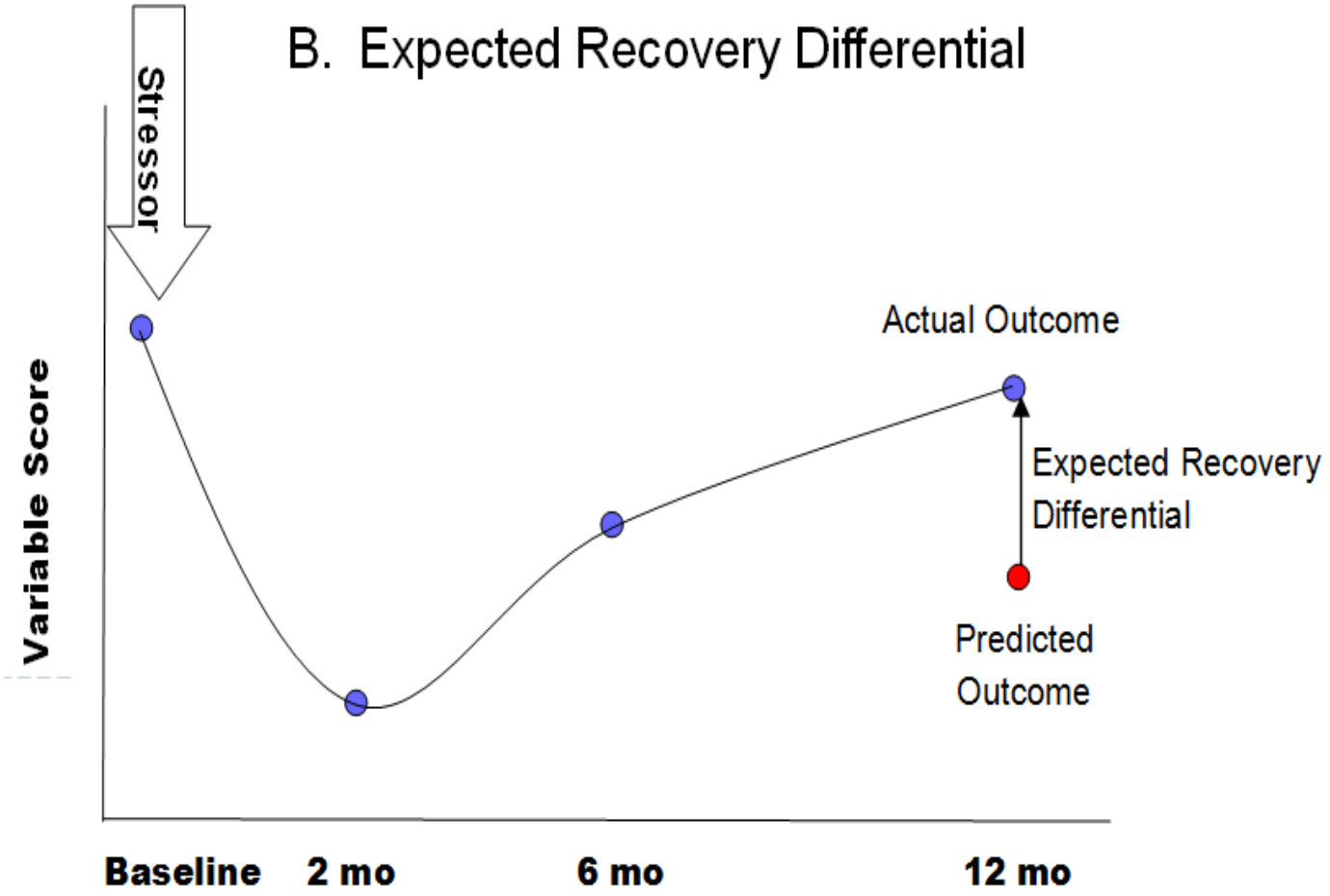
——— Lowest resilience — — — Medium resilience —— - — Highest resilience

J Am Geriatr Soc. 2019 Dec;67(12):2519-2527

What Factors Were Associated with the Phenotype of High Resilience after Hip Fracture?



Expected Recovery Differential (ERD) Approach

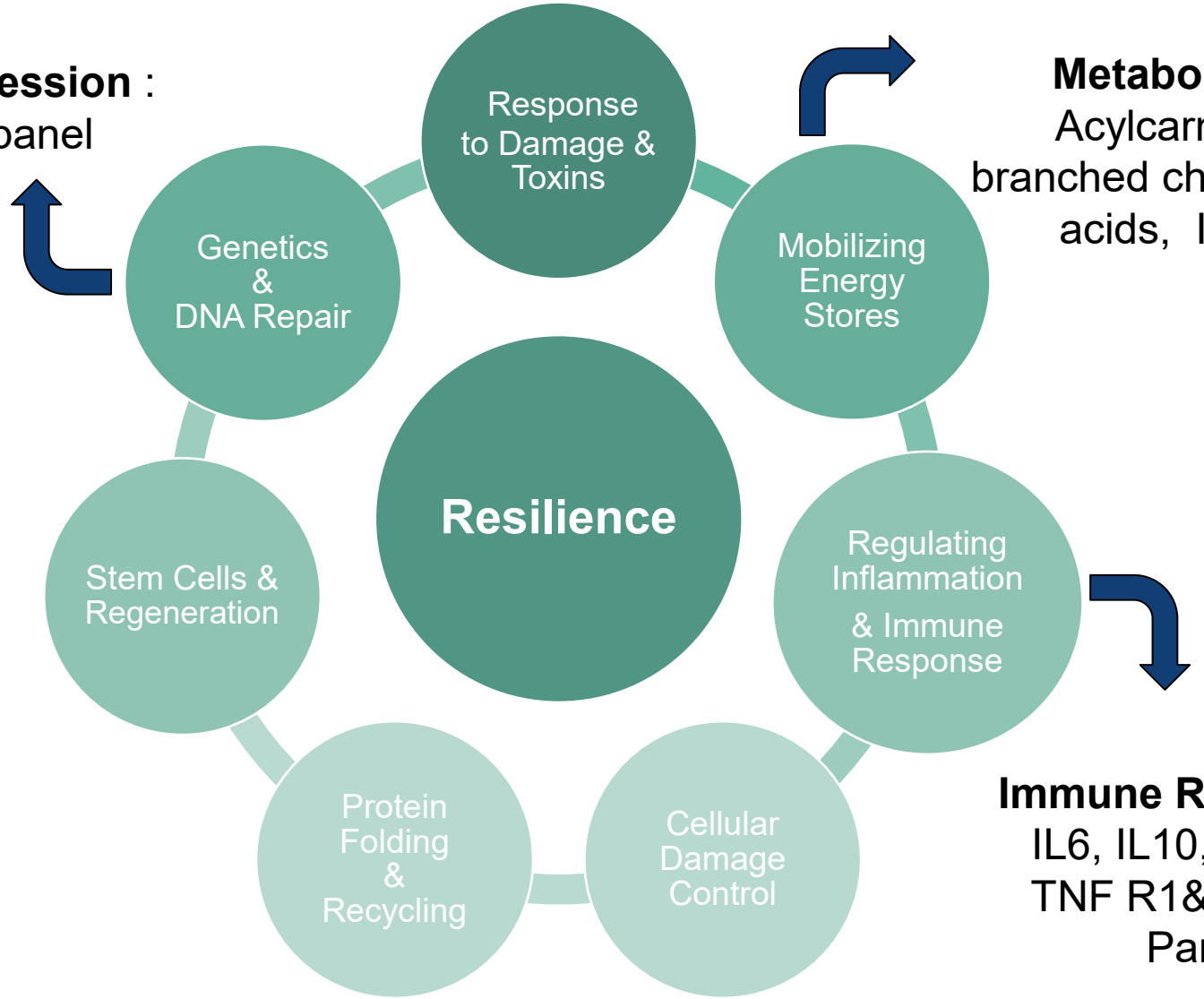


- Quantifies how observed outcomes differed from expected
- Requires predictive model from large cohort
- Accounts for baseline status, stressor factors, environment etc.

J Gerontol A Biol Sci Med Sci. 2020 Mar 9;75(4):731-738.

Proof of Concept: Are key resilience biomarkers linked to Recovery Differentials after Hip Fracture?

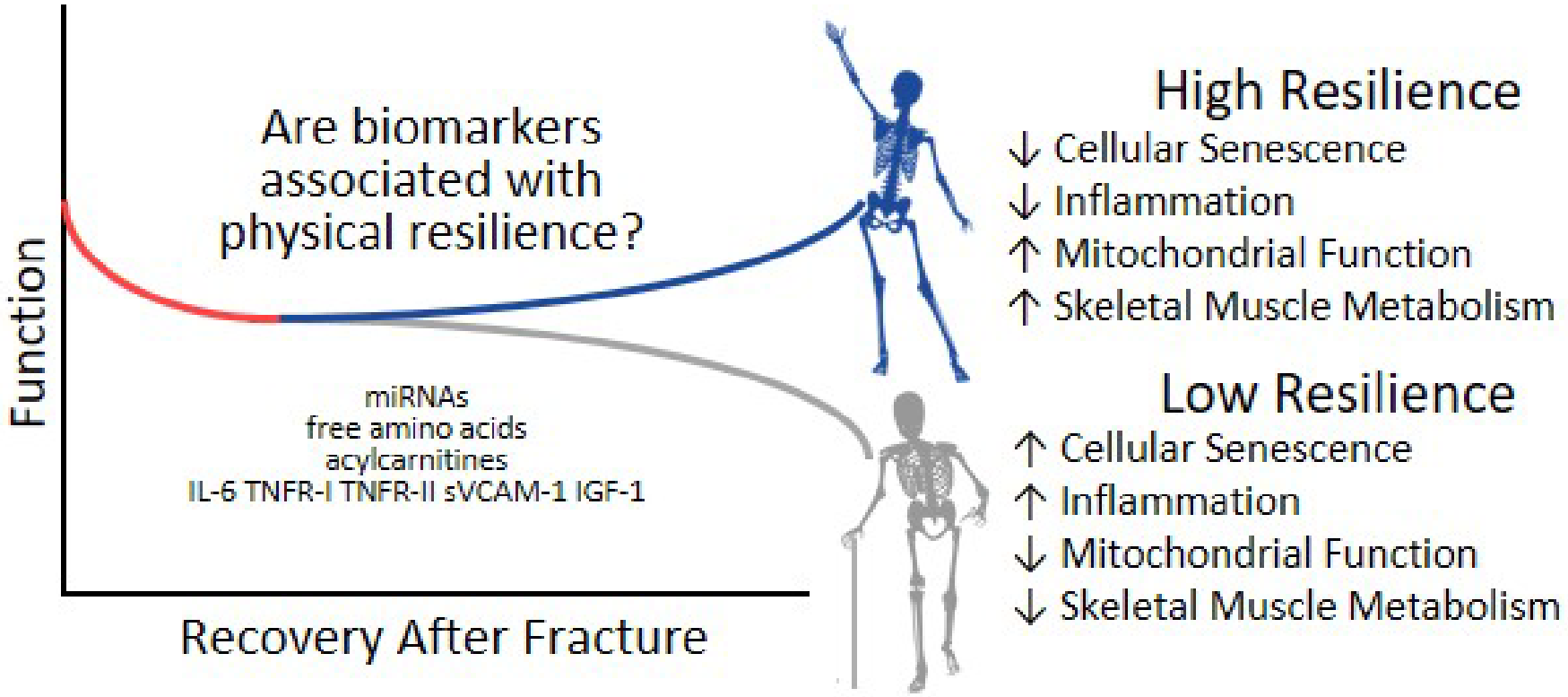
Gene Expression :
miRNA panel

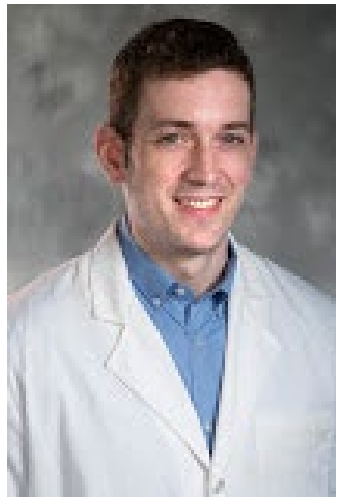


Metabolism :
Acylcarnitine, branched chain amino acids, IGF-1

Immune Response :
IL6, IL10, V-CAM, TNF R1&2, SASP Panel

This panel of biomarkers explained 38% of the observed variability in recovery differential after hip fracture.





Daniel Parker, MD

J Gerontol A Biol Sci Med Sci. 2020 Sep 25;75(10):e166-e172.

Example #1:
PRIME-KNEE Study

Predicting resilience to a planned stressor

PRIME-KNEE Study

200 Duke patients scheduled for elective knee replacement surgery

Baseline Visit

Consent

Covariates (Demographics, education, social support, environment)

Cognitive Reserve Tests

Physical Reserve Tests

Provocative Tests (dual task gait/cognition, fNIRS reactivity tests, PBMC reactivity tests)

Blood for biomarkers

7 day Step Counts

Surgery Week

Provocative test (ECG variability)

Covariates (surgery characteristics, complications, length of stay)

Pain intensity and interference (daily)

3D-CAM Attention items

Blood for biomarkers

7 day Step Counts

1, 2, 4 Month Phone Calls

Pain intensity and interference

LE PADLs

Cognitive Change Index (subject, informant)

7 day Step Counts

Intercurrent events, Rehabilitation received

6-Month Visit

Cognitive Reserve Tests

Physical Reserve Tests

Provocative Tests (dual task gait/cognition, fNIRS reactivity tests, PBMC reactivity tests)

7 day Step Counts

Whitson et al. A template for physical resilience research in older adults: Methods of the PRIME-KNEE study. *J Am Geriatr Soc*. 2021 Nov;69(11):3232-3241

Are there feasible, safe tests that can predict physical recovery after big health stressors?

Provocative Tests: Baseline and 6 months

- **Gait Speed Dual Task Test** walking while performing a speech generation task
- **Near-Infrared Spectroscopy** (**NIRS**)cerebrovascular reactivity before and after cognitive task, orthostatic challenge
- **In vitro PBMC response** influenza vaccine/virus and LPS stimulation

Measures of Reserve at Baseline

Physical/Biological Reserve

- Grip strength, 3-min walk test, and usual gait speed
- Biomarkers: TNFR1, sVCAM, miR-376a-3p, miR-16-5p, miR-26b-5p, miR-499a-3p, IL6, Aspartate, Arginine, C22, C5:1, Lactate, Glutamate/Glutamine, Myostatin

Cognitive Reserve

- 3MS, trails A/B, 15 item word list, digit symbol substitution

Psychosocial Reserve

- 25-item psychosocial Resilience Scale, Patient Health Questionnaire-9, and (PROMIS) Emotional Support Instruments

A sneak peek at PRIME-KNEE data

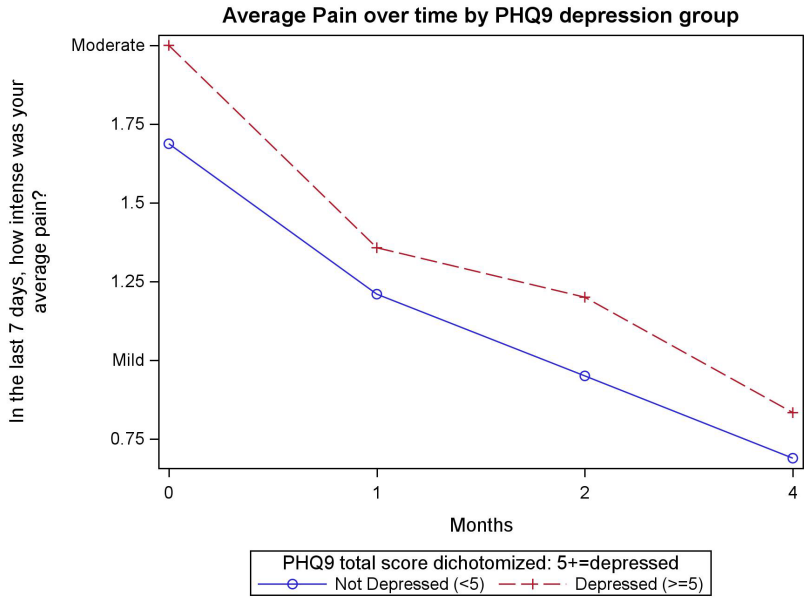
Do self-reported psychosocial measures collected before elective total knee arthroplasty predict pain trajectories in older adults?

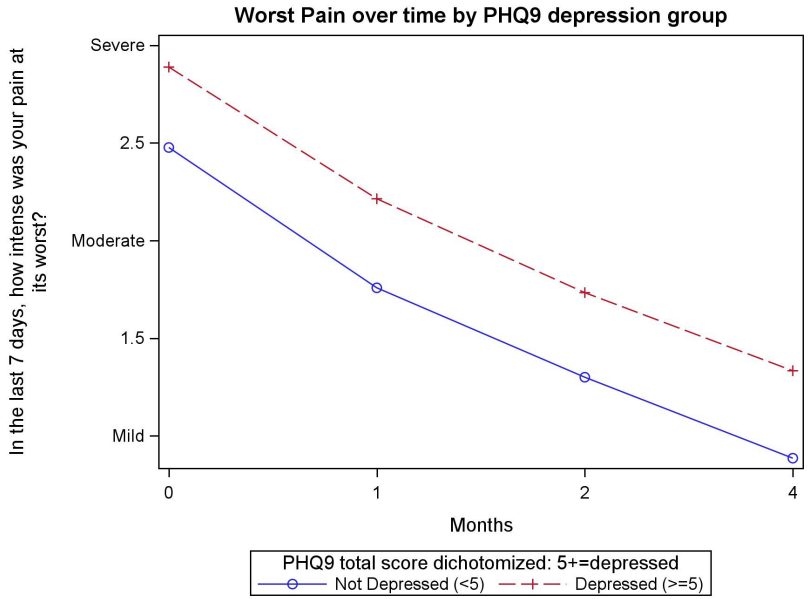
- PHQ9 Depression Scale
- Brief psychosocial resilience scale
- Emotional support questionnaire

Samantha Karle
Duke SoM MS3

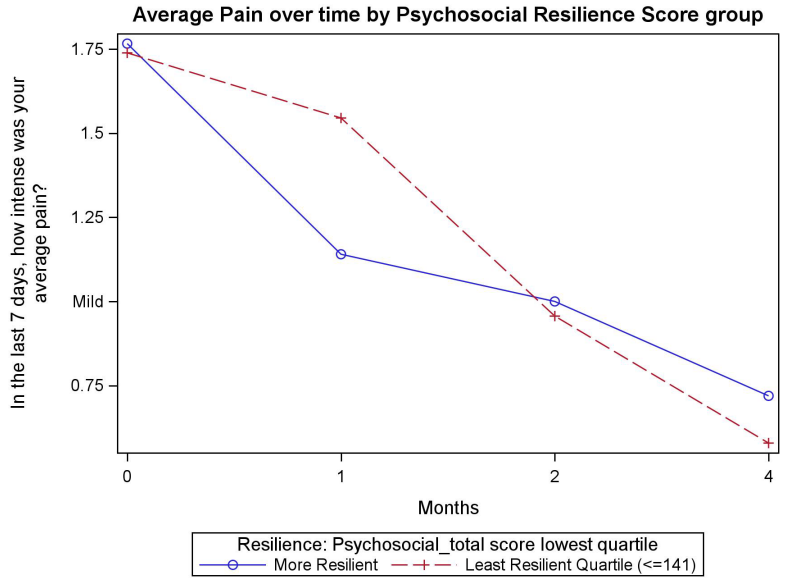
Predicting Pain Trajectories in PRIME-KNEE

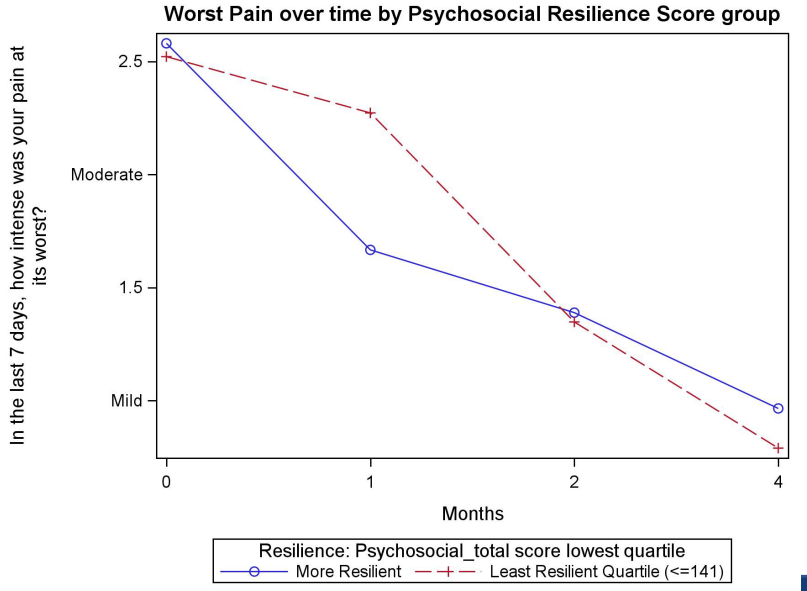
How is pain recovery different for people with depressive symptoms?





How is pain recovery different for people with low psychosocial resilience?





Populations with ongoing resilience research at Duke Aging Center

- Sickle cell anemia
- Hemodialysis
- Glomerulosclerosis
- Rheumatoid arthritis
- Bone marrow transplant
- ECMO
- Osteoarthritis
- Fracture

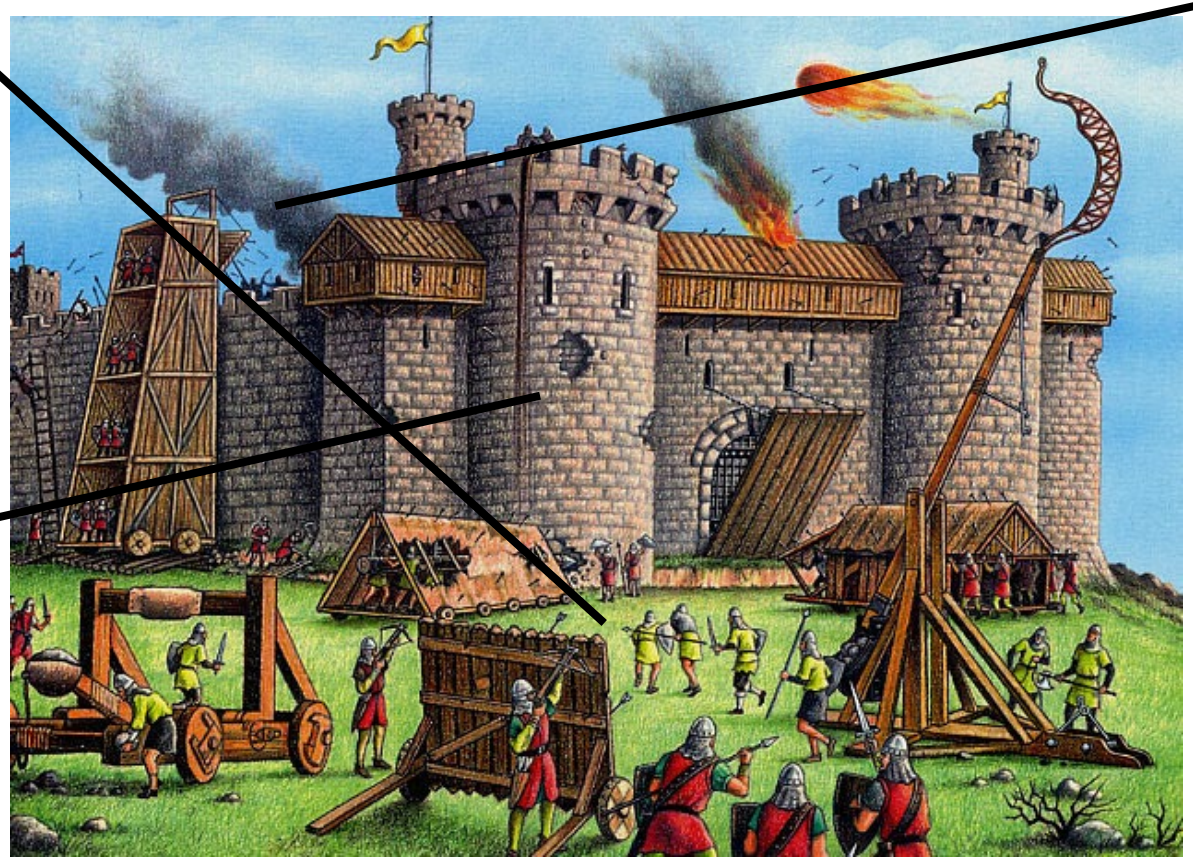
- Alzheimer’s disease/Dementia
- Urinary tract infections
- Vaccination
- Elective abdominal surgery
- Anesthesia/POCD
- Lemurs!

Example #2: Preclinical work to identify mechanisms and druggable targets

Metaphor of the Castle under Siege: Will the Castle Fall?

Strength of attack (magnitude of stressor)

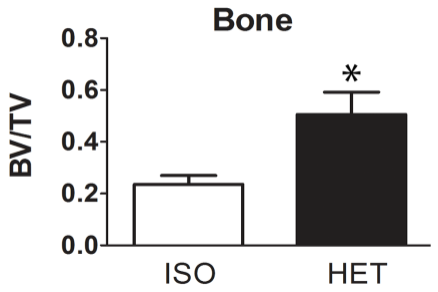
How quickly it can deploy defenses and repair damage (resilience)

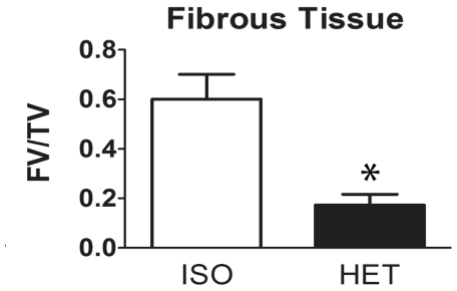


Quality of construction and maintenance over time (reserve)

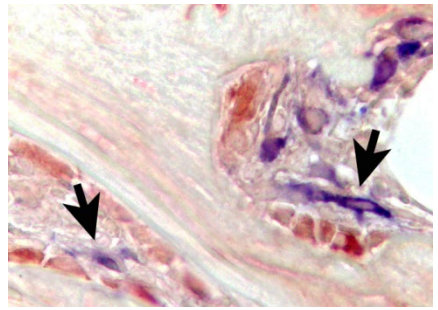
Geroscience Hypothesis: Different cellular and molecular mechanisms may underlie reserve and resilience

Pepper Pilot: Youthful Circulation Rescues Aged Fracture Repair





- Osteoblasts did **NOT** engraft; endogenous aged osteoblasts did the work
- Circulating factor(s) rescue bone repair declines with age
- Apo E is a mediator
- Meteorin-like protein (Metrnl) increases with injury, but was not required for recovery



Baht et. al. (2015). *Nat Comm*
Huang et al (2022) *J Orth Res*

The New York Times

Blood of Young Mice Extends Life in the Old

Infusions of youthful blood led older mice to live 6 to 9 percent longer, a new study found.

3 months of heterochronic parabiosis:

Reduced the epigenetic age of older mouse's blood and liver

- Based on multiple clock models using two independent platforms
- Persisted 2 months after detachment

More youthful transcriptome: Gene expression changes opposite to aging but akin to several lifespan-extending interventions

Longer lifespan

James White, …Gurpreet Baht, et al. *Nature Aging* 2023

Example #3: STRIDE and GeroFit

Interventions to support resilience

A Practical Resilience Intervention: STRIDE

Supervised Walking Program Developed in Hospitalized Veterans

Importance of Mobility

Hospitalized older adults spend only **3-4%** of their time standing or walking during their stay

10 days of bed rest for healthy adults in a hospital can result in up to **1kg (2.2 lbs.)** of muscle mass loss.

The STRIDE Program

STRIDE conducts an early assessment of the Veteran within **24 hours** of hospital admission so their mobility needs are addressed quickly.

Veterans who are eligible to participate are guided by trained staff to walk up to **20 minutes a day** for the duration of their stay.

193

Total number of walks with the STRIDE program at the Michael E. DeBakey VAMC.

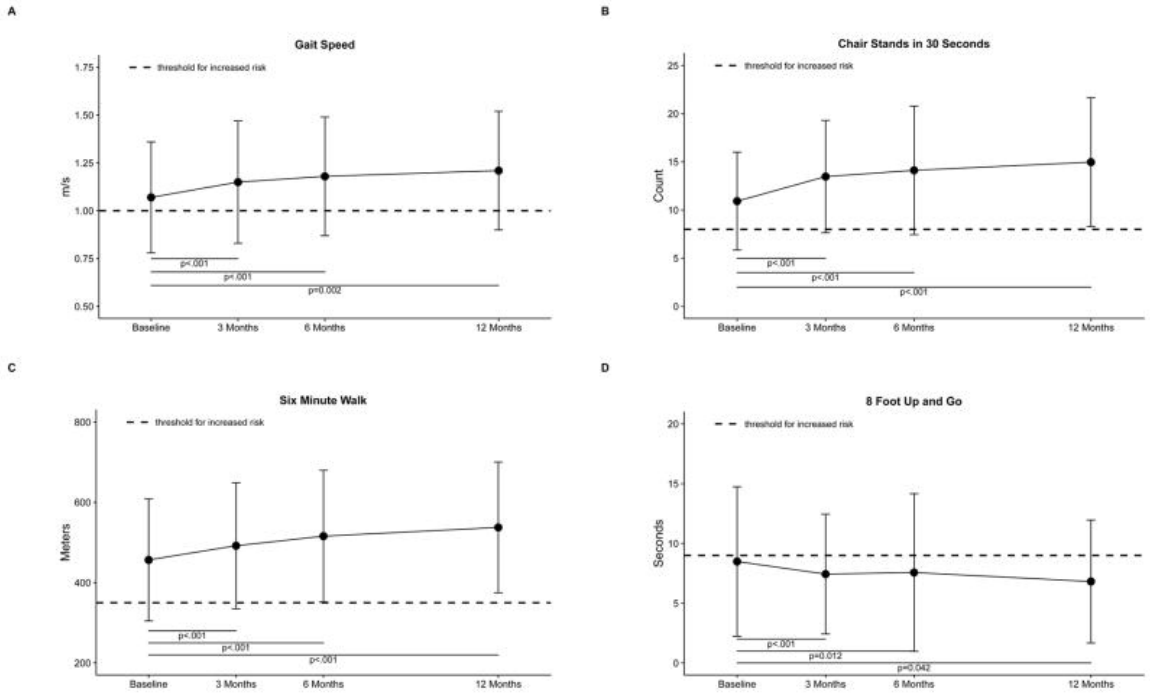
100% reported feeling better or the same after their walk.

Hastings et al. *Geriatrics (Basel)* 2018

Ultimate Reserve-Building, Resilience-Promoting Intervention: Physical Activity

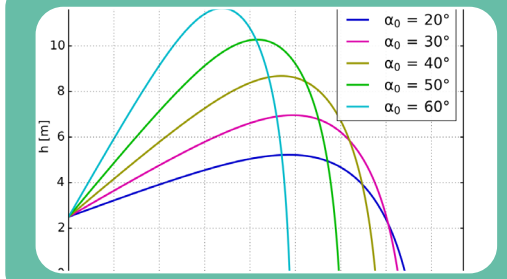
GEROFIT
VETERANS IN ACTION!

Improving Reserve with 12 months of Gerofit



Morey MC et al. *J Amer Geriatri Soc* 2018

Goal: Promoting Resilience Before and During Health Stressors



Predict Recovery Trajectory

- Clinically feasible provocative tests
- Biomarkers

Current Interventions

- “Prehabilitation”/Exercise
- Decision support tools

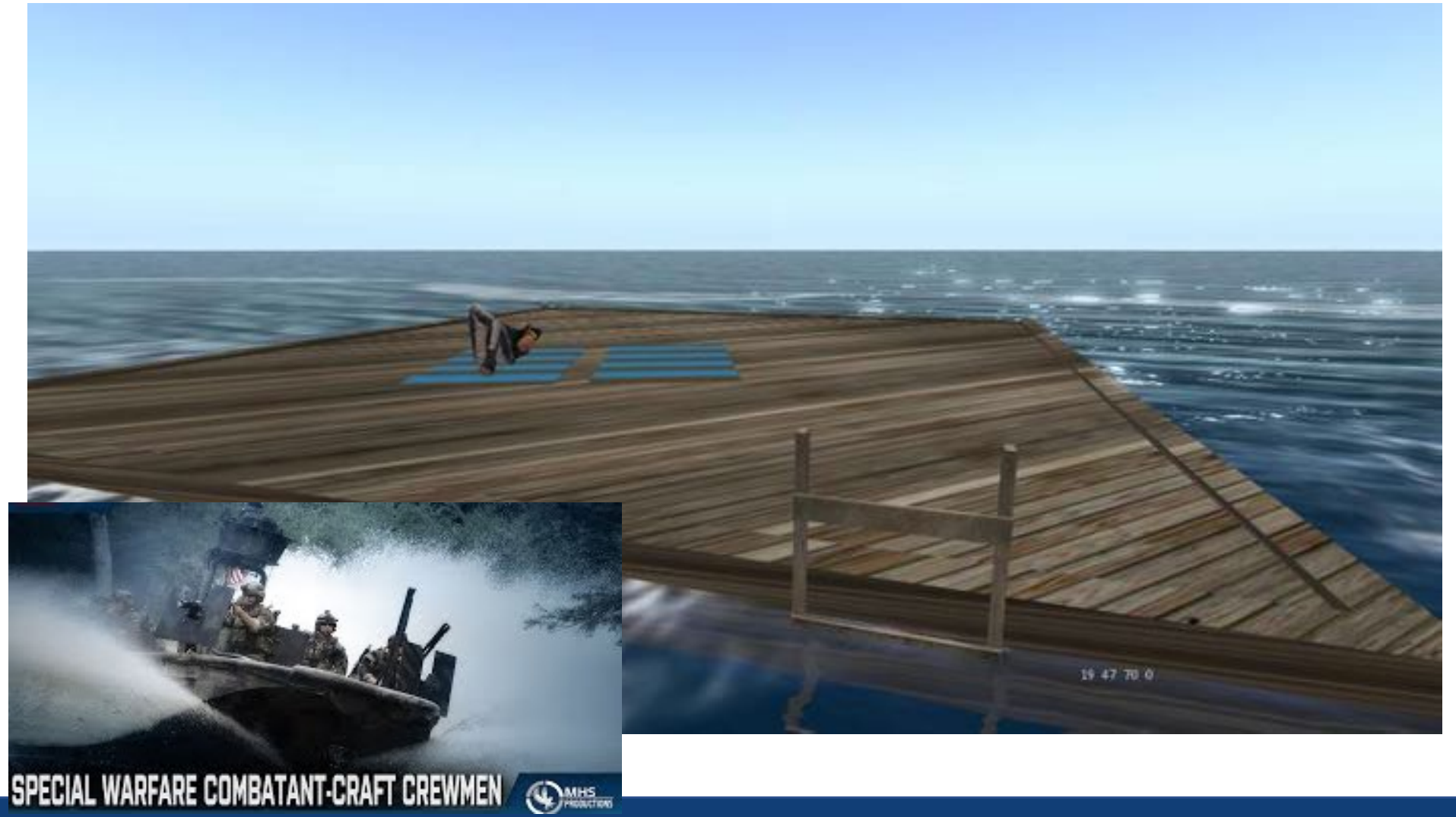
Nutrition
Psychosocial support

Future Interventions

- Resilience in a pill?

The Era of Resilience Medicine

Motivating Patients toward Resilience: The Platform Metaphor



An Invitation to Get Involved

Conference #2 will focus on **mechanisms and predictors** of resilience to health stressors.

It will occur in DC area in March 2024

WANT TO BE PART OF IT?
Look for a call late November for applications for Rising Star travel awards to attend!!

DOI: 10.1111/jgs.18388

SPECIAL ARTICLE

Journal of the
American Geriatrics Society

An overview of the resilience world: Proceedings of the American Geriatrics Society and National Institute on Aging State of Resilience Science Conference

Peter M. Abadir MD[1] | Karen Bandeen-Roche PhD[1] | Cindy Bergeman PhD[2] | David Bennett MD[3] | Daniel Davis PhD, MRCP[4] | Amy Kind MD, PhD[5] | Nathan LeBrasseur PhD, MS[6] | Yaakov Stern PhD[7] | Ravi Varadhan PhD[1] | Heather E. Whitson MD, MHS[8,9]

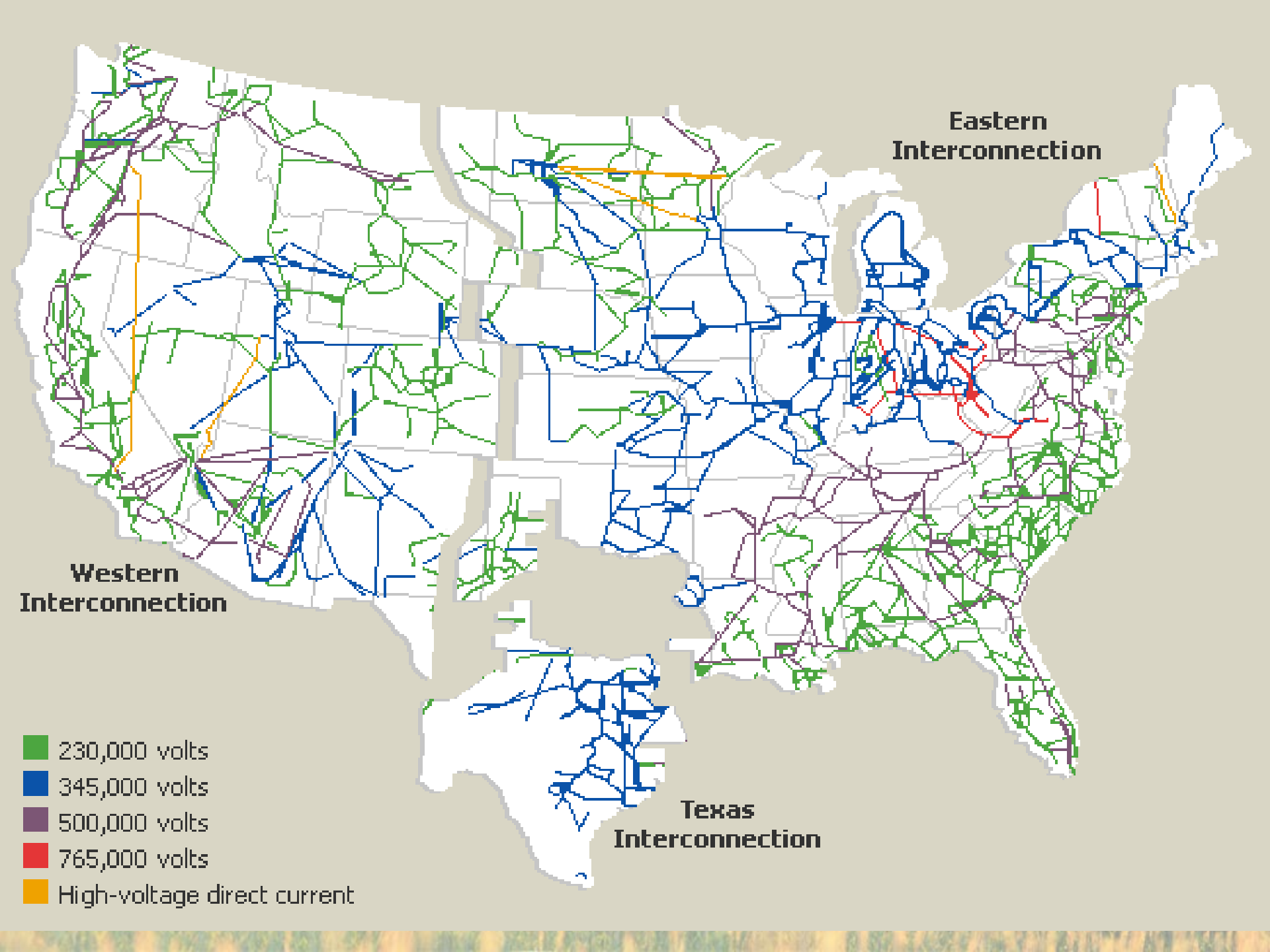
Thank you and Questions

Duke Collaborators:
Cathleen Colon-Emeric, Ken Schmader, Kim Huffman, Bill Kraus, Virginia Kraus, James Bain, Micah McClain, Miles Berger, Marty Woldorff, Daniel Parker, Janet Huebner, Harvey Cohen, Miriam Morey, Carl Pieper, Rick Sloane, Mary Cooter, Jody Feld, Patrick Smith, Katherine Hall, Leah Acker
U. Maryland Collaborators:
Jay Magaziner, Denise Orwig, Ann Gruber-Baldini
U. Connecticut Collaborators:
George Kuchel
Harvard Collaborators:
Lew Lipsitz, Junhong Zhou
Johns Hopkins Collaborators:
Peter Abadir, Jeremy Walston, Karen Bandeen-Roche, Ravi Varadhan
NIA Collaborators: Giovanna Zappala, Basil Eldadah, Chhanda Dutta, Laverne Brown

Case-based Studies in Resilience

Rocky Mountain Geriatrics Conference
September 26, 2023
Discussion Lead:
Rand Rupper, MD, MPH

System Failure


Eastern
Interconnection
Western
Interconnection
Texas
Interconnection
230,000 volts
345,000 volts
500,000 volts
765,000 volts
High-voltage direct current

Case Study

- You are seeing a 73 year-old Vietnam Veteran in a primary care geriatric clinic. You have known this patient for at least the past five years, when the patient transferred to your clinic because of memory concerns.
- You discovered some short-term memory loss that the patient is able to compensate for in daily function. This has been stable over the time that you have been seeing this patient.

Case Continues

- The patient informs you that life became more challenging when his wife underwent knee surgery 3 months ago. Her recovery is taking longer than they expected. His wife normally accompanies him to clinic but she couldn't join today.
- His sleep has been more interrupted, and he tells you that for the first time in his life he occasionally has nightmares reflecting his war-time experiences.

Discussion

- What thoughts are you having about this patient's resilience?
- What about his wife's resilience?
- What are the stressors that are testing resilience?

Case Continues

- He let's you know that his wife had an option to go to a skilled facility for rehabilitation, but really just wanted to be at home. She has been getting home physical therapy, and within the last week has been able to manage the stairs to her upstairs bedroom.
- He thinks that his sleep will improve when they are able to sleep together upstairs again.

Case Continues

- You notice that he has lost 6 pounds since his visit 6 months ago.
- When you ask about this, he tells you that his wife had previously been doing all of the cooking, but that he has taken this over after her surgery.
- His daughter lives 30 minutes away and has been visiting weekly to drop off groceries and freezer meals.
- Neighbors have offered to help, but they have declined so far?

Discussion

- What protective factors are you seeing?
- What risk factors are you seeing?
- What else do you really want to know?

Case Continues

- When you examine the patient, you notice that he has some swelling in his ankles that you have not noticed previously.
- What are your thoughts about this finding?
- What tests or interventions might you suggest to address this?

Case Continues

- You encourage the patient to accept more help from neighbors to improve diet/nutrition.
- You proceed with some work-up for heart and kidney failure, but this is unremarkable.
- You encourage the patient to be more physically active.
- You encourage the patient to sleep in bed and not in a reclining chair.
- You ask the patient to follow-up in 3 months and to bring his wife if she is able.

Discussion

- What do you like about these provider suggestions as related to a framework for resilience?

- What else would you like to add?

The Case Continues (3 months later)

- When the patient returns, his wife is with him. She states that she is feeling better, and shares with you that her rationale for rehabbing at home was to not leave the patient alone at home.
- With her knee repaired, she is now able to resume all of her prior function, and is even excited to grow a garden again after three years of not being able to kneel to do gardening.

Case Continues

- Your patient has gained back three pounds and his edema has resolved.
- When you repeat cognitive testing, his scores are between 5 to 10% lower than a year ago.
- Although he feels his sleep has generally improved, he is still having nightmares a few times a month. He is puzzled about why this is happening now, and wants you to know that he is not trying to qualify for new benefits.

Discussion

- What do you think about the patient's resilience within the following domains?
  - Physical
  - Cognitive
  - Psychosocial
- What do think about the wife's resilience within these domains?
- What do you think about their resilience as a dyadic couple?

Looking forward

- Can steps be taken now to improve their resilience as:
  - Patients
  - Caregivers
  - A dyad

TECHNOLOGY-BASED SOLUTIONS FOR PATIENTS AND CARE PARTNERS

Cathy Bodine PhD, CCC-SLP
Professor | Department of Bioengineering/School of Medicine
Coleman-Turner Endowed Chair in Cognitive Disabilities
Executive Director, Coleman Institute for Cognitive Technologies
University of Colorado System
Director | Center for Inclusive Design and Engineering (CIDE)
Director, Innovation Ecosystems, Colorado Clinical Translational Sciences Institute

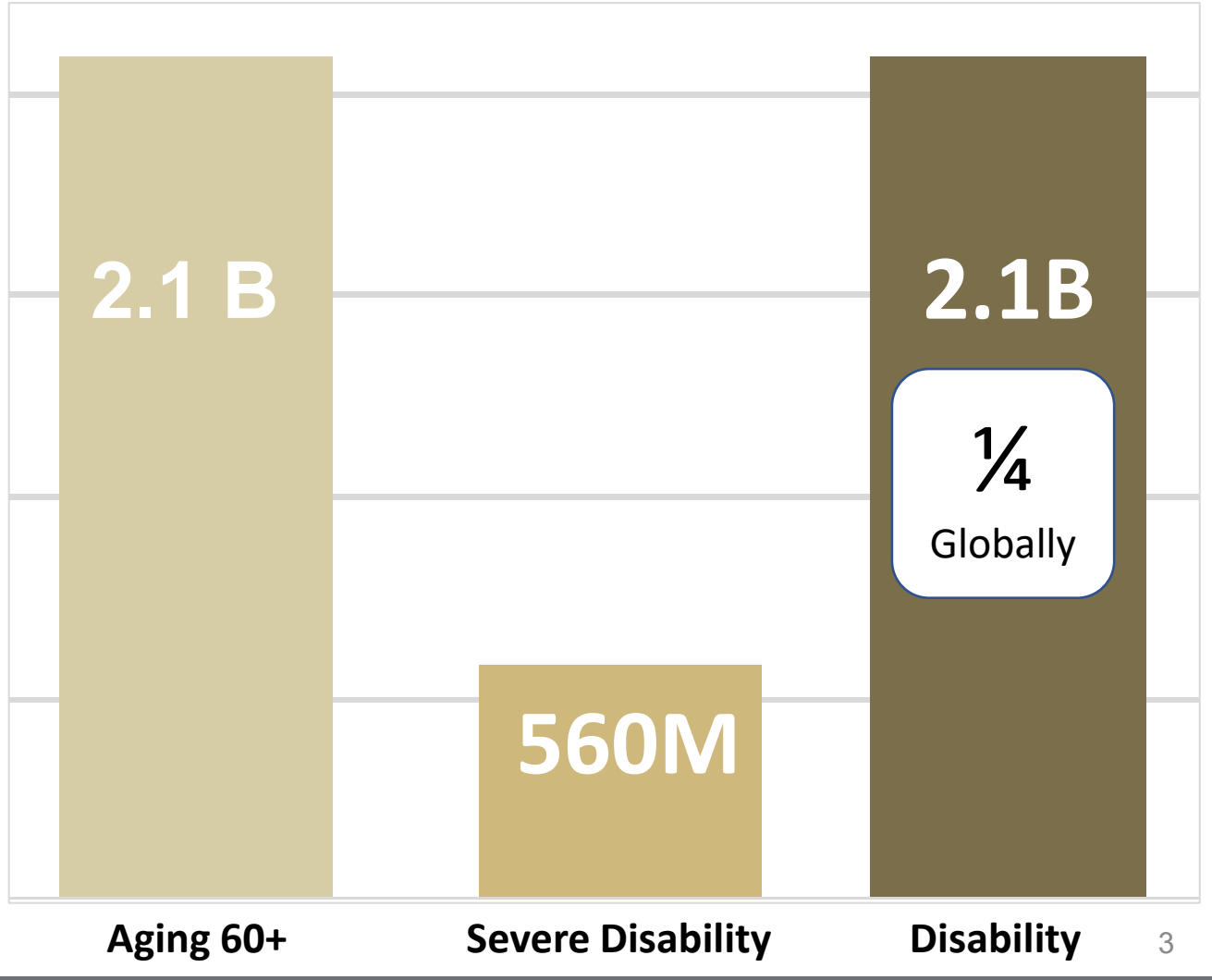
THE GRAND CHALLENGE

Over a billion people around the world live with a disability.

THE GRAND CHALLENGE

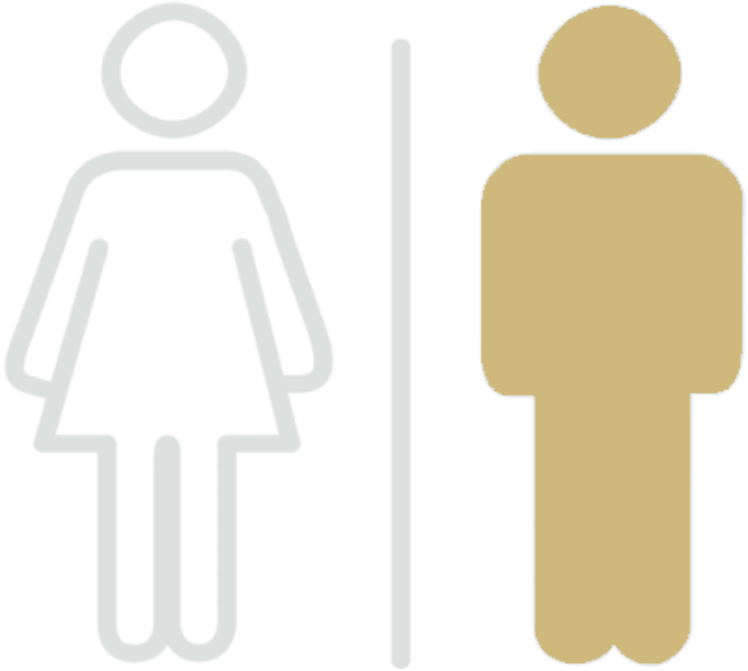
That number will double in less than 30 years.

Global Growth By 2050



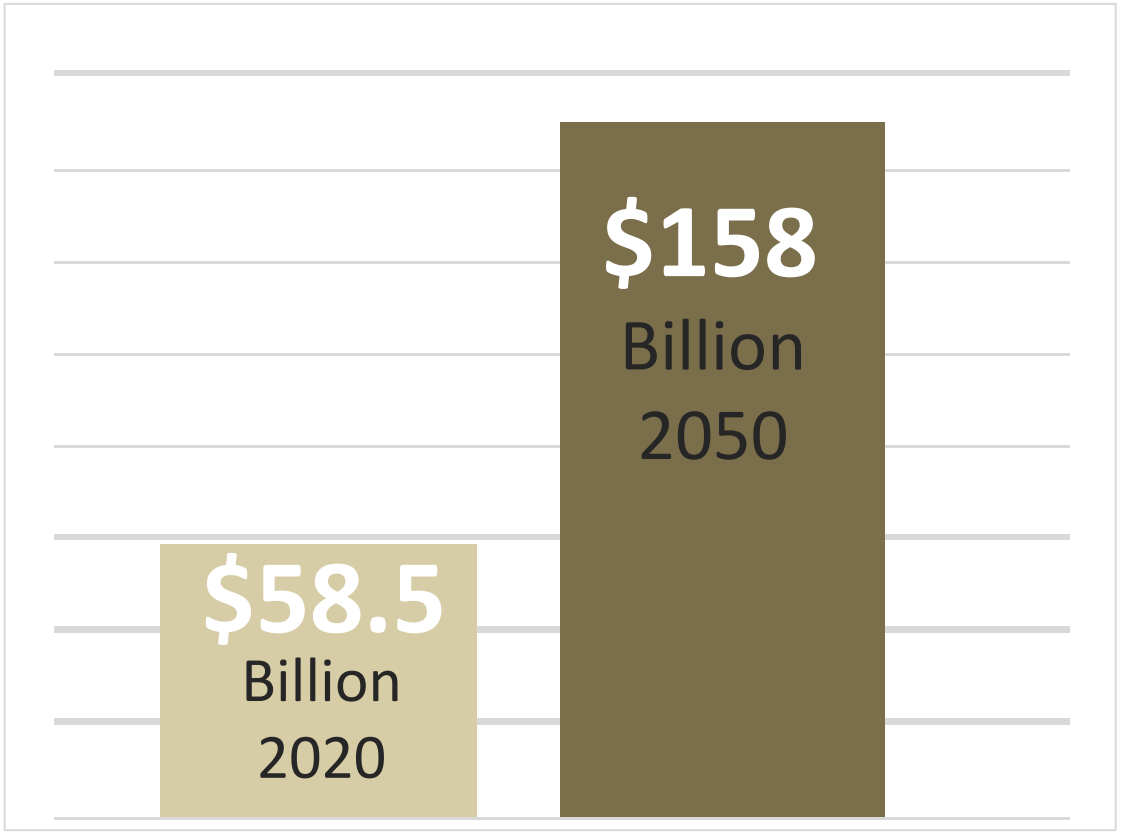
DEMAND FUELS INNOVATION

Cognition, Vision, Hearing, Mobility



1-in-2

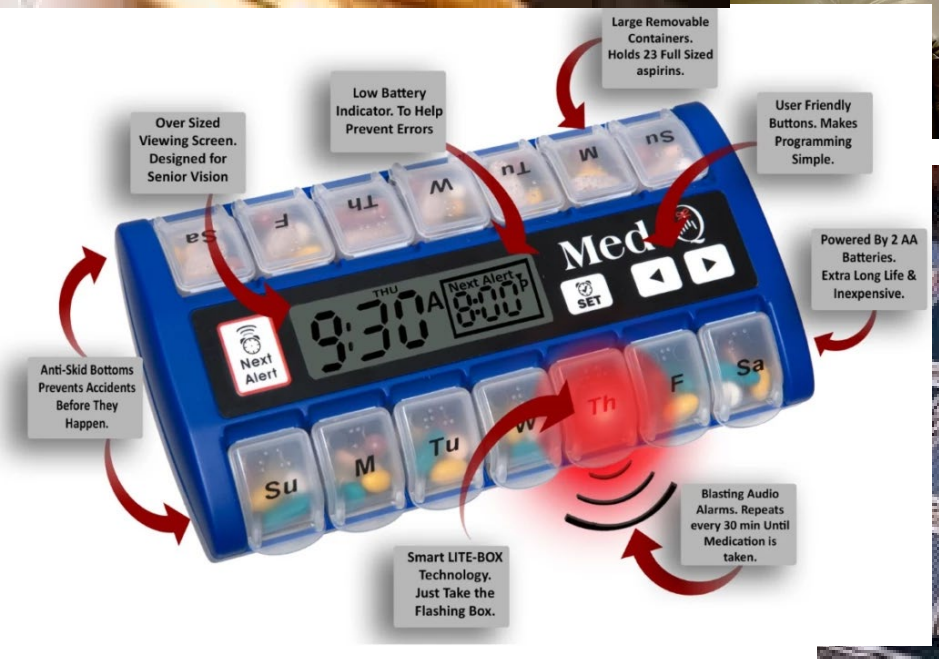
Exponential growth



Disability Technology

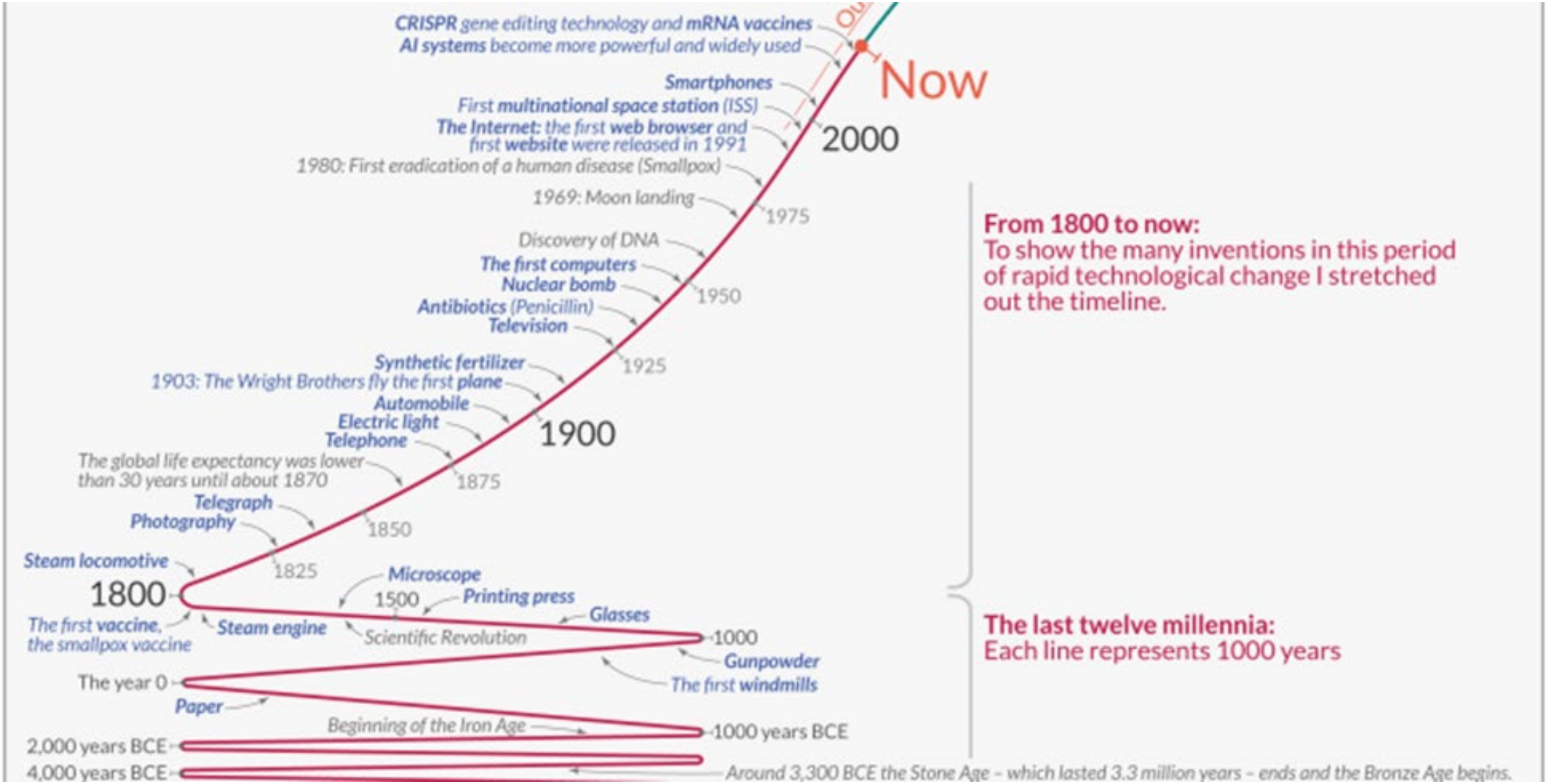
Sources: WHO world report on disability, BCC research

Would you like to use this product?



Who are older people anyway?

Who says older adults are afraid of innovation?



Gaps and Opportunities

Key Areas to support older adults:

- **Smart City/Smart Home**
- **Equitable Transportation**
- **Point-of-Care Technology**
- **Social Assistive Robotics**
- **Artificial Intelligence/Machine Learning**

CU – a Global Destination for Disability and Aging Innovation

CIDE

Coleman Institute

CU Denver/Anschutz

Industry partners

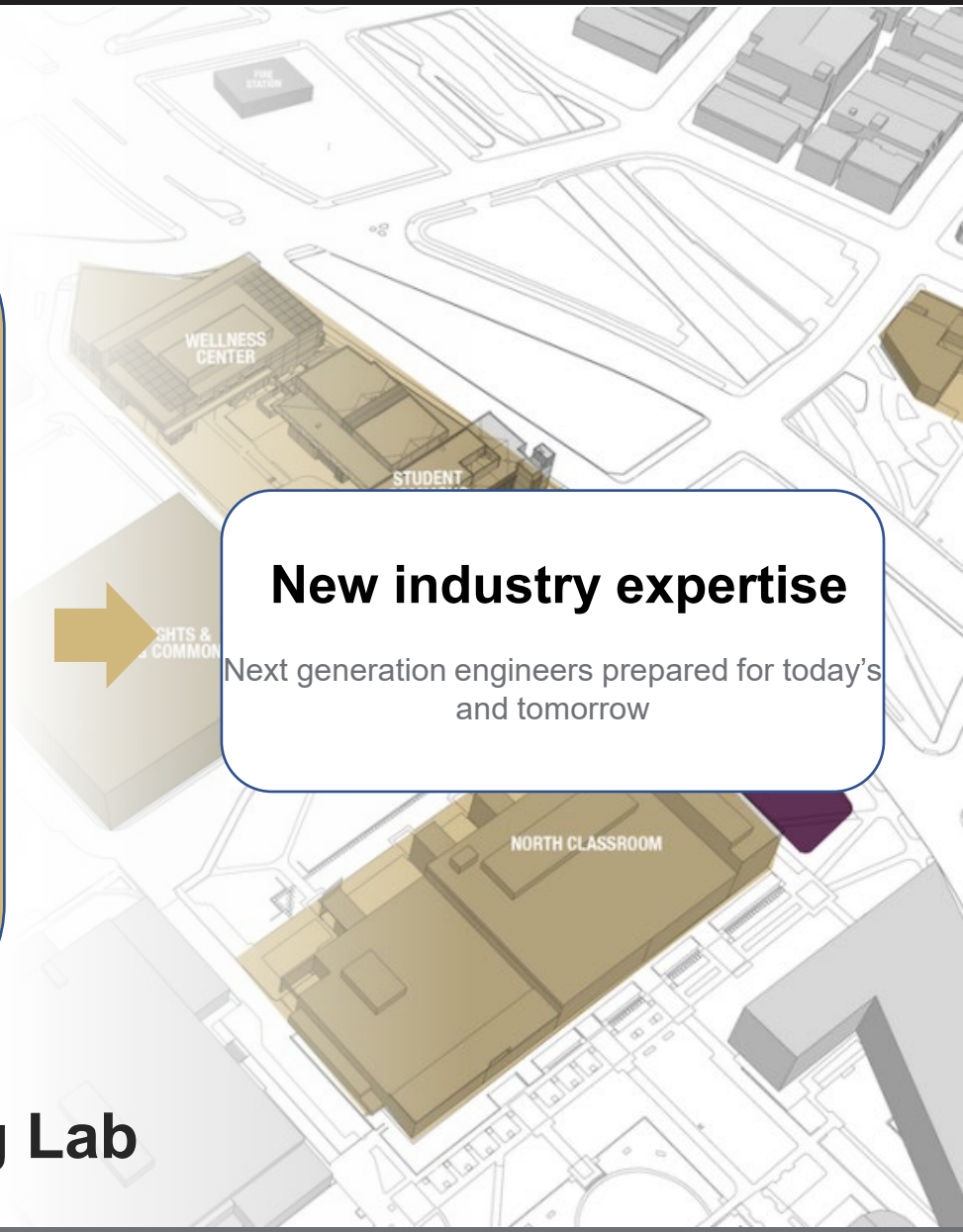
Medtronic

NATIONAL SEATING & MOBILITY

Microsoft

Global Technology Research and Data Science Center

- ✓ Innovative
- ✓ Partner-driven
- ✓ Entrepreneurial
- ✓ Human Centered
- ✓ Focused on Commercialization



New industry expertise

Next generation engineers prepared for today's and tomorrow

Innovation District / Living Lab

Putting it all together

Must haves for successful deployment:

+ Human Centered--User-centered design
+ Clinical expertise
+ Industry partnerships
+ Access to the disability and aging community
+ Industry Testbed
+ Co-Development

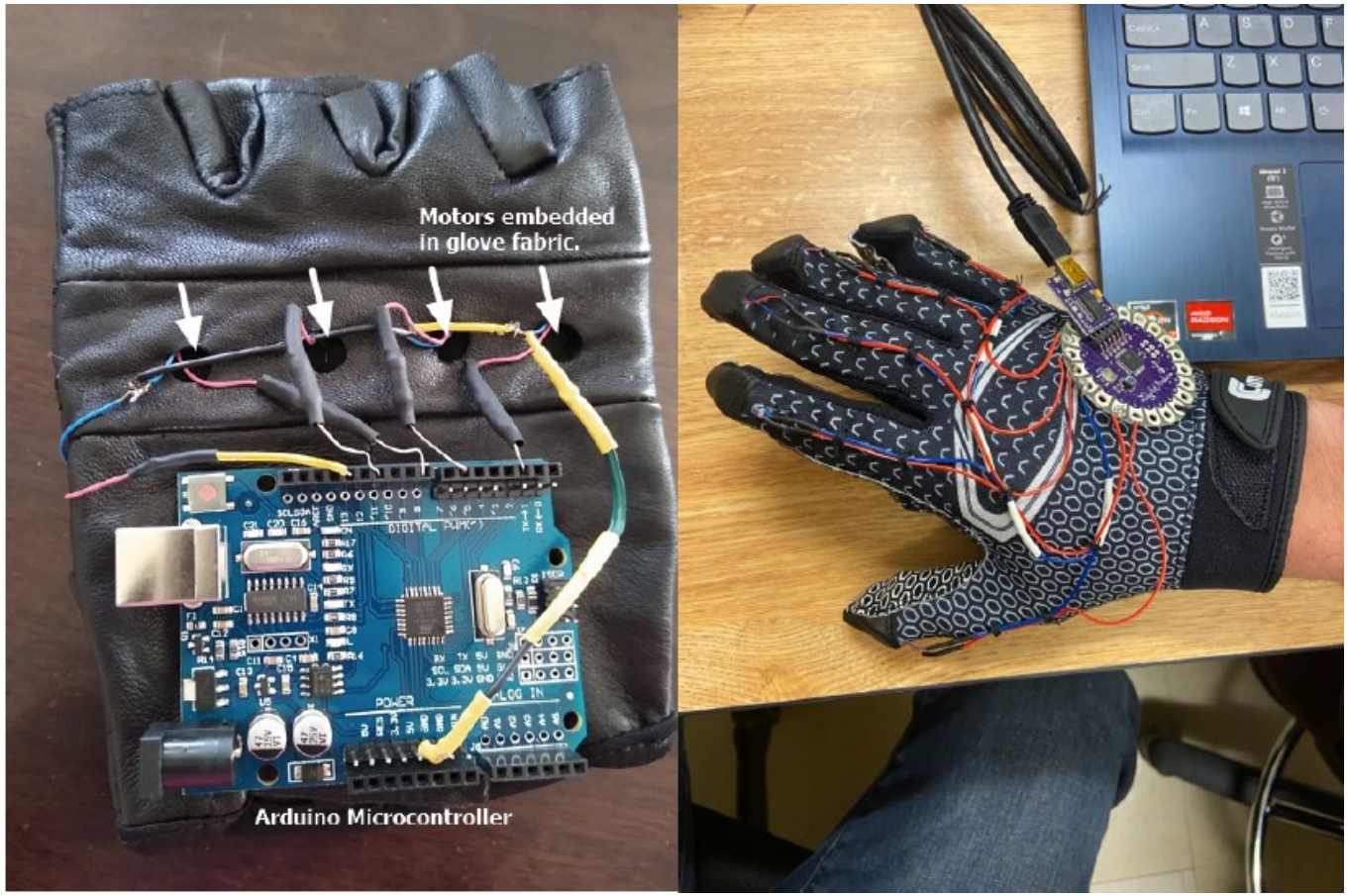
Older Adult Research Specialists (OARS), NIH R24, Dr. Kady Nearing, PI

Have graduated from an intensive training course focused On supporting research faculty with their projects.

Phase I Development Winner

Project:
Feasibility trial of Vibrotactile Stimulation to Entrain 40 Hz Gamma Oscillation for Alzheimer's disease

Team:
Mazen Al Borno, PhD (PI)
Brice McConnell, MD, PhD
Peter Teale
Zhengxiong Li



Partner:

Center for Inclusive Design and Engineering (CIDE)
CELEBRATING 25 YEARS

Coleman Institute for Cognitive Disabilities
UNIVERSITY OF COLORADO
Boulder | Colorado Springs | Denver | Anschutz Medical Campus

Phase II Development Winner

Project:
PointItOut: Grocery Shopping Independence for Mild-to-Moderate Disabilities via Augmented Reality-enabled Destination Visualization

Team:
Bing Han, PhD (PI)
Jim Sandstrum, SLP
Kendall Hunter, PhD
Caroline Clevenger, PhD, PE, AIA

Partner:

Center for Inclusive Design and Engineering (CIDE)
CELEBRATING 25 YEARS

Coleman Institute for Cognitive Disabilities
UNIVERSITY OF COLORADO
Boulder | Colorado Springs | Denver | Anschutz Medical Campus

Phase II Development Winner

Project:
Innovative and Stylish Mobility Devices to help in the Prevention of Alzheimer's Disease

Team:
Petra Conaway, DPT (PI)
Dana Carpenter, PhD
Dan Griner

Partner:

MOBELLA

Coleman Institute for Cognitive Disabilities
UNIVERSITY OF COLORADO
Boulder | Colorado Springs | Denver | Anschutz Medical Campus

Thank you!

Cathy Bodine PhD, CCC-SLP (she/her)

303.315-1281 | **303.513.8396**

cathy.bodine@cuanschutz.edu

Associate Professor | Department of Bioengineering

CCI Endowed Professorship

University of Colorado Denver | College of Engineering, Design and Computing

Executive Director | Coleman Institute for Cognitive Disabilities

Coleman Turner Endowed Chair in Cognitive Disabilities

Director | Center for Inclusive Design and Engineering (CIDE)

Associate Professor | Departments of Pediatrics, Physical Medicine and Rehabilitation, and Orthopedics

Director, Innovation Ecosystems, Colorado Clinical Translational Sciences Institute

The Hear and Know: Presbycusis, Cognition, and Cochlear Implants in Older Adults

Thoughts by
Richard K. Gurgel, MD, MSCI
Associate Professor – Otolaryngology

59th Western Intermountain Neurological WINO Organization Conference 2023

DISCLOSURES

- Research funding:
  - NIH/NIA - 1 R21 AG067403-01A1
  - Center on Aging Pilot Grant

- Surgical Advisory Board: Med-El

- Industry: Institutional Research Funding from Cochlear Corp and Advanced Bionics

INTRODUCTION OF TEAM





- Ankita Date (UPDB), Mike Newman (EDW), Tom Belnap (IHC), Alison Fraser (UPDB)

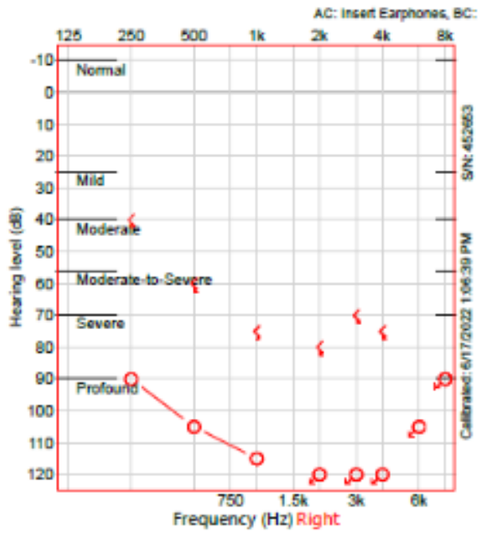
CASE PRESENTATION

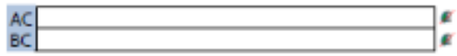
- 84 y/o woman
- Bilateral hearing loss for 20 years
- Can't communicate with family
- PMHx:
  - Dementia NOS
  - Breast cancer (remission)
  - HTN, Heart failure (mild) with h/o MI
  - OSA

Report Date: 10/26/2022

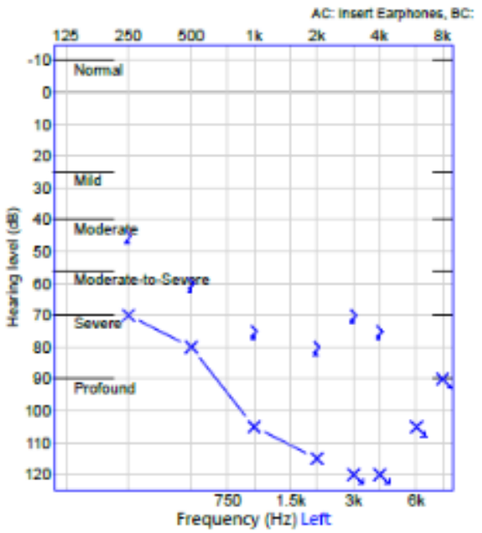
UNIVERSITY OF UTAH

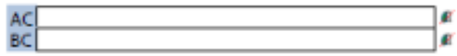
RIGHT 10/26/2022





LEFT 10/26/2022





PTA (dB HL) / AI (%)

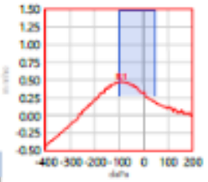
	AC	BC	AI
Right			
Left			

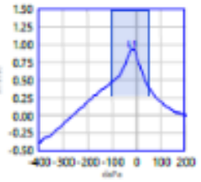
PTA AC: 500, 1k, 2k, 3k
PTA BC: 500, 1k, 2k, 3k

Legend

L	R	Masked
X	O	AC
>	<	BC
S	S	SF
M	M	MCL
U	U	UCL
↘	↙	NR

Immittance 10/26/2022





Tymp	Right
Tone	226 Hz
SC	0.5 ml
TPP	-86 daPa
ECV	1.9 ml
TW	210 daPa
Type	A

Tymp	Left
Tone	226 Hz
SC	0.9 ml
TPP	-17 daPa
ECV	1.6 ml
TW	142 daPa
Type	A

Speech	SDT		SRT		WRS / SRS 1				WRS / SRS 2				MCL	UCL
	dB HL	[m]	dB HL	[m]	%	dB HL	[m]	S/N	%	dB HL	[m]	S/N	dB HL	dB HL
Right			~~CNT~~	CNT										
Left			80		CNT	~~CNT~~	CNT	CNT						
Bin														
Note	[1] NU-6 List 3A				[2]									
Aided														
Note	[1]				[2]									

Reflex	Threshold (dB HL)					Decay (s)	
	500	1k	2k	4k	BBN	500	1k
R Ipsi	~~110~~	~~110~~	~~110~~				
L Ipsi	~~110~~	~~110~~	~~110~~				
R Contra							
L Contra							

Stimulus Ear

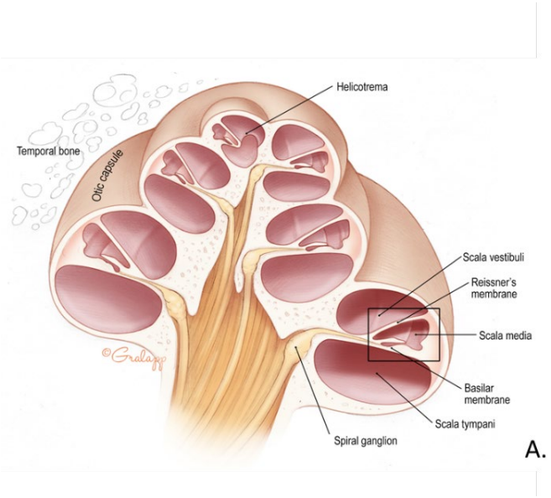
Probe tone: 226 Hz

QUESTIONS

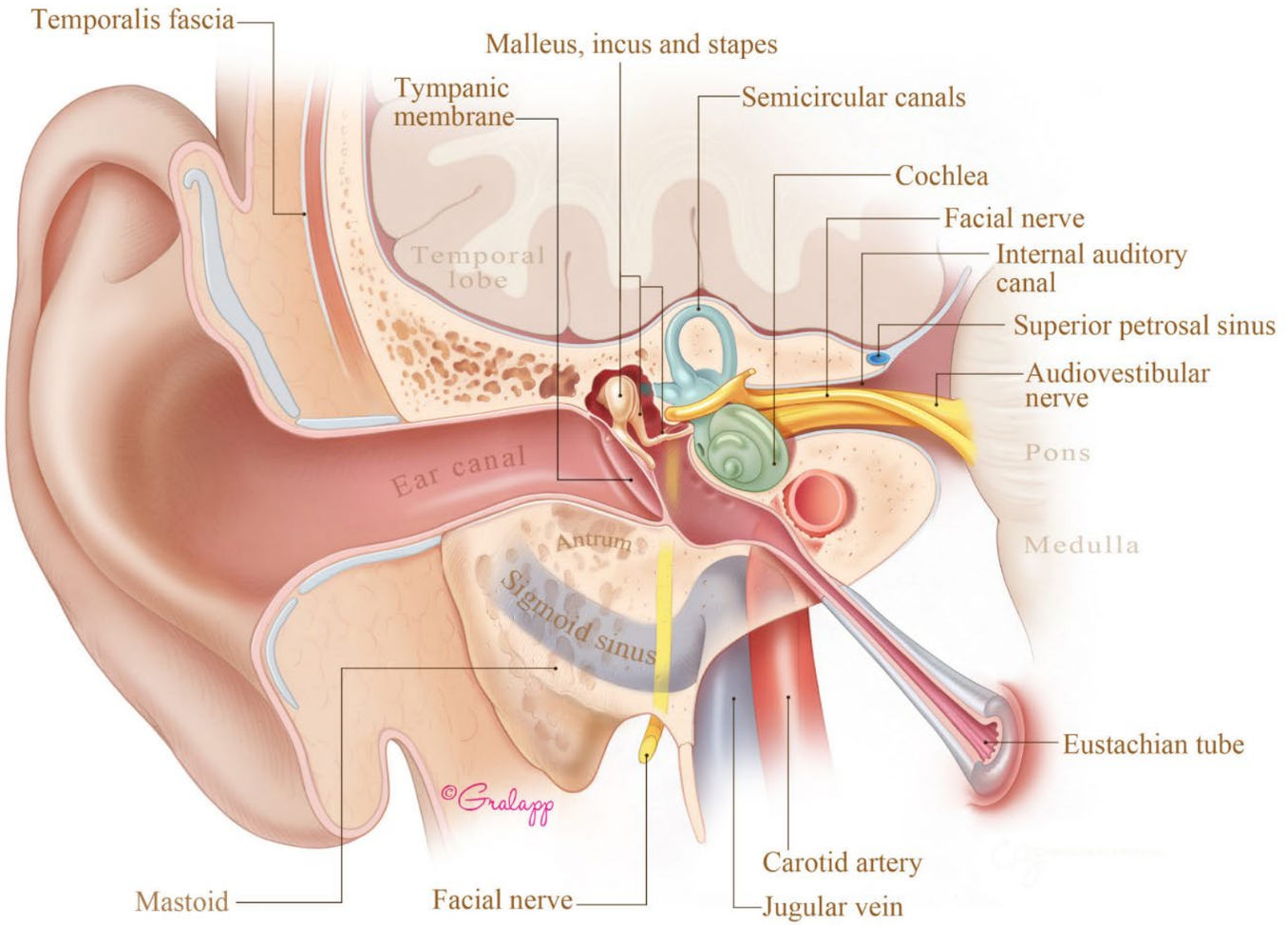
- Did her hearing loss cause her dementia (or is her "dementia" just hearing loss)?
- Would you offer a cochlear implant to this patient?

OVERVIEW

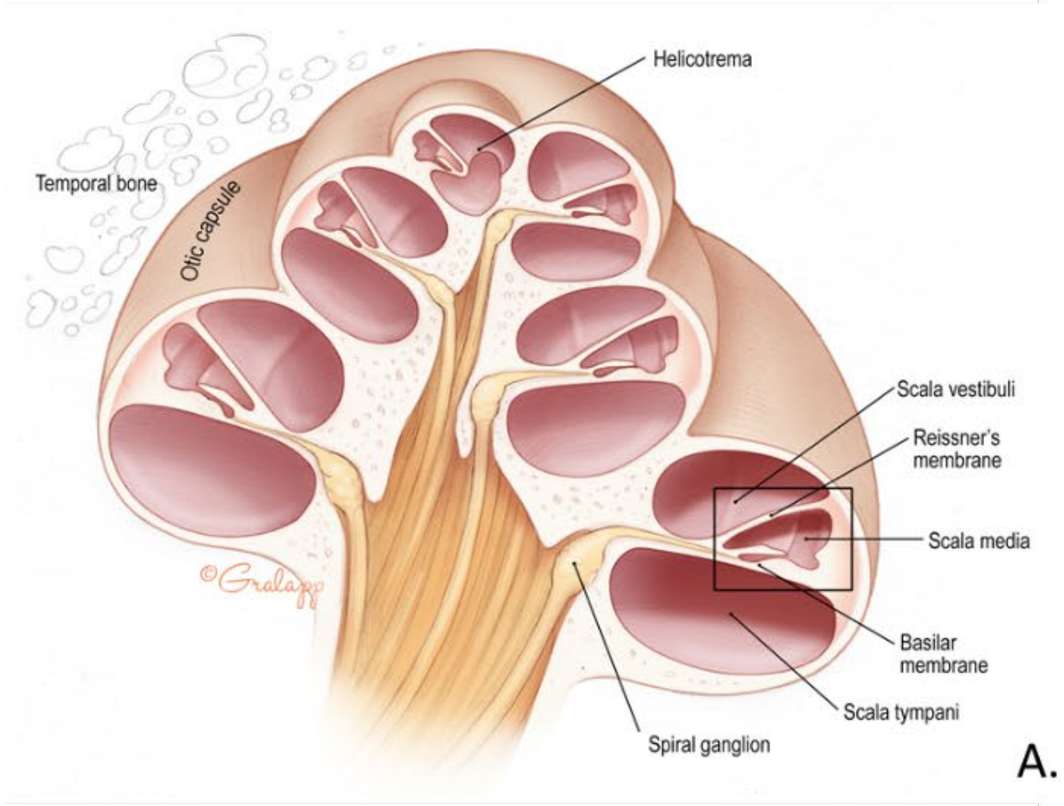
- Hearing Loss and Dementia
- Frailty
- Cochlear implants, cognition, and quality of life

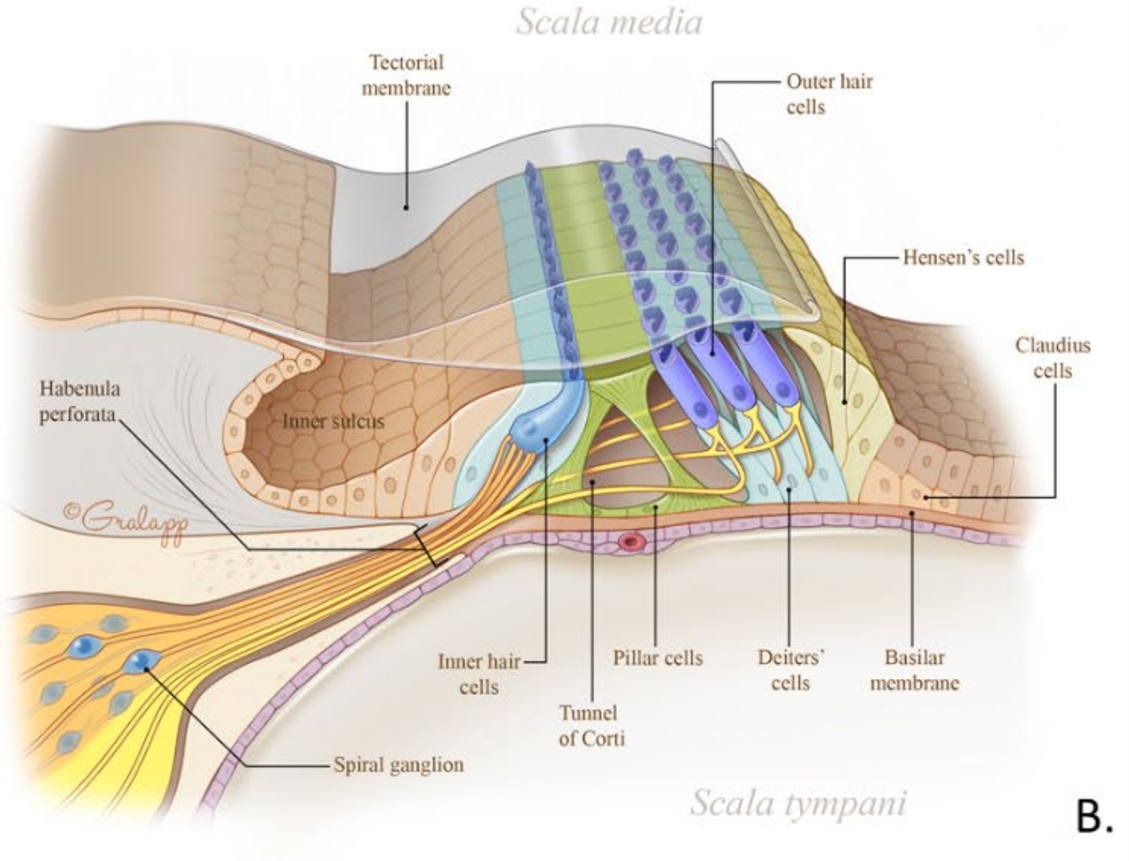


HOW WE HEAR

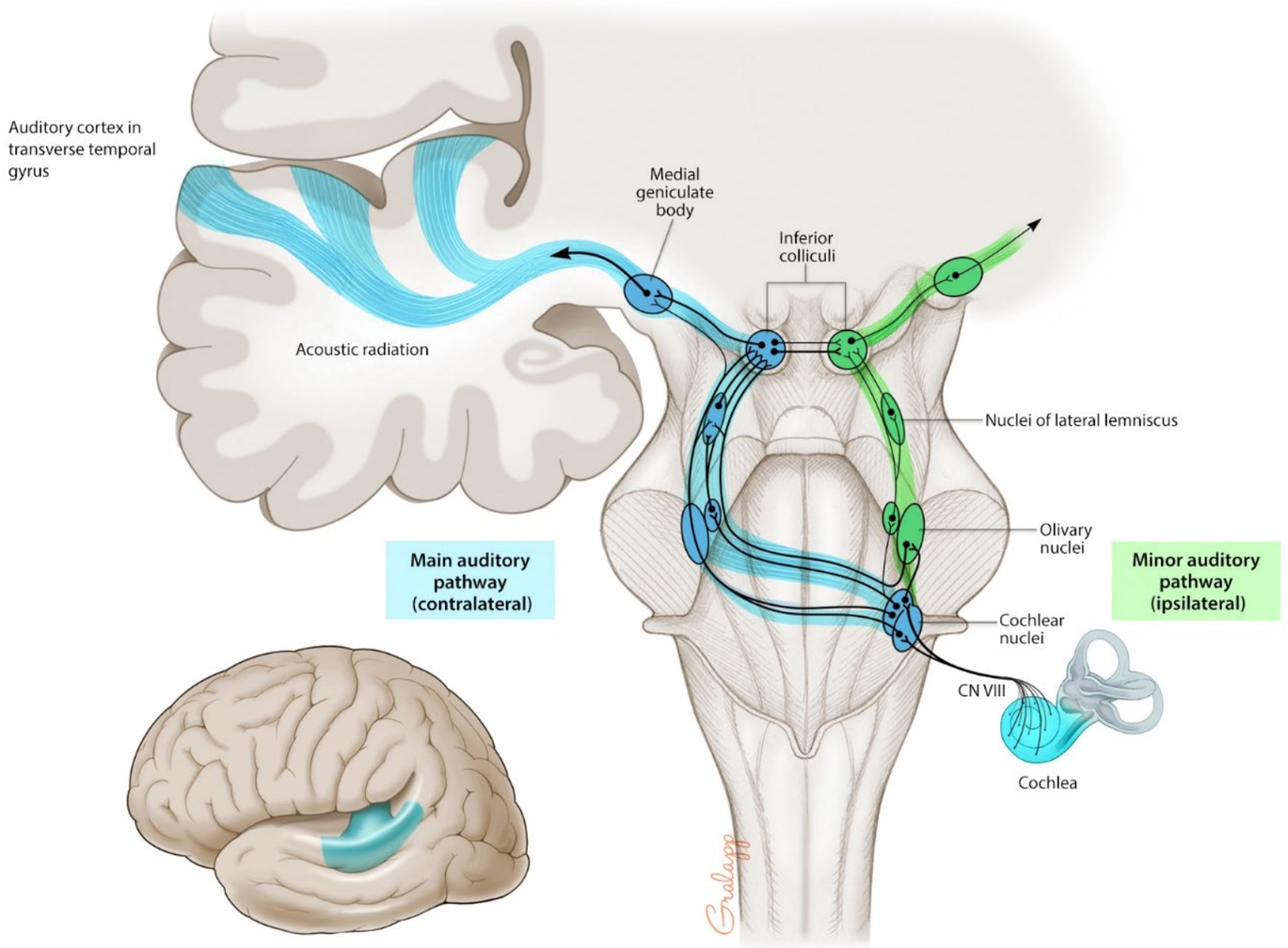


COCHLEA





CENTRAL PATHWAYS



HEARING LOSS AND DEMENTIA

ORIGINAL ARTICLE

Central Auditory Dysfunction as a Harbinger of Alzheimer Dementia

George A. Gates, MD; Melissa L. Anderson, MS; Susan M. McCurry, PhD; M. Patrick Feeney, PhD; Eric B. Larson, MD, MPH

Neuropsychology
2011, Vol. 25, No. 6, 763–770

DOI: 10.1037/a0024238

Hearing Loss and Cognition in the Baltimore Longitudinal Study of Aging

Frank R. Lin
Hopkins University

Luigi Ferrucci, E. Jeffrey Metter, Yang An,
Alan B. Zonderman, and Susan M. Resnick
National Institute on Aging, Baltimore, Maryland

ORIGINAL INVESTIGATION

ONLINE FIRST

Hearing Loss and Cognitive Decline in Older Adults

Frank R. Lin, MD, PhD; Kristine Yaffe, MD; Jin Xia, MS; Qian-Li Xue, PhD; Tamara B. Harris, MD, MS; Elizabeth Purchase-Helzner, PhD; Suzanne Satterfield, MD, DrPH; Hilsa N. Ayonayon, PhD; Luigi Ferrucci, MD, PhD; Eleanor M. Simonsick, PhD; for the Health ABC Study Group

Relationship of Hearing Loss and Dementia: A Prospective, Population-Based Study

*Richard Klaus Gurgel, *Preston Daniel Ward, †Sarah Schwartz, †‡§Maria C. Norton, ||Norman L. Foster, and †§JoAnn T. Tschanz

Laryngoscope Investigative Otolaryngology

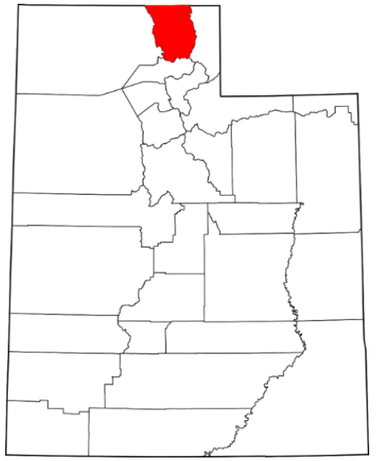
Hearing Loss as a Risk Factor for Dementia: A Systematic Review

Rhett S. Thomson, BA; Priscilla Auduong, MD; Alexander T. Miller, BS; Richard K. Gurgel, MD

Relationship of Hearing Loss and Dementia: A Prospective, Population-Based Study

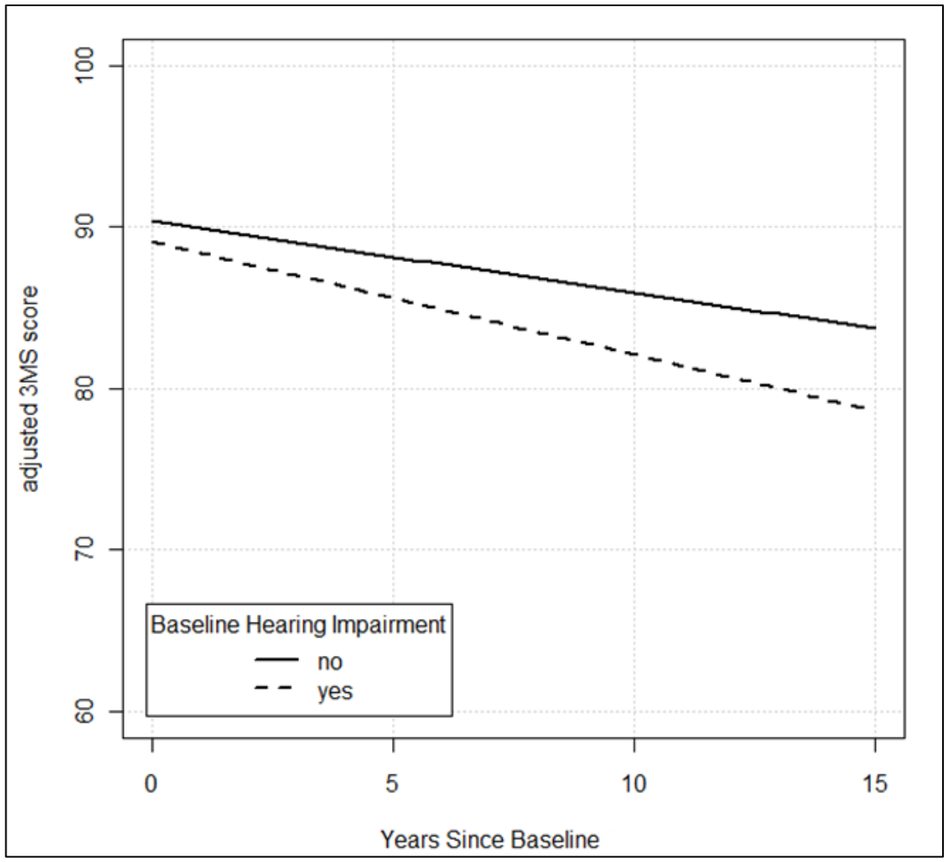
*Richard Klaus Gurgel, *Preston Daniel Ward, †Sarah Schwartz, †‡§Maria C. Norton, ||Norman L. Foster, and †§JoAnn T. Tschanz

- Cache County Study on Memory, Health, and Aging
- Began in 1995
- ≥ 65 years old
- 90% of residents enrolled

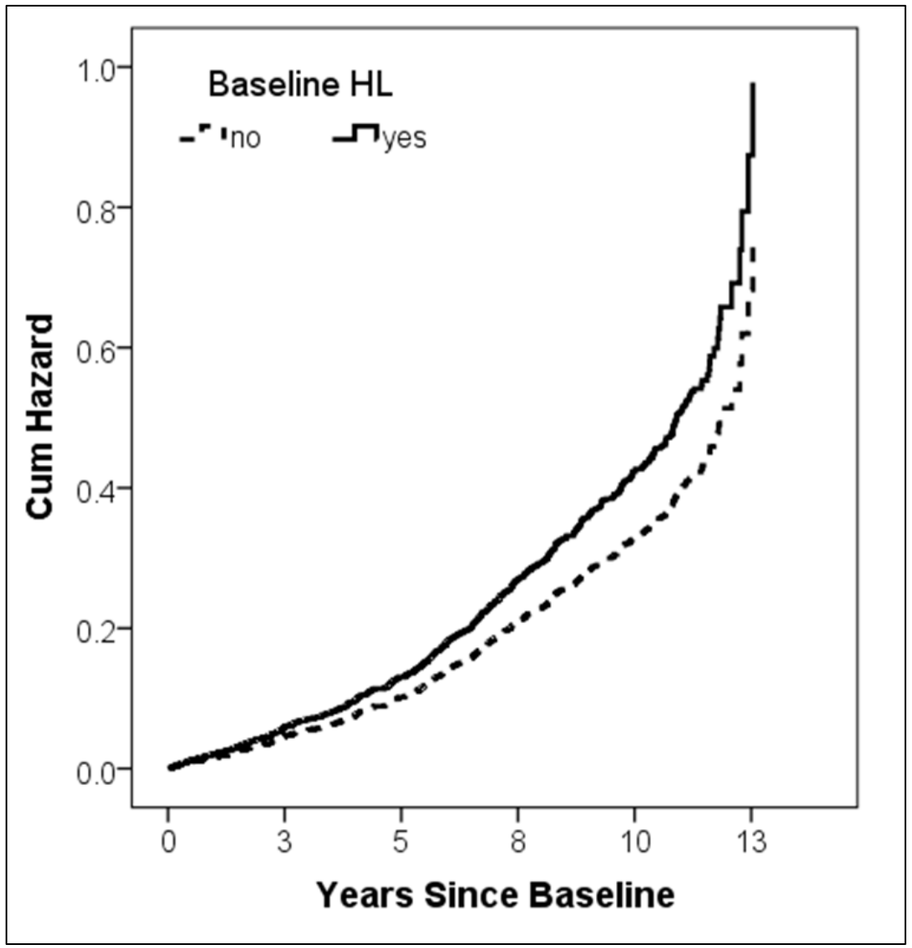


RESULTS

- 4,463 subjects
  - 836 with hearing loss (HL)
- Subjects with HL
  - 16.3% developed dementia vs. 12.1% without HL ($p<0.001$)
- Mean time to dementia
  - 10.3 years HL vs. 11.9 years without HL ($p<0.001$)



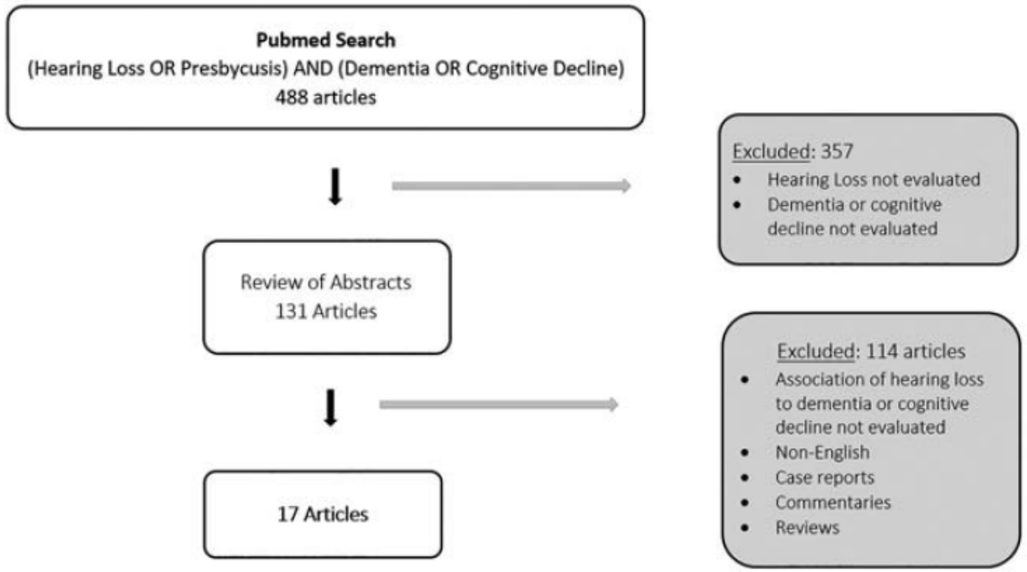
HL 0.26 points/year worse than without HL



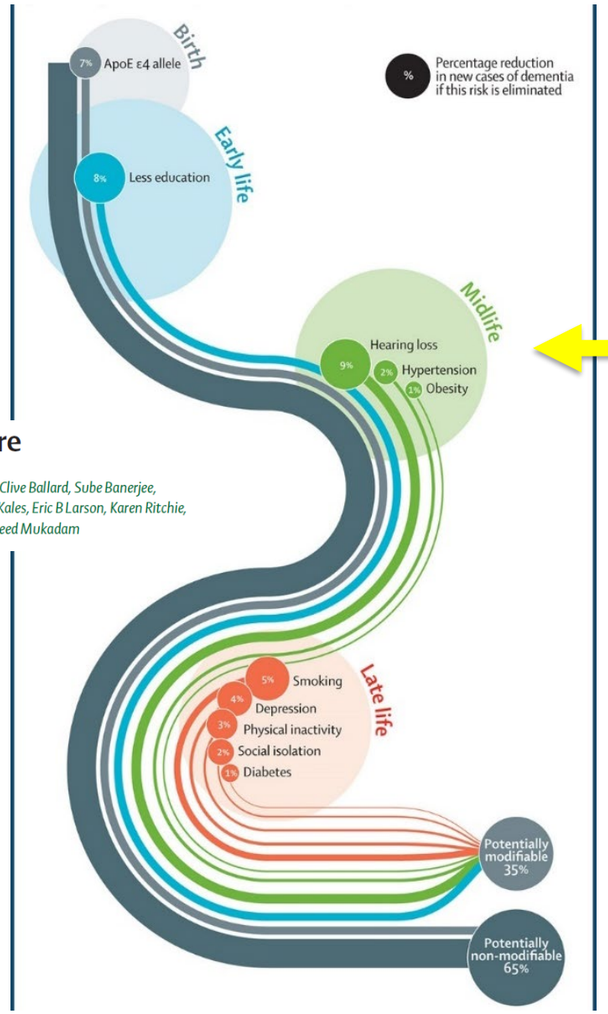
HR = 1.30
p = 0.013

Hearing Loss as a Risk Factor for Dementia: A Systematic Review

Rhett S. Thomson, BA; Priscilla Auduong, MD; Alexander T. Miller, BS; Richard K. Gurgel, MD



- Odds ratio for an older adult with hearing loss developing dementia compared to normal hearing control:
  - **1.24-1.8**
- up to OR 4 for severe-profound SNHL



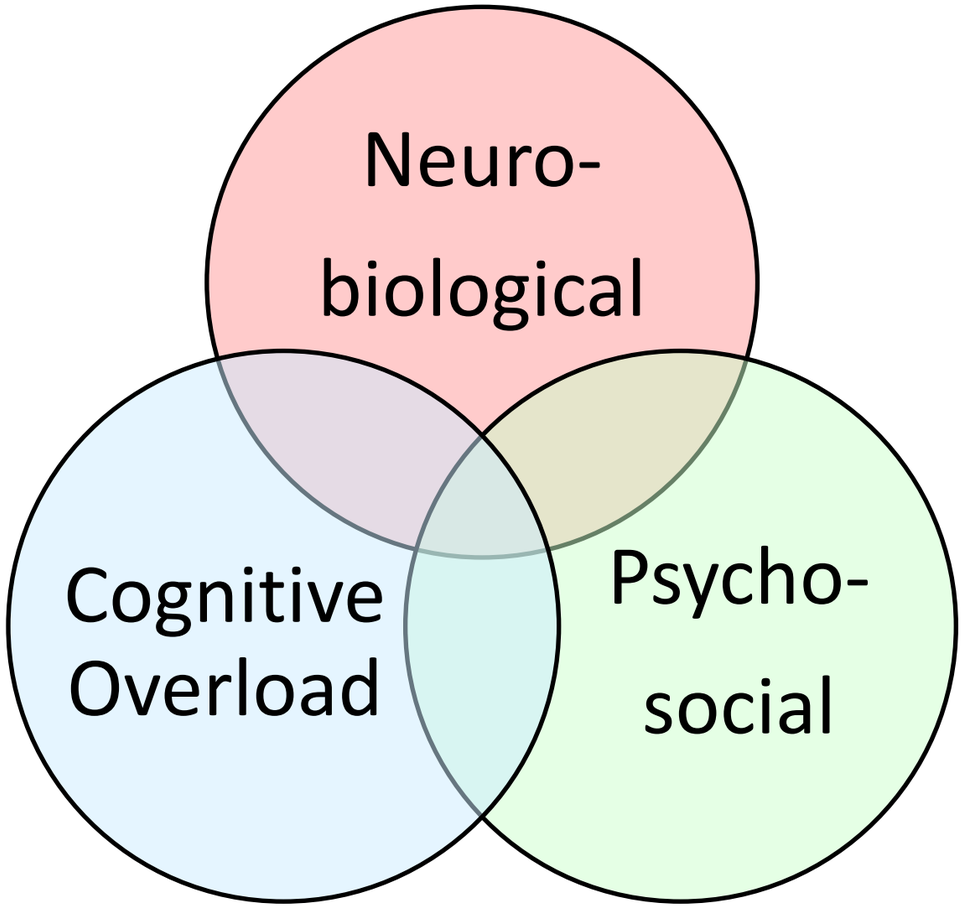
Dementia prevention, intervention, and care

Gill Livingston, Andrew Sommerlad, Vasiliki Orgeta, Sergi G Costafreda, Jonathan Huntley, David Ames, Clive Ballard, Sube Banerjee, Alistair Burns, Jiska Cohen-Mansfield, Claudia Cooper, Nick Fox, Laura N Gitlin, Robert Howard, Helen C Kales, Eric B Larson, Karen Ritchie, Kenneth Rockwood, Elizabeth L Sampson, Quincy Samus, Lon S Schneider, Geir Selbæk, Linda Teri, Naaheed Mukadam

9% of modifiable risk of Alzheimers disease attributed to hearing loss

G. LIVINGSTON ET AL., LANCET, 19 JULY 2017

CORRELATION OR CAUSATION?



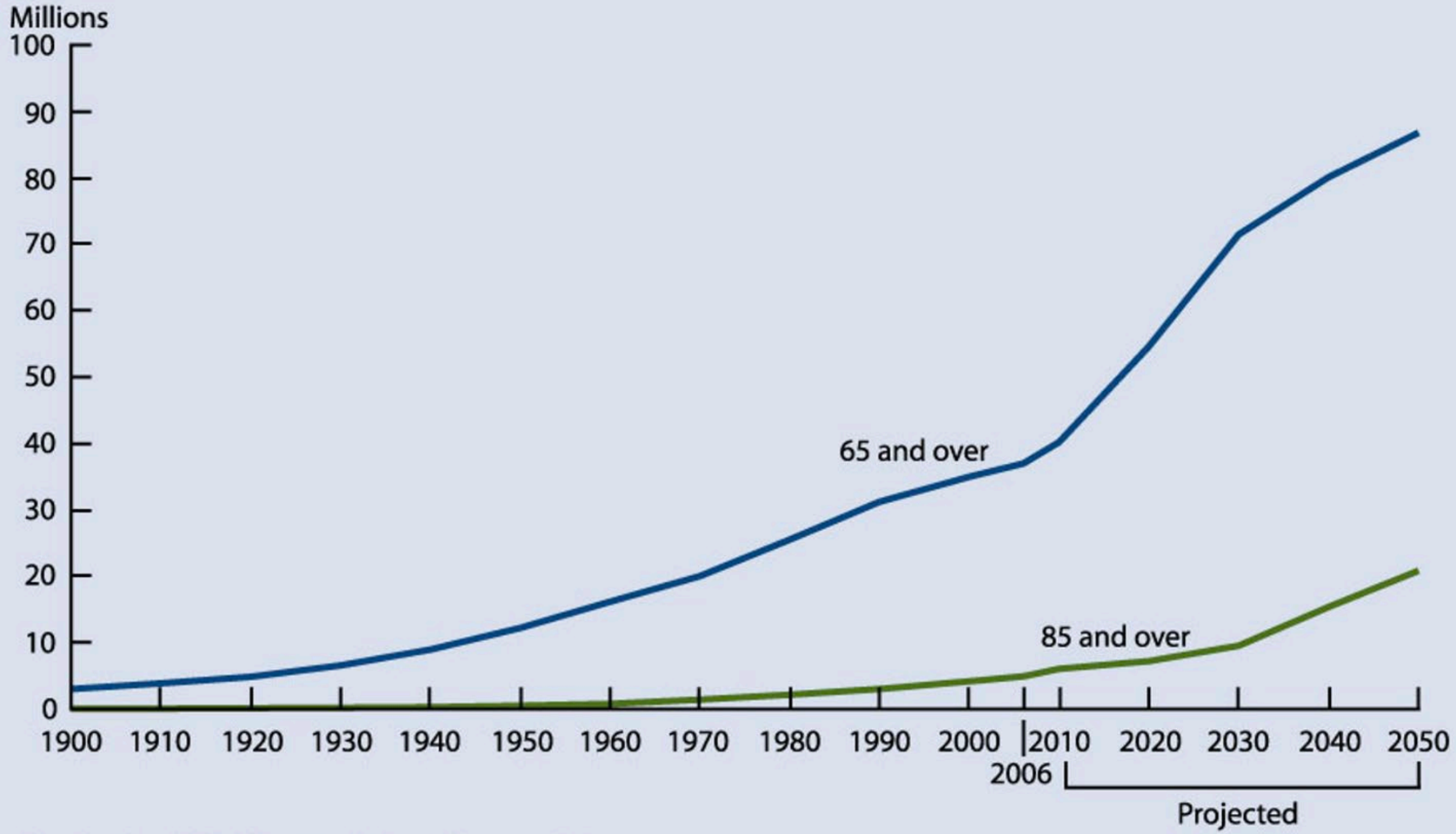
HEARING LOSS WHAT CAN WE DO ABOUT IT?

- Diagnosis: Screening
- Treatment: Cochlear implants and cognition

SCREENING

- What level of hearing loss would you treat in a child?

Number of people age 65 and over, by age group, selected years 1900–2006 and projected 2010–2050



Note: Data for 2010–2050 are projections of the population.
Reference population: These data refer to the resident population.
Source: U.S. Census Bureau, Decennial Census, Population Estimates and Projections.

Invited Articles

AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY FOUNDATION

Quality Improvement in Otolaryngology–Head and Neck Surgery: Age-Related Hearing Loss Measures

Richard K. Gurgel, MD, MSCI[1], Selena E. Briggs, MD, PhD, MI
Nui Dhepyasuwan, MEd[4], and Richard M. Rosenfeld, MD, MP

Otolaryngology–
Head and Neck Surgery
1–9

Quality Improvement in Otolaryngology-Head and Neck Surgery: Age-Related Hearing Loss Measures.
Gurgel RK, Briggs SE, Dhepyasuwan N, Rosenfeld RM.
Otolaryngol Head Neck Surg. 2021 Mar 23:1945998211000442. doi: 10.1177/01945998211000442.
Online ahead of print.
PMID: 33752512

Clinical Review & Education

JAMA | US Preventive Services Task Force | RECOMMENDATION STATEMENT

Screening for Hearing Loss in Older Adults
US Preventive Services Task Force Recommenda

US Preventive Services Task Force

Screening for Hearing Loss in Older Adults: US Preventive Services Task Force Recommendation Statement.
US Preventive Services Task Force, **Krist AH**, Davidson KW, Mangione CM, Cabana M, Caughey AB, Davis EM, Donahue KE, Doubeni CA, Epling JW Jr, Kubik M, Li L, Ogedegbe G, Pbert L, Silverstein M, Stevermer J, Tseng CW, Wong JB.
JAMA. 2021 Mar 23;325(12):1196-1201. doi: 10.1001/jama.2021.2566.
PMID: 33755083

IMPORTANCE Age-related sensorineural hearing loss is a common health problem among adults. Nearly 16% of US adults 18 years or older report difficulty hearing. The prevalence of perceived hearing loss increases with age. Hearing loss can adversely affect an individual's quality of life and ability to function independently and has been associated with increased risk of falls, hospitalizations, social isolation, and cognitive decline.

Multimedia
Related article page 1202 and
JAMA Patient Page page 1234
Supplemental content

QUALITY MEASURE #1

Patients who were screened for hearing loss

All patients age 60 years and older.

SCREENING

- Clinical tests (e.g., detection of a whispered voice, finger rub, or watch tick), a single question (e.g., "Do you have difficulty with your hearing?")
- questionnaires (e.g., Hearing Handicap Inventory for Elderly-Screening (HHIE-S))
- Online screening
- NHANES survey questions
- Handheld audiometric devices (e.g., the AudioScope)

QUALITY MEASURE #2

Patients who either received, were ordered, or were referred for comprehensive audiometric testing.

All patients who failed screening

QUALITY MEASURE #4

Patients or their caregiver(s) who participated in shared decision making (SDM) regarding treatment options for symmetric sensorineural hearing loss.

All patients age 60 years and older with a diagnosis of symmetric sensorineural hearing loss.

USPSTF

Table. Summary of USPSTF Rationale

Rationale	Assessment
Detection	Adequate evidence that screening instruments can detect hearing loss
Benefits of screening and intervention and treatment	• Inadequate evidence that screening for hearing loss in asymptomatic patients improves health outcomes • Inadequate evidence that interventions to treat hearing loss in screen-detected patients improves health outcomes
Harms of early detection and intervention and treatment	Inadequate evidence to determine the harms of screening for and treatment of hearing loss
USPSTF assessment	The evidence on screening for hearing loss is lacking, and the balance of benefits and harms cannot be determined

Abbreviation: USPSTF, US Preventive Services Task Force.

Summary of Recommendation

Asymptomatic adults 50 years or older	The US Preventive Services Task Force (USPSTF) concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for hearing loss in older adults.	I statement

See the Practice Considerations section for additional information regarding the I statement. USPSTF indicates US Preventive Services Task Force.

SCREENING REQUIREMENTS

- Does screening result in increased detection of disease?
- Does increased detection lead to increased treatment?
- Does increased treatment lead to improved health outcomes?

HEARING AIDS

Reagan Begins to Wear A Hearing Aid in Public

By STEVEN R. WEISMAN
Special to The New York Times

WASHINGTON, Sept. 7 — President Reagan has begun wearing a custom-made, technologically advanced hearing aid in his right ear after experiencing increased difficulty hearing high-pitched sound.

Mr. Reagan, who is 72 years old, began wearing the device last week, according to the White House. He wore it today in public for the first time, at a meeting of business and education leaders on the subject of adult literacy.

The hearing aid is fitted into the ear canal and is barely visible.

Larry Speakes, the White House spokesman, said the President's hearing aid was prescribed after he visited Dr. John William House in Los Angeles Aug. 22. Dr. House, an associate of the House Ear Institute, a research and training facility, has been treating Mr. Reagan for his hearing problems since 1979.

Removes It at Will

A White House official said Mr. Reagan had already developed the habit of using and then removing the hearing aid at will, much like a pair of glasses. The official said the President had told aides he intended to use it mostly for meetings at the White House.

Among Presidential advisers, Mr. Reagan's use of a hearing aid revived speculation on whether his age would be an issue if he seeks re-election next year. The general feeling was that it would not.

Both Dr. House and a spokesman for the manufacturer of the device said in interviews that Mr. Reagan's hearing problems were common. They also expressed the hope that his wearing a hearing aid publicly would set an example for others who might be reluctant to use one.

Mr. Reagan's hearing problems date from the 1930's, when a .38-caliber pistol was fired near his right ear while he was acting in a movie. Dr. House said the impairment "affects the right ear primarily."

Many people who have spent time with the President have noticed his hearing has deteriorated in the last year or so. Reporters have been told to speak loudly when they interview him, particularly from the right side.

Dr. House said of the President's hearing, "It's not really deteriorated much from last year." He said he had recommended that Mr. Reagan use a hearing aid not so much because the hearing had worsened but because there had been many recent technological advances.

"There have been many improvements in hearing aids recently, particularly in the area of quality of sound they can produce," the doctor said. "There have also been improvements in miniaturization. That's the reason we felt we could make the recommendation that he use one."

He said Mr. Reagan suffered a deterioration in the auditory nerve, which picks up sound vibrations in the inner ear and converts them to electrical impulses to the brain. He said the nerve was damaged by the old gunshot noise.

Amplifies High Frequencies

The hearing aid, manufactured by Starkey Laboratories of Minneapolis, is powered by a small battery and is designed to amplify higher sound frequencies. Because it can selectively amplify these higher frequencies, the device has the effect of making what Mr. Reagan hears not just louder but also clearer, Dr. House said.

Jerome Buzicka, director of manufacturing for Starkey Laboratories, said the ability to make a hearing aid that could amplify some frequencies more than others was a major technological gain of the last year or so.

Another recent improvement cited by Mr. Buzicka is the ability to fit the hearing aid into the ear canal itself rather than restricting it to the outer part of the ear.

Mr. Buzicka said liquid material had been injected into Mr. Reagan's ear canal so an impression could be made when the material hardened. The hearing aid was then molded to conform to this impression.

Associated Press

President Reagan wearing a hearing aid as he addressed a group of business and education leaders yesterday at the White House.

'Big Cosmetic Appeal'

"There's a big cosmetic appeal for a canal hearing aid," he said. "It's pretty obvious that with a President, you have an advantage to having it out of sight."

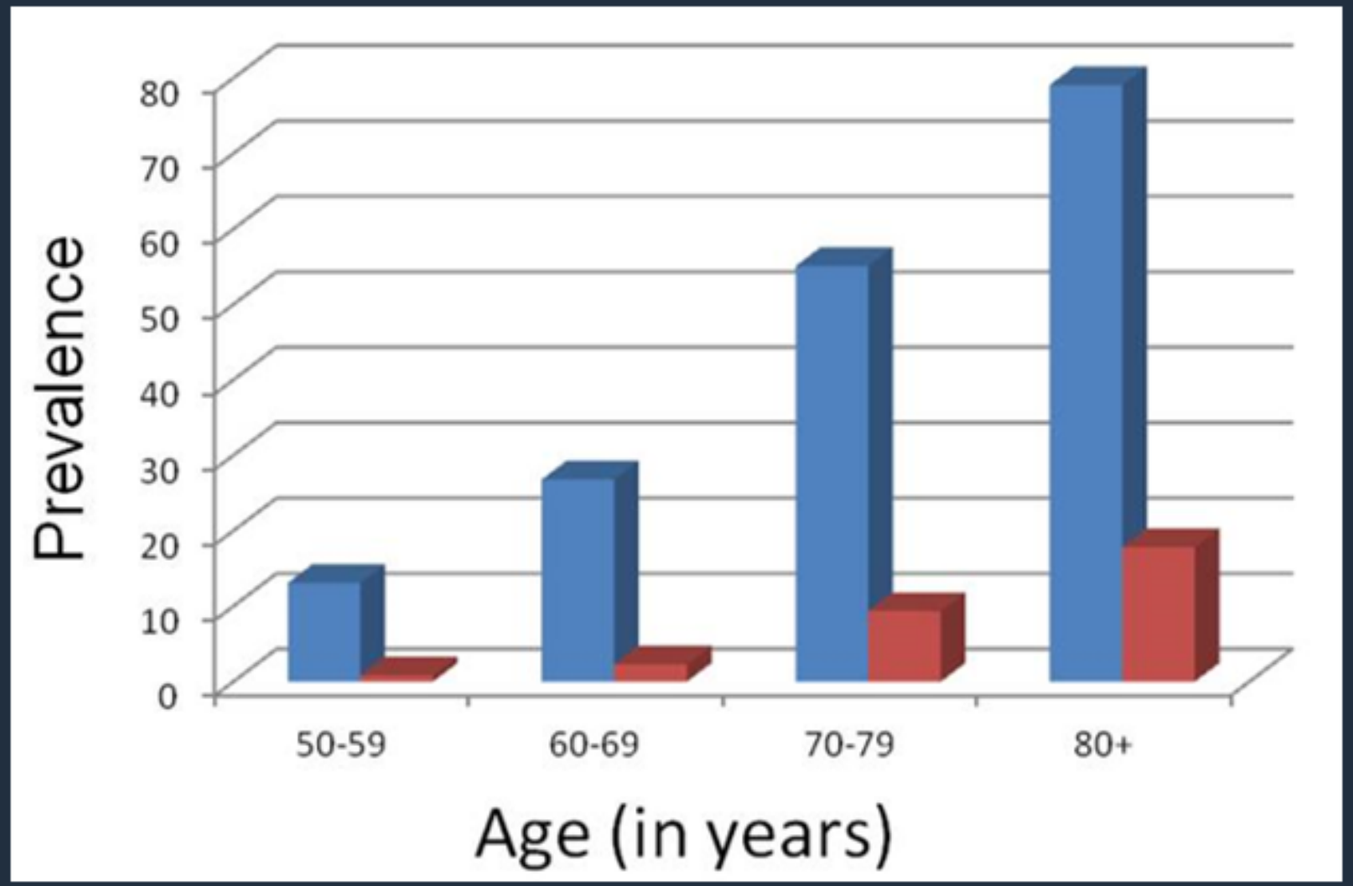
"That seems to be the problem with millions of people who need hearing aids," Mr. Buzicka continued. "One reason they don't want to wear one is that they don't want it hanging over their ear or sticking out of their ear. This one is tucked securely in the canal and, in most cases, it's out of sight."

Mr. Buzicka said the President's hearing aid was donated by Starkey Laboratories and Burton Associates, the Los Angeles distributor. The device, custom fitted, retails for $900 to $1,100, he said.

Dr. House said one out of three people over the age of 60 had hearing problems. "Hearing loss is the most common problem in the country," he said. "It affects one in 10 of the general population. Maybe the President's doing this will help others realize that they can ease their problems with a hearing aid. I would hope so."

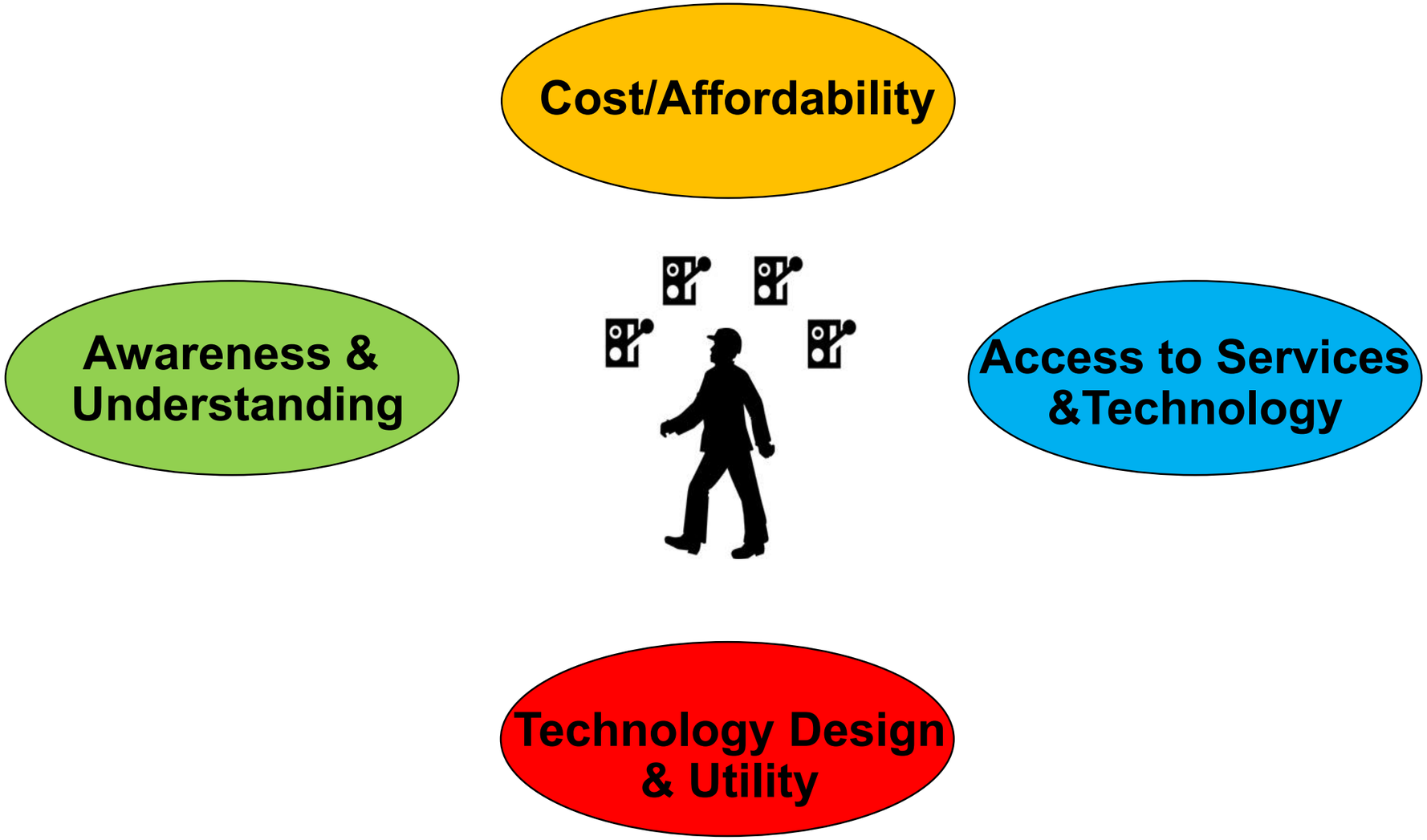
"Among presidential advisors, Mr. Reagan's use of a hearing aid revived speculation on whether his age would be an issue if he seeks re-election next year"

Hearing Loss & Hearing Aid Use Prevalence Among Older Adults in the U.S. 1999-2006



Chien W et al, Arch Int Med, 2012

BARRIERS TO UPTAKE OF HEARING CARE IN ADULTS

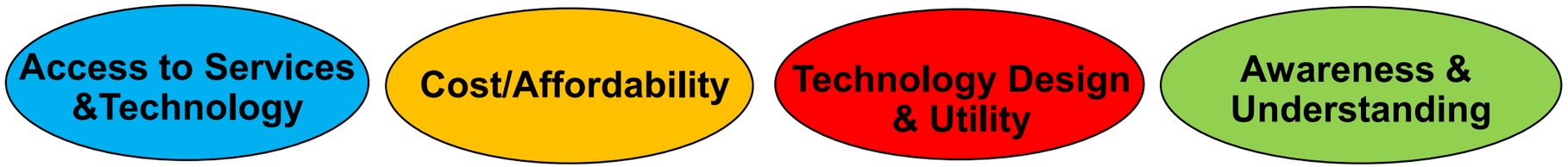


Adapted from Frank Lin, 2018 AAO-HNS

OTC Hearing Aid Bill introduced into U.S. Congress in March 2017 & signed into law in August 2017

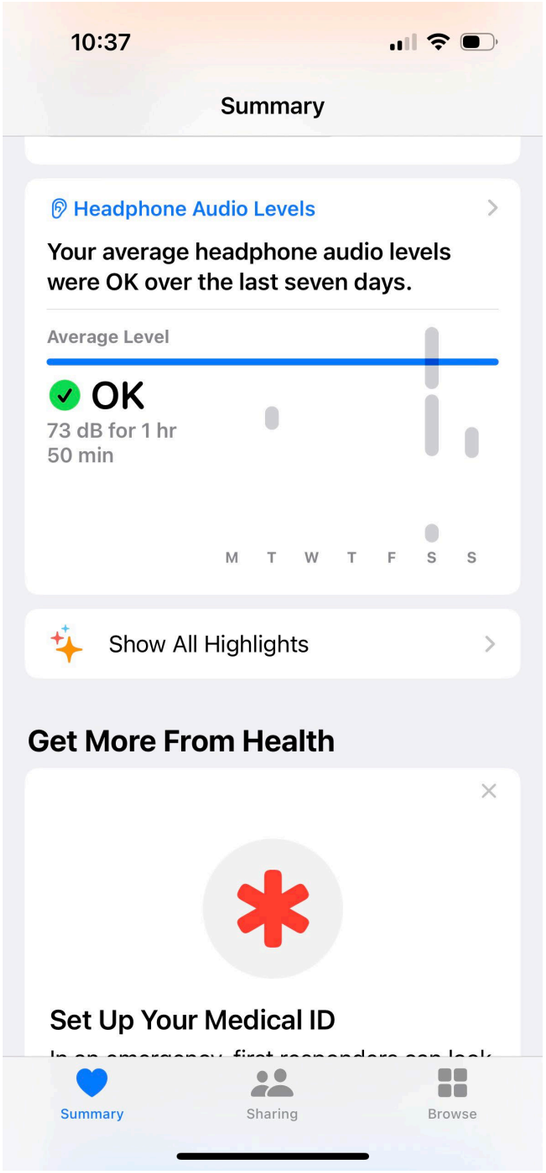
This law overturns > 40 years of regulatory precedent in the U.S. & around the world

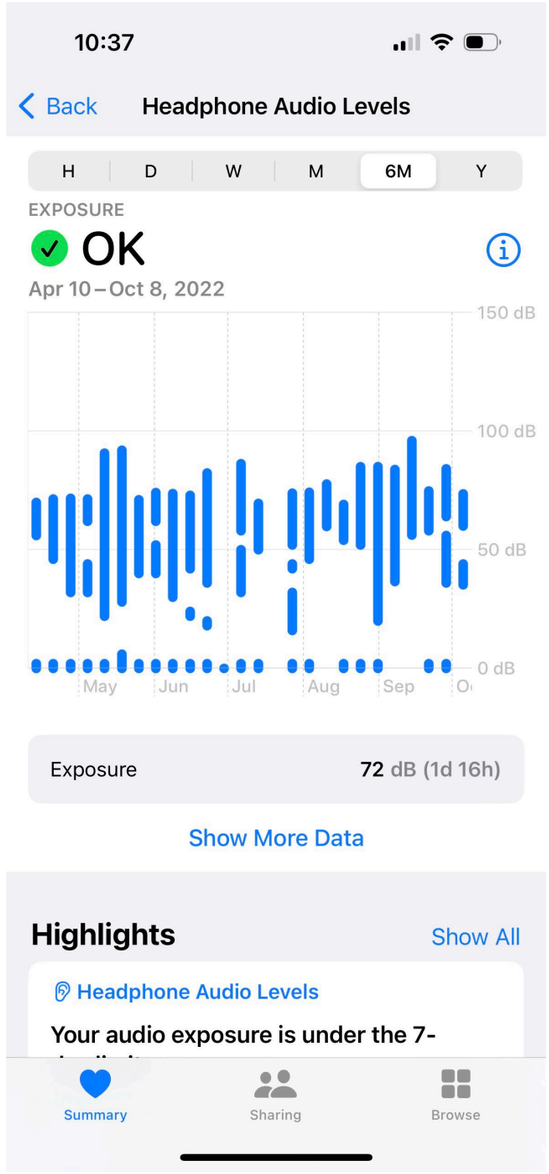
FDA regulation for OTC hearing aids in the U.S. to go into effect by 2020 (2022)



- **Importance of solving health problems with rigorous public health research that can inform public policy**

Adapted from Frank Lin, 2018 AAO-HNS





Sony to bring over-the-counter hearing aids to the masses

By Derek Malcolm
September 13, 2022

SHARE

Sony announced today that it has partnered with Danish hearing device experts WS Audiology to develop consumer-friendly, over-the-counter (OTA) hearing aids that users can "just pick up and use as naturally as contact lenses," Sony's Osamu Hajimoto says in a video from Sony Global.

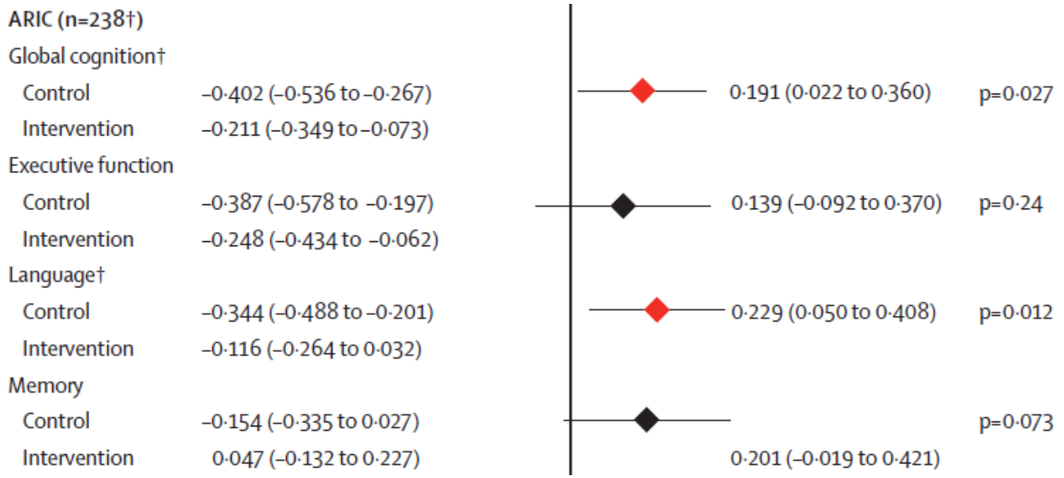
ACHIEVE TRIAL

Hearing intervention versus health education control to reduce cognitive decline in older adults with hearing loss in the USA (ACHIEVE): a multicentre, randomised controlled trial

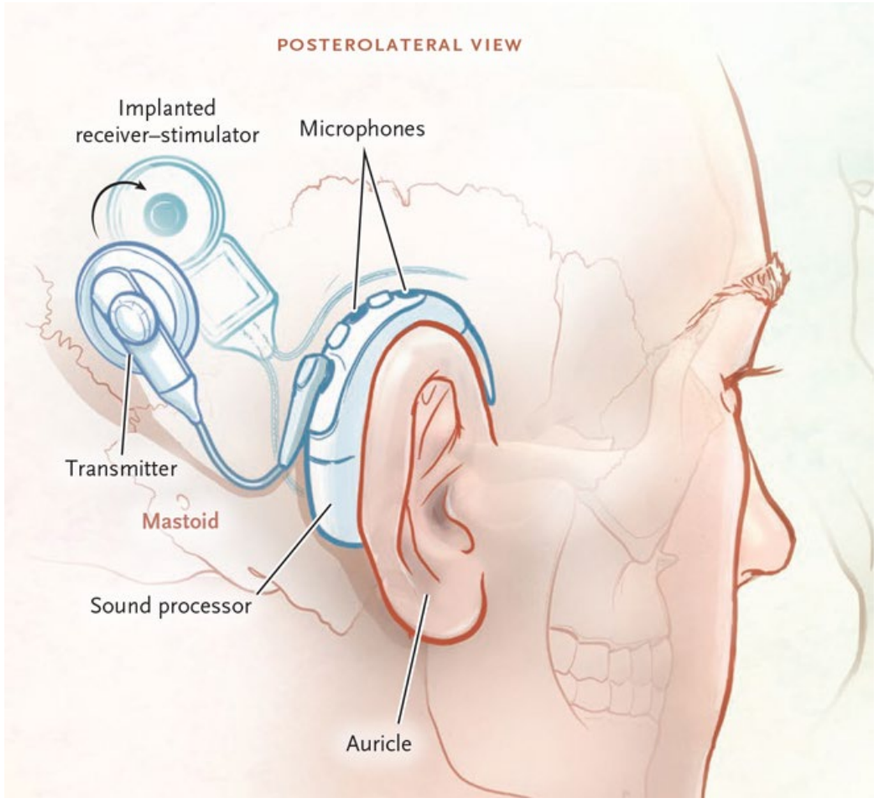
*Frank R Lin, James R Pike, Marilyn S Albert, Michelle Arnold, Sheila Burgard, Theresa Chisolm, David Couper, Jennifer A Deal, Adele M Goman, Nancy W Glynn, Theresa Gmelin, Lisa Gravens-Mueller, Kathleen M Hayden, Alison R Huang, David Knopman, Christine M Mitchell, Thomas Mosley, James S Pankow, Nicholas S Reed, Victoria Sanchez, Jennifer A Schrack, B Gwen Windham, Josef Coresh, for the ACHIEVE Collaborative Research Group**

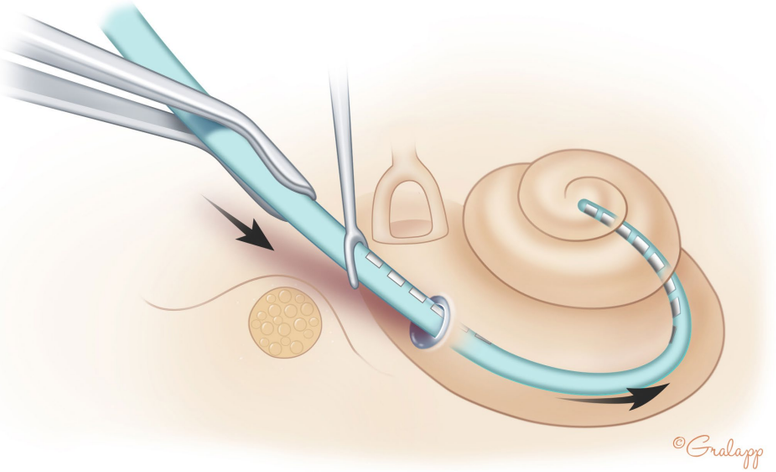
Lancet 2023; 402: 786–97

Interpretation The hearing intervention did not reduce 3-year cognitive decline in the primary analysis of the total cohort. However, a prespecified sensitivity analysis showed that the effect differed between the two study populations that comprised the cohort. These findings suggest that a hearing intervention might reduce cognitive change over 3 years in populations of older adults at increased risk for cognitive decline but not in populations at decreased risk for cognitive decline.



COCHLEAR IMPLANTS



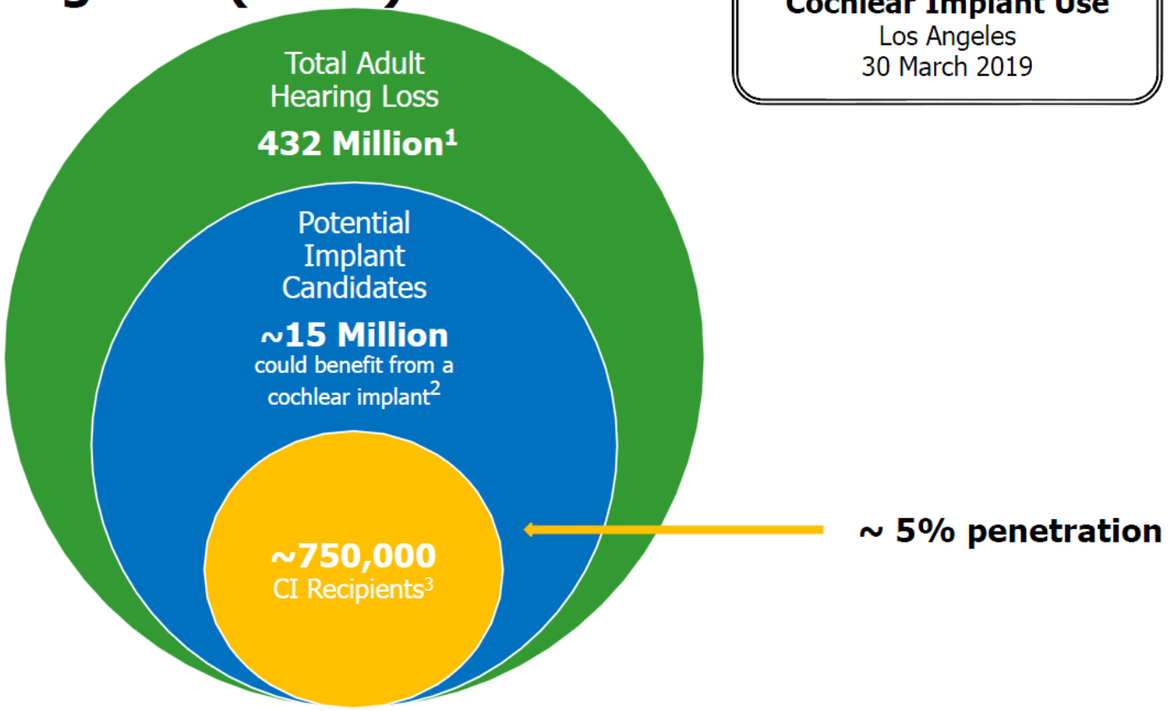


COCHLEAR IMPLANTS IN OLDER ADULTS

- Only 5-10% of adult cochlear implant candidates in the US have received cochlear implants
- Average delay from time of profound ARHL to CI is 10 years
- Fastest growing segment of CI users = older adults

Global Adult Hearing loss (2018)

Delphi Consensus Meeting
Cochlear Implant Use
Los Angeles
30 March 2019



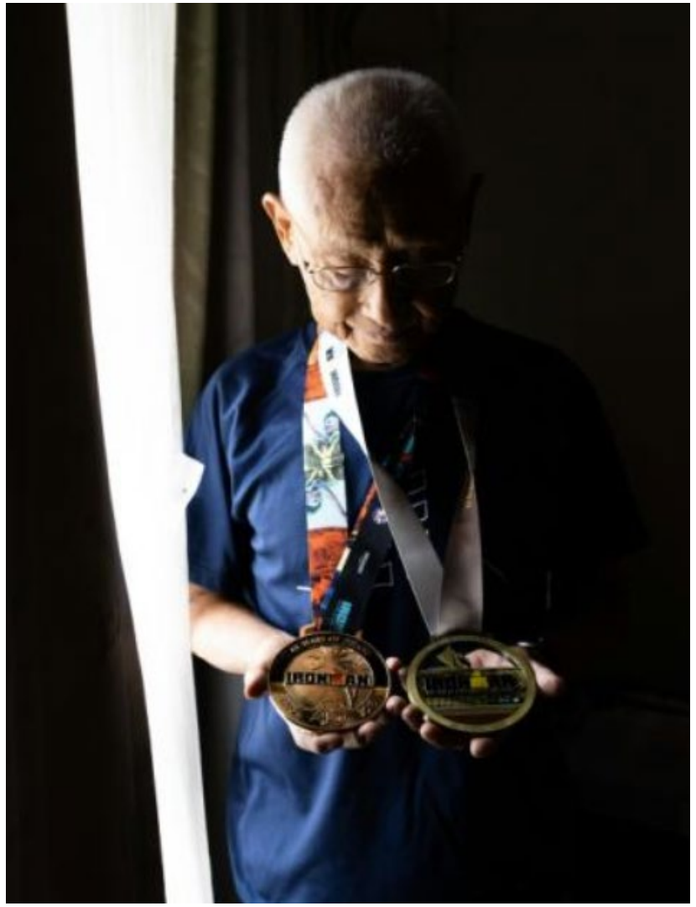
1. *World Health Organization. Over 5% of the world's population – or 466 million people – has disabling hearing loss (432 million adults and 34 million children). It is estimated that by 2050 over 900 million people – or one in every ten people – will have disabling hearing loss. Available from: http://www.who.int/features/factfiles/deafness/en/*
2. *Cochlear internal data.*
3. *Market penetration estimate based on Cochlear sourced data.*

SURGICAL CANDIDACY

- How old is too old?

Mollie Smith, UK, implanted at 99 years old

HIROMU INADA - IRONMAN



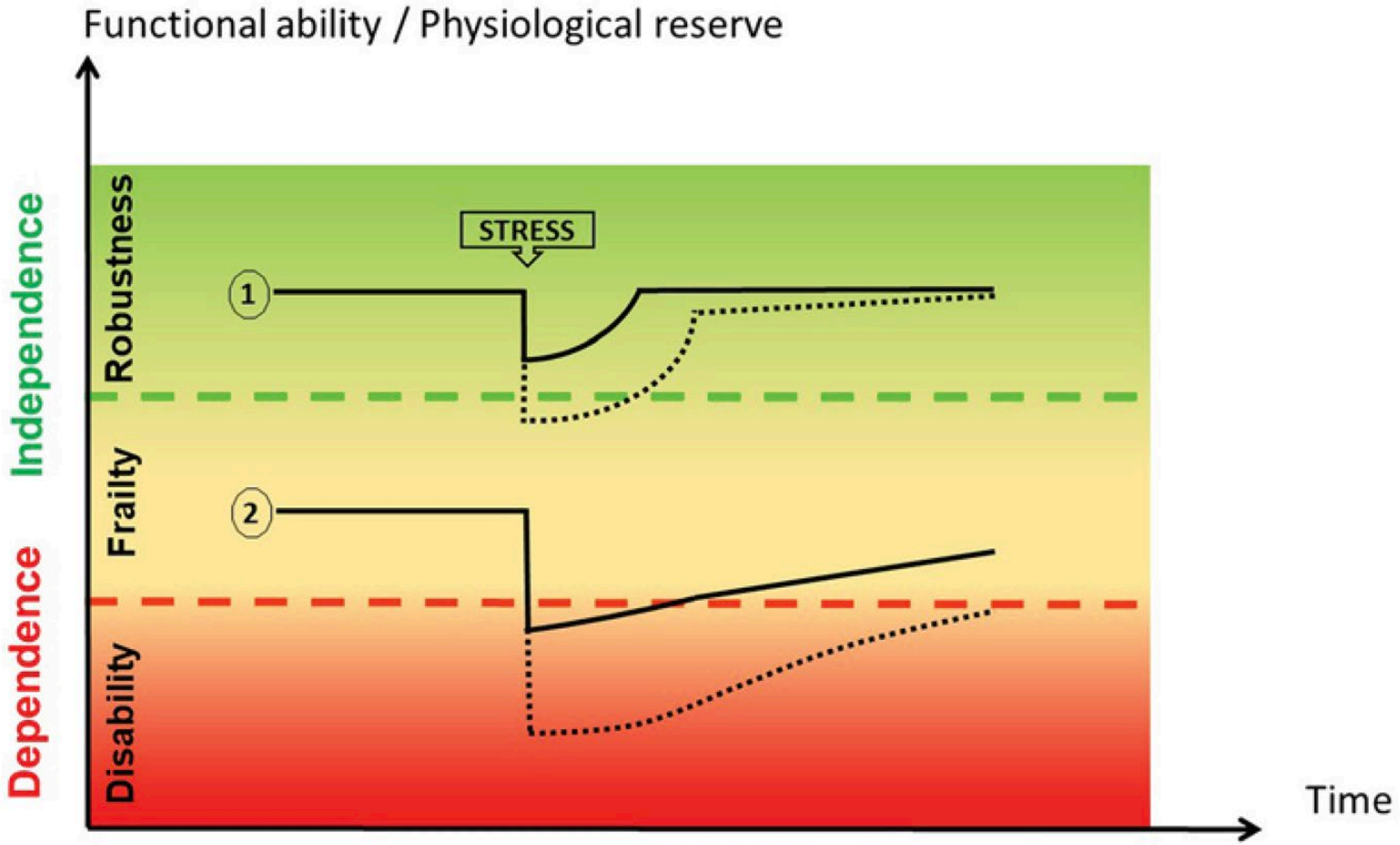


FIG. 1. Vulnerabilities of robust and frail older persons to a minor (*solid line*) or major (*dashed line*) change in health status. Based on the work of Calvani et al.[10] and Clegg et al.[11]

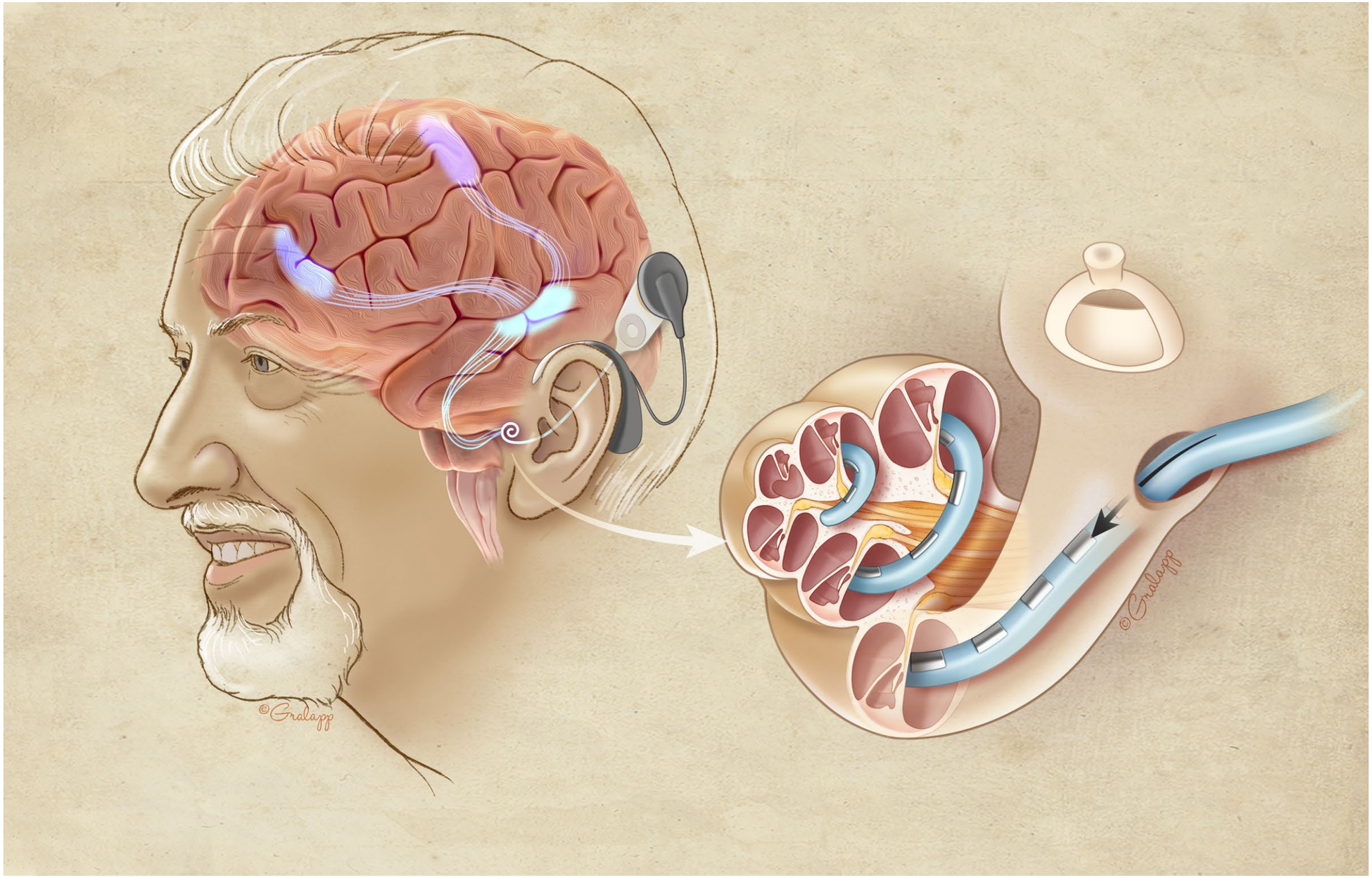
Association of Baseline Frailty Status and Age With Postoperative Complications After Cochlear Implantation: A National Inpatient Sample Study

*Kyril L. Cole, †Eric Babajanian, †Ryan Anderson, †Steve Gordon, †Neil Patel, ‡Alis J. Dicpinigaitis, §Syed Faraz Kazim, §Christian A. Bowers, and †Richard K. Gurgel

*School of Medicine, University of Utah, Salt Lake City, Utah, USA; †Division of Otolaryngology, University of Utah, Salt Lake City, Utah, USA; ‡School of Medicine, New York Medical College, Valhalla, New York, USA; and §Department of Neurosurgery, University of New Mexico, Albuquerque, New Mexico, USA

(6.2%) discharged to a nonhome destination. Multivariate analysis showed no statistically significant correlation between increasing participant age or frailty status and postoperative complications; however, increasing baseline frailty tier showed an independent association with risk of eLOS (severely frail: odds ratio, 4.83; 95% confidence interval, 3.00–7.75; $p < 0.001$) and nonhome discharge (severely frail: odds ratio, 6.51; 95% confidence interval, 3.81–11.11; $p < 0.001$). The mFI-11 showed very similar trends.

(58.1%) robust (mFI-5 = 0), 1710 (33.3%) prefrail (mFI-5 = 1), 362 (7.1%) frail (mFI-5 = 2), and 78 (1.5%) severely frail (mFI-5 ≥ 3) participants. Three hundred twenty-eight (6.49%)



COCHLEAR IMPLANT COGNITION

The Laryngoscope

Evaluating the Impact of Cochlear Implantation on Cognitive Function in Older Adults

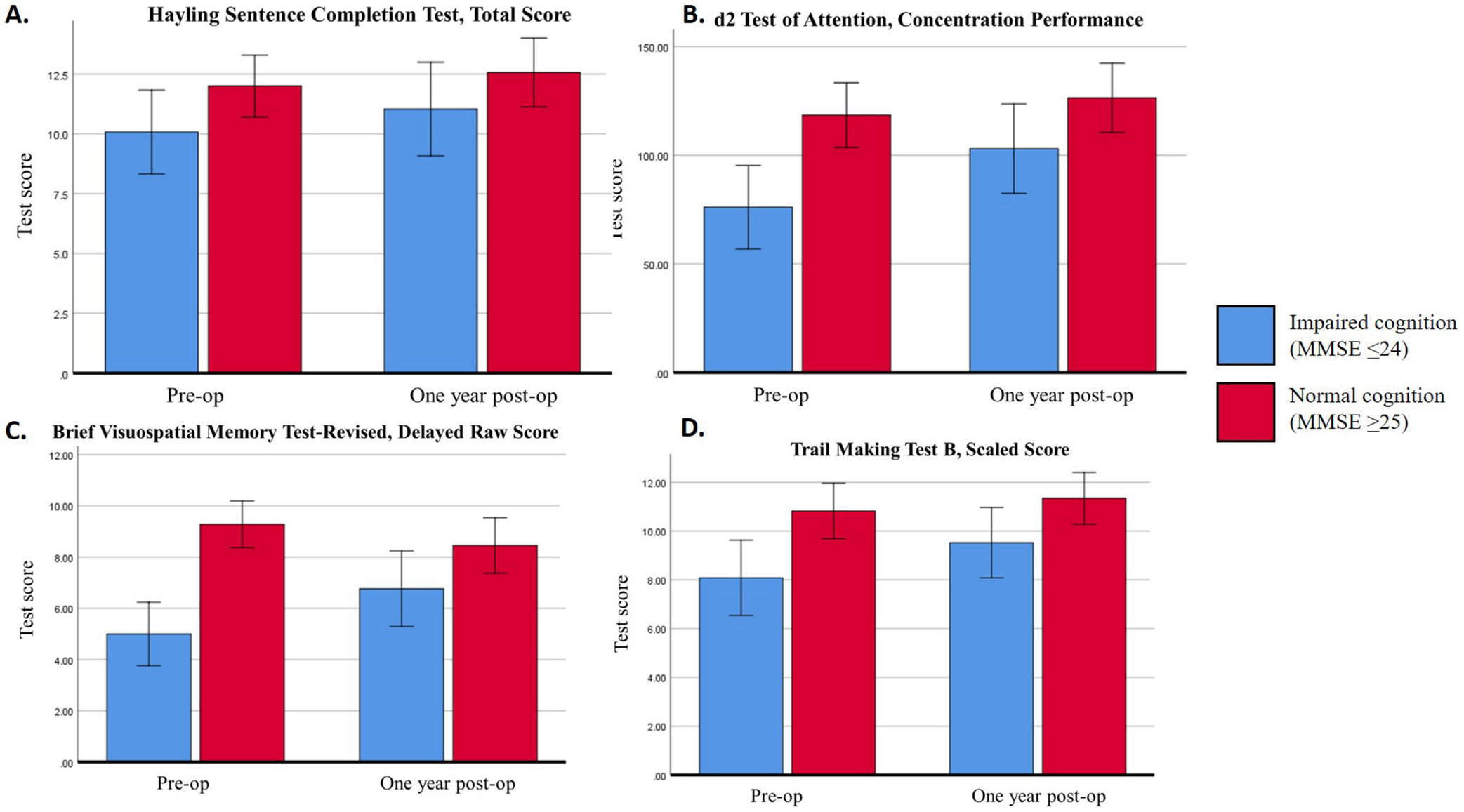
Richard K. Gurgel, MD, MSCI; Kevin Duff, PhD; Norman L. Foster, MD; Kaitlynn A. Urano, AuD; Alvin deTorres, MD

- 37 patients, ≥65 yo
- Cognitive testing before and 1 year after cochlear implant

Cognitive domain	Verbal stimuli/responses	Visual stimuli/responses
Simple attention	Digit Span	Spatial Span
Sustained attention	Stroop Color Word Test	d2 Test of Attention
Learning and memory	HVLT-R	BVMT-R
Executive functioning	Hayling Sentence Completion Test	Trail Making Test Part B

Table II: Patient characteristics			
- Patients initially enrolled		48	
- Patients lost to follow-up prior to 12 months		9	
- Patients who did not undergo surgery or did not have data available to analyze		2	
-Total number of patients		37	
Age at implantation, mean (SD)		79.4 (7.4)	
Factor, n (%)		n	(%)
Male		32	(86%)
Veteran		16	(43%)
Laterality, right		16	(43%)
Pre-operative cognitive classification based on MMSE	Normal (≥25)	24	(65%)
	Impaired cognition (<24)	13	(35%)
Visual impairment present	No	26	(70%)
	Yes	11	(30%)
Pre-operative depression classification based on GDS	Normal	29	(78%)
	Mild	8	(22%)
Manufacturer	Advanced Bionics	12	(32%)
	Cochlear	15	(41%)
	Med-El	10	(27%)

	Pre-operative			Post-operative		
	Non-implanted ear	Implanted ear	Bilateral	Implant only	Implant and aided	p-value
	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	
4f-PTA (dB HL)	72.5 (62.8, 80.0)	78.8 (70.6, 90.6)			31.3 (26.9, 35)	<0.001
CNC (%)			35.2 (23.0, 44.2)		54.4 (46.0, 64.0)	<0.001
AzBio in Quiet (%)	41.8 (37.1, 45.7)	22.5 (15.3, 25.5)	37.0 (21.5, 48.0)	51.1 (30.0, 78.5)	72.0 (65.1, 87.5)	<0.001



COCHLEAR IMPLANTS COGNITION

- Cochlear implants improve cognition in older adults
- Individuals with cognitive impairment - Even more improvement
- Do cochlear implants protect against dementia?

IMPLANTS IN PATIENT WITH KNOWN DEMENTIA

Original Study

Cochlear Implantation in Patients With Known Cognitive Impairment: What Are the Benefits?

*Eric E. Babajanian, †Erin C. Carmichael, *Steven A. Gordon, *Neil S. Patel, and *Richard K. Gurgel

*Division of Otolaryngology—Head and Neck Surgery, Department of Surgery, University of Utah, and †Department of Communication Sciences and Disorders, University of Utah, Salt Lake City, Utah

- Similar in principle to children with developmental delay
- Eight patients met inclusion criteria
- Mean age at time of implantation: 77.8 years (SD 9.6 years)
- Average preoperative MoCA cognitive score: 22.1 (SD 4.1, 14-25)
  - ≤25 demonstrates cognitive impairment
- Average follow up: 26.8 months

RESULTS – CI WITH KNOWN DEMENTIA

- Median pure tone average (*p=0.012*):
  - Pre-op: 88.9 dB HL (IQR 32.2 dB HL)
  - Post-op: 33.8 dB HL (IQR 4.1 dB HL)

- Median preoperative speech testing score (AzBio/HINT) (*p=0.018*):
  - Pre-op: 21% (IQR 24%)
  - Post-op: 44% (IQR 21%)
- No observed surgical complications during the follow up period
  - Two patients passed away at an average 58.0 months (SD 31.1 months) after surgery
  -

JAMA Neurology | Original Investigation

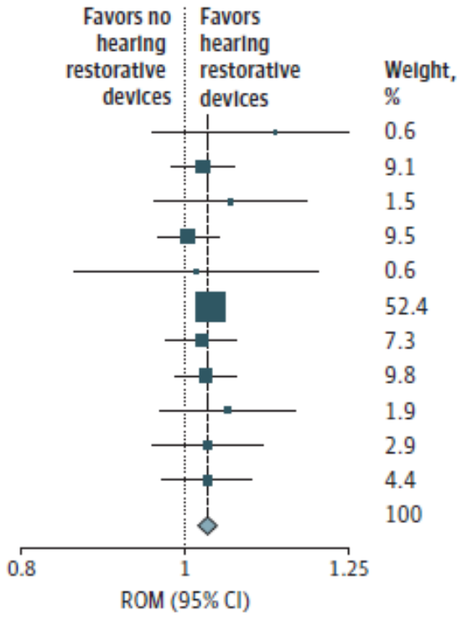
Association of Hearing Aids and Cochlear Implants With Cognitive Decline and Dementia
A Systematic Review and Meta-analysis

Brian Sheng Yep Yeo, MBBS; Harris Jun Jie Muhammad Danial Song, MBBS; Emma Min Shuen Toh, MBBS; Li Shia Ng, MBBS, MMed, MRCS; Cyrus Su Hui Ho, MBBS, MRCPsych, MSc, MSc; Roger Ho, MBBS, MD, DPM, MMed; Reshma Aziz Merchant, MBChB, MRCP; Benjamin Kye Jyn Tan, MBBS(Hons); Woei Shyang Loh, MBBS

Figure 3. Pooled Ratio of Means (ROM) of Cognitive Test Scores Before and After the Use of Hearing Restorative Devices

Source	After hearing restoration		Before hearing restoration		ROM (95% CI)
	Total, No.	Mean (SD)	Total, No.	Mean (SD)	
Acar et al,[24] 2011	34	23.05 (7.59)	34	20.38 (7.74)	1.13 (0.96-1.34)
Buchman et al,[30] 2020	96	25.30 (3.75)	96	24.70 (3.75)	1.02 (0.98-1.07)
Claes et al,[17] 2018	20	95.30 (15.70)	20	89.60 (15.20)	1.06 (0.96-1.18)
Dawes et al,[18] 2015	69	26.80 (3.32)	69	26.70 (3.32)	1.00 (0.96-1.05)
Deal et al,[31] 2017	20	40.80 (11.50)	20	40.20 (10.20)	1.01 (0.86-1.20)
Mosnier et al,[19] 2015	94	28.80 (1.80)	94	27.80 (1.70)	1.04 (1.02-1.05)
Sonnet et al,[20] 2017	16	27.70 (1.60)	16	27.10 (2.10)	1.02 (0.97-1.07)
Vasil et al,[32] 2021	77	25.40 (3.30)	77	24.70 (3.20)	1.03 (0.99-1.07)
Castiglione et al,[21] 2016	15	27.20 (3.72)	15	25.70 (3.08)	1.06 (0.97-1.16)
Uchida et al,[38] 2021	94	46.10 (12.20)	94	44.70 (11.80)	1.03 (0.96-1.11)
Issing et al,[22] 2021	33	16.90 (2.10)	33	16.40 (2.10)	1.03 (0.97-1.10)
Random-effects model	568		568		1.03 (1.02-1.04)

Heterogeneity: $\tau^2 = 0$ ($P = .95$); $I^2 = 0\%$



The size of each box reflects the relative weight apportioned to each study; the diamond indicates the estimated pooled ROM for each random-effects meta-analysis.

For hearing aids for cognitive decline:
HR, 0.81; 95%CI, 0.76-0.87; *I2* = 0%)

For hearing restorative devices, cognitive improvment:
ratio of means, 1.03; 95%CI, 1.02-1.04, *I2* = 0%).

CI – DEMENTIA: TRINETX DATABASE

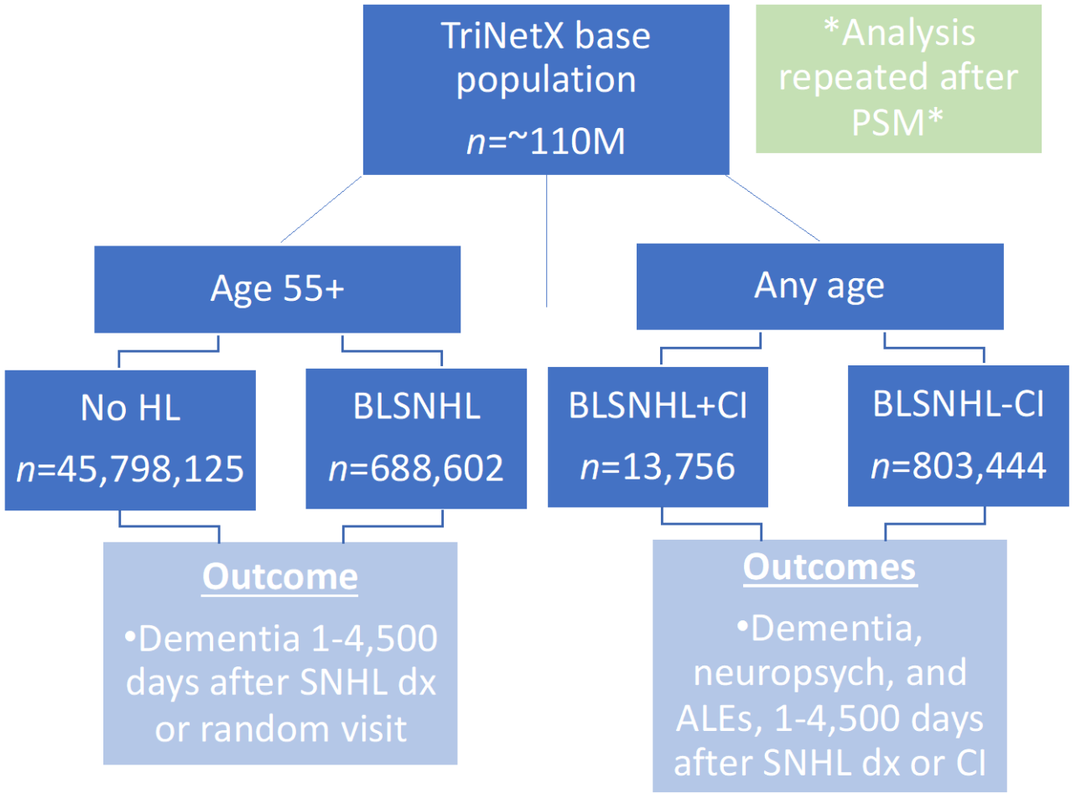
TriNetX is a cloud supercomputing, HIPPA-compliant, live, multi-HCO international electronic health records (EHR) database representing 78 HCO's and ~103.5-million patient records from nine countries. Queries on the database were made using medical billing codes (ICD-10, CPT, etc.) via Boolean operators and temporal constraints to define patient cohorts.

Patients with BLSNHL (ICD10: H90.3) with and without CI (CPT: 69930) were queried

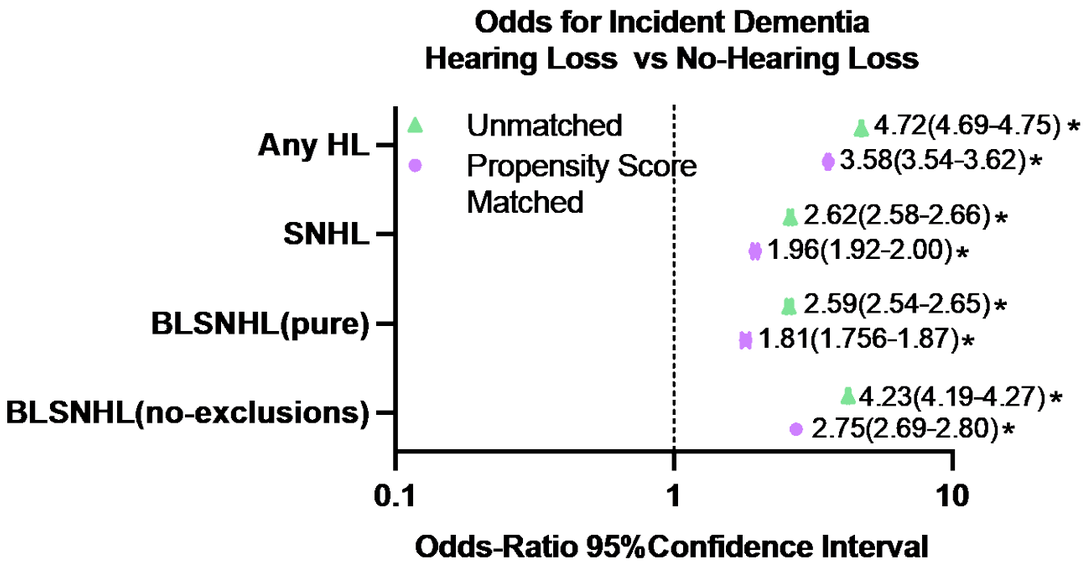
Propensity score matching (PSM) was performed to control for covariates. p-values were calculated before and after PSM using chi-squared or unpaired t-tests (QR code).

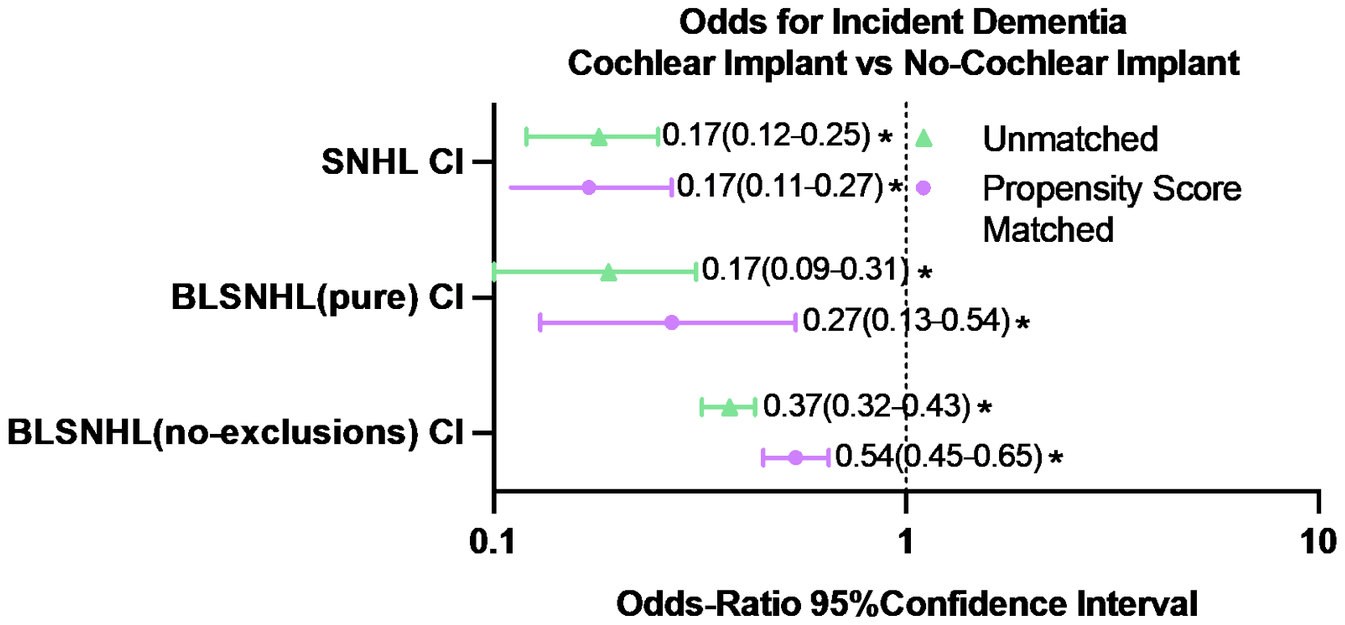
Multiple comparisons: because outcomes were pre-defined, and the number of comparisons were limited, we decided to not adjust our p-values.

Odds ratios (OR) with 95% confidence intervals were calculated for dementia (ICD10: F01, F03, G30), neuropsychiatric, and ALE outcomes (Fig1 and QR code) 1-4,500 days after index. Patients with outcomes prior to index were excluded from analysis.

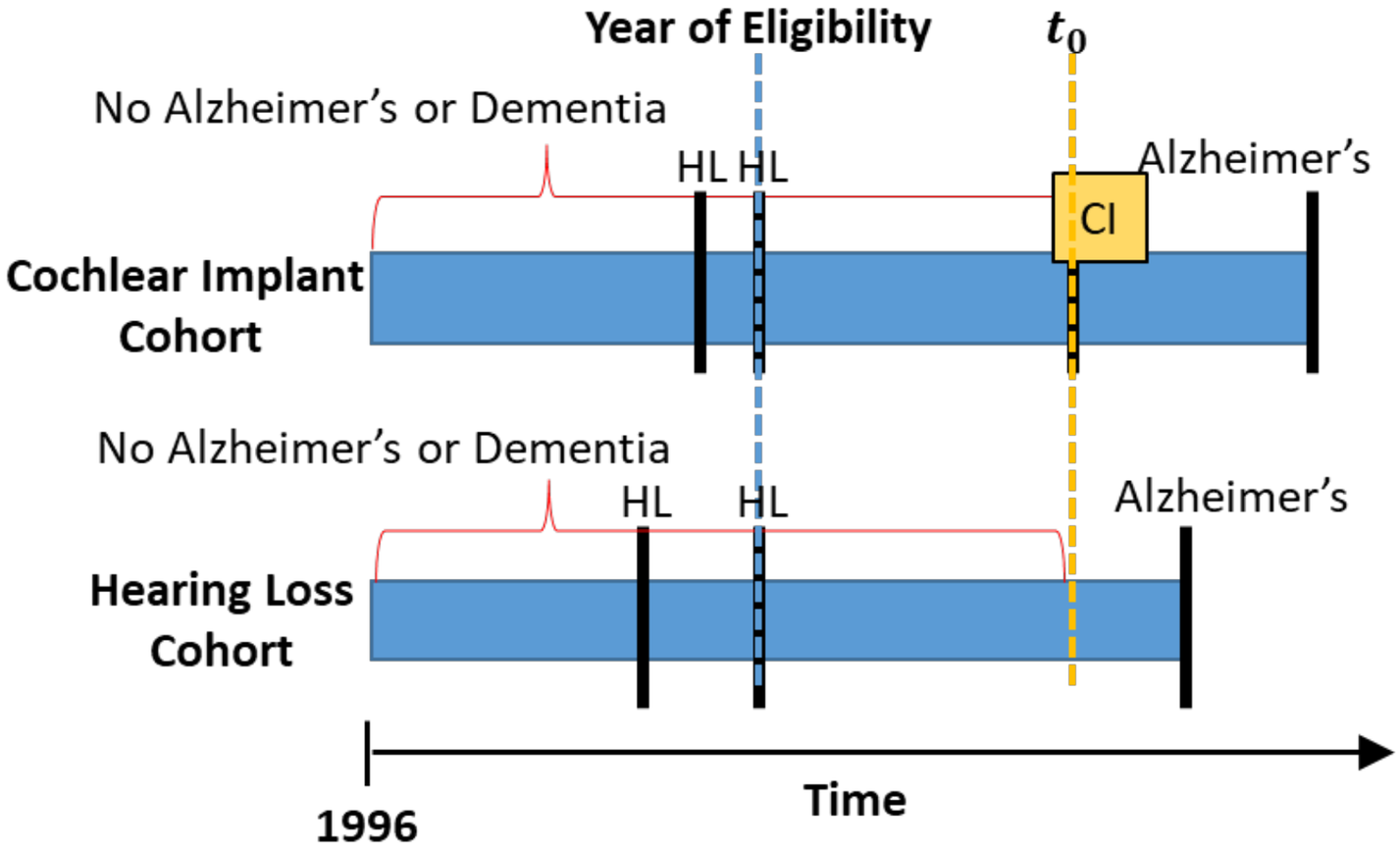


COCHLEAR IMPLANTS - RISK OF DEMENTIA



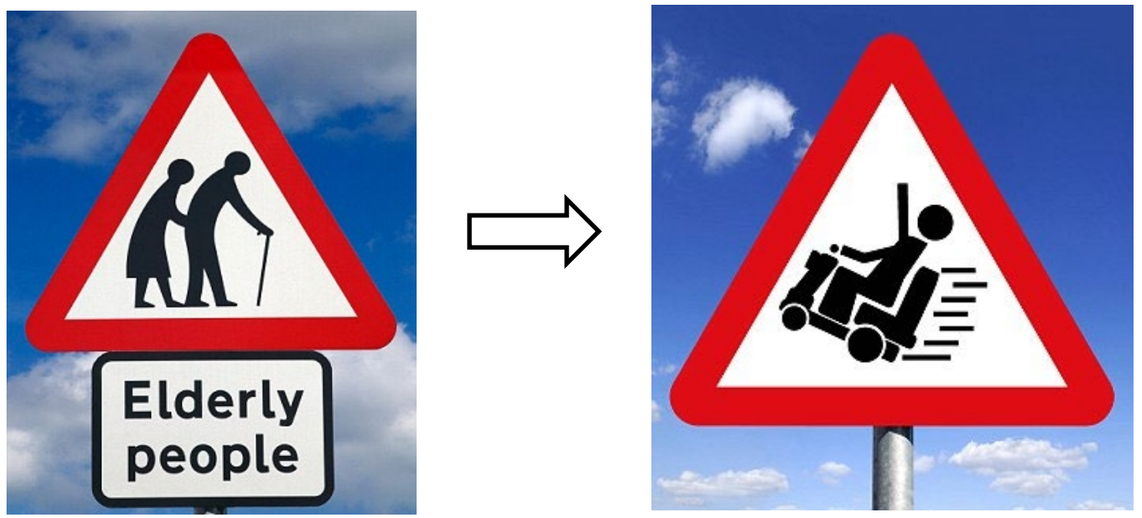


DO COCHLEAR IMPLANTS MITIGATE THE RISK OF AD?



COCHLEAR IMPLANTS IN OLDER ADULTS

- Move past "safe and effective." No longer research
- How do we improve access?



QUESTIONS

- Did her hearing loss cause her dementia (or is her "dementia" just hearing loss)?
- Would you offer a cochlear implant to this patient?

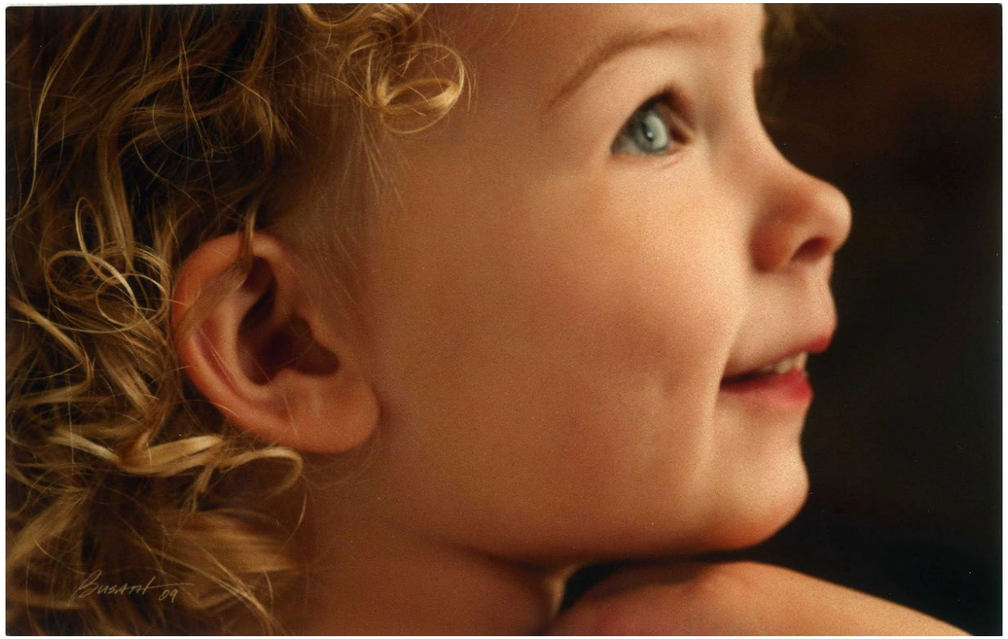
FUTURE DIRECTIONS

- Screening data
- Observational cohort study: CI-Alzheimer's
  - UPDB
- Long-term outcomes CI-cognition
- Frailty and CI
- CI and QoL – patients and caregivers

CONCLUSIONS

- There is an association between hearing loss and dementia
- Cochlear implants and hearing aids are safe and effective in older adults, and can improve cognition
- Cochlear implants and hearing aids may reduce risk of cognitive decline and/or dementia

THANK YOU



Questions

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