What practice effects can tell us about diagnosis, prognosis, treatment recommendations, and cognitive resilience in late life cognitive disorders
Disclosures

• NIH funding as PI or Co-I (P30AG066518, R01AG075959, R01AG073261, K01AG073578, K01AG075166, R01MH132218)

• Clinical trials as Co-I or rater (VIVA-MIND with Vivoryon Therapeutics N.V.; AHEAD with Eiasi)
Objectives

• Introduce concept of practice effects and how its calculated

• Instruct on value of practice effects in understanding the diagnosis, prognosis, treatment recommendations, and cognitive resiliency in older patients

• Demonstrate these points through a case example
Resilience within the Cognitive Domain

- Cognitive Reserve: better-than-expected cognitive functioning for age or for age-related brain changes
  - Proxy: educational/occupational attainment
- Brain maintenance: relative absence of “normal” age-related brain changes
  - Proxy: MRI/PET/spectroscopy/etc.
- Interplay of genetic and environmental factors that reduce impact of perturbation on cognition

Abadir et al., 2023
Can studies of people with Alzheimer's disease who do better than expected contribute to an understanding of resilience?
Can studies of people with Alzheimer's disease who do better than expected contribute to an understanding of resilience?
Case Presentation

• 78 yo WWF
  • 14 yrs education, retired bookkeeper
  • Widowed x 5 yrs, lives alone, IADLs independent
  • HTN, T2DM, osteoarthritis, depression
  • Gradually worsening memory x 2 yrs
  • MoCA = 22/30 (1/5 recall)
  • Dx of MCI? Referral to neuropsych? Order MRI of brain.

• MRI appt 2 weeks later
  • mild diffuse cerebral volume loss, mild nonspecific white matter hyperintensities
  • MoCA = 26/30 (4/5 recall)
  • No dx of MCI? Referral to neuropsych!
Case Presentation

NP evaluation:
“Intact in all cognitive domains, except delayed memory.”
“Likely amnestic MCI. Likely due to Alzheimer’s disease. Likely getting worse over time. Repeat testing in one year.”
“Consider lecanemab.”
Follow-up NP evaluation: “Improvements in all cognitive domains, but especially delayed memory.” “Although practice effects may explain some of these changes, she may also have reverted to normal.”
Practice effects (PE)

- Improvements in cognitive test performance due to repeated evaluation with the same/similar test materials
- Due to declarative and procedural memory
- Traditionally viewed as source of error
- May be a marker of cognitive reserve/plasticity/resiliency

Hammers et al., 2021

HVLTR Total Recall in healthy elders
Calculating PE

• Simple difference = T2 – T1 or Ratio = T2/T1
  • Easiest, but doesn’t correct for expected PE, test-retest reliability, regression to the mean, or baseline score, so not sure if it’s clinically meaningful
  • 95 – 73 = 22, ?
  • 95/73 = 30% improvement, ?

• Standardized Regression-Based = (T2_{OBS} – T2_{PRED})/SEE
  • Even more challenging, but does correct for all relevant variables
  • Tends to be most sensitive
  • T2_{PRED}=82.4; (95 – 82.4)/11.5 = z = 1.1, improved more than 86% of comp group
  • Similar to ”Expected Recovery Differential” approach from Dr. Whitson

Duff, 2012
Duff et al., 2017

Delay Memory: 73 → 95
PE: Nuisance or Informative Marker of Cognitive Resilience?
PE across one week can tell us something about the severity of the cognitive impairment, which can inform the diagnosis.
PE inform diagnosis

- PE across one week can tell us something about the breadth of the cognitive impairment, which can also inform the diagnosis.

NIA R01: Duff (PI)  
Pilot work funded by CoA
PE inform prognosis

Long-term changes in cognition:
- Intact show stability/slight improvement
- MCI show slight decline
- AD show decline
PE inform prognosis

PE across one week can tell us something about the individual’s cognitive trajectory, which can inform prognosis.
MCI did show PE across one week, but it fell well below normative expectations.
After controlling for baseline differences:
• High PE group showed more benefit post-tx
• High PE group maintained more gain at one year
PE informs cognitive resiliency

High and Low PE groups for each diagnostic group (intact, MCI, AD)

With-in each group:
• High PE group showed significantly higher global cognition
• PE seems to indicate cognitive reserve/resiliency

No within-group differences on age, education, sex, race, or ethnicity
PE informs cognitive resiliency

• High and Low PE groups were all diagnosed with aMCI
  • No differences on age, education, sex, race, or ethnicity
  • High PE had significantly higher premorbid intellect
  • High PE had significantly higher RBANS Total at baseline, as well as higher scores on tests of learning and memory, attention, and processing speed
  • High PE had significantly higher scores on performance-based measures of daily activities at baseline
  • The informants of High PE rated them as more functionally intact at baseline

• In the face of the same cognitive disorder diagnosis, those with High PE appeared more cognitively resilient
Case Presentation

• 78 yo WWF
  • 14 yrs education, retired bookkeeper
  • Widowed x 5 yrs, lives alone, IADLs independent
  • HTN, T2DM, osteoarthritis, depression
  • Gradually worsening memory x 2 yrs
  • MoCA = 22/30 → 26/30
  • NP: imp memory → intact memory with large PE
  • What do PE tell us about her?

• Likely more intact than MCI (e.g., subjective cognitive decline, reverter)

• Less likely to worsen over the coming year, even if she is MCI

• More likely to respond to a cognitive intervention

• More likely to be cognitively resilient
Resilience within the Cognitive Domain

- PE may allow us to identify those with higher cognitive resilience and predict those who will have more favorable outcomes in response to cognitive insults

Abadir et al., 2023
<table>
<thead>
<tr>
<th>City</th>
<th>Annual rainfall</th>
<th># days with rain per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt Lake City</td>
<td>18 inches</td>
<td>91 days</td>
</tr>
<tr>
<td>Portland</td>
<td>36 inches</td>
<td>164 days</td>
</tr>
</tbody>
</table>
Summary

1. PE are a complex cognitive phenomenon that might inform us about cognitive reserve/plasticity/resiliency.

2. Those with higher PE are more likely to be present with no/milder cognitive disorders, less likely to progress over time, more likely to respond to interventions, and more likely to be cognitively resilient.

3. Being aware of and using this information in clinical cases can make for more personalized diagnoses, prognoses, and treatment recommendations for our patients.
Thank You
Resilient Place for Healthy Aging

Rocky Mountain Geriatrics Conference, Utah

Andy Hong | City & Metropolitan Planning, University of Utah | Sep 27, 2023
1. Built Environments against Healthy Aging
2. Built Environments for Healthy Aging: Age-Friendly Communities
3. Aging in Place through the Pandemic
4. Resilience through Environmental Design
Built Environments against Healthy Aging
1\textsuperscript{st} Case in Point: Sprawl Development
Homogenous Suburban Neighborhoods
Built Environment and Cognitive Health

REGARDS: A national prospective cohort study

Figure 2. Predicted cognitive function scores for individuals

Cognitive function score using five validated measures: verbal learning, memory, orientation, language, and executive function

- Business density
- Availability of parks
- Access to recreation centers

Note: Shaded regions represent 50%, 75%, and 90% uncertainty intervals.

Finlay et al. (2021). *Preventive Medicine*, 150
Aging in Place, Stuck without Options:

No Transportation Options
The City Looks Different When You’re Older

By Andy Hong
Dr. Hong is an assistant professor at the University of Utah and the director of its Healthy Aging and Resilient Places Lab.

This article is part of “Can America Age Gracefully?,” a series on how the country should prepare for the next big demographic shift.

Hong. (2023) New York Times
https://t.co/yQnK60FR7j
2nd Case in Point: Car-oriented Neighborhoods
Walkable Place

Car-oriented Place
Walkable Place

Car-oriented Place

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10 minute walking range

- Major destinations
Built Environment and Obesity

Built environment influences on healthy eating and active living: The NEWPATH study

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Abstract

Objective: The Neighbourhood Environments in Waterloo: Patterns of Active Transportation and Health (NEWPATH) study examined built environment influences on travel, physical activity, food consumption, and health. This collaboration between researchers and practitioners in health and transportation planning is the first, to our knowledge, to integrate food purchasing, diet, travel, and objectively measured physical activity into a trip-destination protocol. This study simultaneously examines diet and physical activity relationships with BMI and waist circumference (WC).

Methods: Individual diet and travel diary data were linked to objective built-environment measures of walkability and retail food environments. BMI and WC were self-reported (n = 1,160). Some respondents wore accelerometers to objectively measure physical activity (n = 549). Pathways from the built environment through behavior (walking and eating) to BMI and WC were assessed using path analysis.

Results: Walkability was associated with lower BMI and WC through physical activity and active travel. Healthy retail food environments were associated with healthy eating and lower BMI and WC, whereas walkability and healthy retail food environments were insignificant (p < 0.05). Walkable neighborhoods had less healthy food environments, but active travel was not associated with healthy eating or caloric intake.

Conclusions: Findings highlight the importance of neighborhood walkability and food environments in shaping physical activity, diet, and obesity.

Frank et al. (2022). Obesity, 30: 424-434
Built Environment and Obesity

3rd Case in Point: No Place to Walk or Use Wheelchairs
Marginalization of pedestrians in the roadway space
Sidewalk Occupancy: City Ranking

Sidewalk occupancy ranking of 10 cities around the world

Rhoads et al. (2021). *Communications Physics*, 4(183)
Sidewalk
Occupancy:
City Ranking

Sidewalk occupancy ranking of 10 cities around the world

Rhoads et al. (2021). *Communications Physics*, 4(183)
Sidewalk Occupancy: Denver vs Paris

Rhoads et al. (2021). *Communications Physics*, 4(183)
Our Next Infrastructure Crisis: Broken Sidewalks

And California moves to streamline approvals for transit, bike and pedestrian construction projects and more in this week's The Mobile City.
For Smaller Towns, Paying for Sidewalks Isn't Always Simple

Missoula considers a new approach to funding walkability as demand grows
2

Built Environment for Healthy Aging: Age-Friendly Communities
What is Age-Friendly Environment?

The 8 Domains of Livability:
- Housing
- Outdoor Spaces and Buildings
- Transportation
- Communication and Information
- Social Participation
- Health Services and Community Supports
- Respect and Social Inclusion
- Civic Participation and Employment
Age-Friendly Interventions for Health and Social Outcomes

Hong et al. (2022). IJERPH, 20(30): 2554

Review

Age-Friendly Community Interventions for Health and Social Outcomes: A Scoping Review

Andy Hong 1,*, Jesse Welch Stockton 1,*, Ja Young Kim 1,*, Sarah L. Canham 1,2,3,4, Valerie Greer 1,4 and Michelle Serwed 1,2,4

Abstract: To address the numerous challenges associated with aging, increased attention has been given to the development of age-friendly cities and communities (AFCC) to promote healthy aging and social participation. However, limited evidence exists for addressing both health and social needs through the AFCC framework. We address this gap by conducting a scoping review of the interventions that target both health and social outcomes within the purview of the AFCC framework. The results showed that many of the successful interventions used a partnership model and behavioral change theories to inform the program design and implementation. The results also indicated that social participation and engagement played a key role in making the interventions successful. However, the results revealed that the literature is dominated by person-focused approaches. Future research should focus more on evaluating environmental-focused interventions and develop a holistic framework that combines both person- and environment-based approaches to healthy aging.

Keywords: age-friendly cities and communities, age-friendly interventions, health outcomes, social outcomes
Age-Friendly Interventions for Health and Social Outcomes

Physical activity interventions
- Resistance training program
- Fall-prevention program
- Tai Chi program
- Exercise program
- Healthy ageing program

Educational interventions
- Cognitive stimulation / training
- University program
- Peer-led education
- Comedy improvisation program
- Family-based empowerment program
- Health promotion program

Multi-domain interventions
- Senior living enhancement program
- NORC supportive service
- Health education and exercise
- Multi-center health promotion

Other interventions
- Free bus pass
- Online social network and technology training

Hong et al. (2022). *IJERPH*, 20(30): 2554
'HAPPY' Program from Singapore

- **Objectives:**
  - Observe improvements to cognition
  - Observe overall health and social outcomes
- **Population:** Older adults 60+
- **Intervention:** 3-month community-based exercise program
- **Results:** Significant improvements in cognitive, social, and physical functions

Merchant et al (2021) J Nutr Health Aging
**Free Bus Pass Program from England**

- **Objectives**: Analyze the impact of free bus passes on the mental health of older people in England
- **Population**: Older adults in England
- **Intervention**: Free bus passes for qualifying older adults
- **Results**: Overall decreases in depressive symptoms and feelings of loneliness

Reinhart et al (2018) *J Epidemiol Community Health*
Aging in Place through the Pandemic
Photovoice Study of Older Adults during COVID-19

Aging & Society (2023), 1–24
doi10.1177/0144686X23002211

ARTICLE

Shifting perspectives: outlooks on ageing in place in the COVID-19 era

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(Accepted 6 March 2023)

Abstract

Given the significant impact the pandemic has had on the lives of older adults, research is needed to understand how conceptions of ageing in place and attitudes about living independently may have shifted during a time marked by significant environmental change. There is a gap in knowledge about how older adults characterise positive support for ageing in place in response to rapid changes in physical and social environments, including home confinement, reduced social interaction and greater barriers to resources. To fill this knowledge gap, we conducted a photovoice study with community-dwelling older adults (N = 17).

Participant 6: This is on the street that I live on. And it just is, this is my very own neighborhood. This is looking east, and I took this picture because there are a lot of shelves, windows on my street, and we kind of helped each other out, some of us in varying ages. And that just reminded me how important that is to have a little colony of older ladies. There's one little old lady, she's 90. We'd like to make a walking group.

Interviewer: And how does this support or not support your idea of ageing in place?

Participant 6: I think it helps, you know, I mean, having some people you know, you have to... Yeah, and people you know are going to help you. Whenever you are in trouble. So I think it supports having a little neighborhood to be in.

Interviewer: And then how has the pandemic changed how you value this?

Participant 6: I think that it helped even more because I think we all got to know each other a little bit more because we're stuck in homes the street, it's not a street any more. You know you can stand in the middle of the street for a while there before anybody comes, but we would know several people when we saw each other and stuff like that, and I think that's been really, really increased the camaraderie of us.

Participant 5: That's my workout, front room. And that just represented my online class that I took last summer through the rec center that I belong to the... they had... they had a program... group called for teaching seniors, um, exercise and exercise. So I got to do that on zoom last summer.

Interviewer: What does this mean to you?

Participant 5: Um, it was... it was actually not bad for all of us. I had two trainers because there weren't enough older people to do it. So I had two young women that were asbestos. They'd take turns, and it worked out really good because they didn't have to leave their apartments. I didn't have to leave the house. We had lots of fun doing exercises and talking, and it was... it was actually quite fun.

Interviewer: That's cool. What about the photo supports or doesn't support your ability to age in place?

Participant 5: Well, of course, exercise is always good for everyone, but especially at your age, because your body goes down the line faster if you use it, and so I really try to exercise everyday, just a little bit. And just to keep my muscles as strong as I can.

Interviewer: How has the pandemic changed the way you view your safety compared?

Participant 5: Well, it really made me value the computer, and the internet and the technology really gave me another way to keep in touch with the world. That's cool.

Photovoice Study of Older Adults during COVID-19

From Sheltered in Place to Thriving in Place: Pandemic Places of Aging

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Decision Editor: Andrea Cimenko-Blostein, PhD, RN

Abstract
Background and Objectives: Response to the coronavirus disease 2019 pandemic required rapid changes to physical, social, and technological environments. There is a need to understand how independent-living older adults are adapting to pandemic-driven transformations of place and how environmental factors may shape experiences of aging well in the context of a public health emergency response.

Research Design and Methods: We conducted a prosence study to examine the characteristics associated with aging in place. Our study investigated how independent-living older adults characterized aging in a “right” place approximately 1 year after the onset of the pandemic.

Results: Six themes categorized into 2 groups capture how older adults describe a “right” place to age. The first category, “places as structure of identity and belonging,” describes the significance of places contributing to intimate relationships, social connections, and a sense of personal continuity. The second category, “places as facilitators of activities and values,” recognizes environments that promote health, hobbies, goals, and belief systems. Participants reported modifying their daily living environments with increased use of technology and more time outdoors.

Discussion and Implications: Our findings emphasize older adults’ active engagement with place and strategies used to maintain healthy aging through public health restrictions. The results also identify place-based characteristics that may help older adults adapt to stressful circumstances from their unique perspectives. These findings inform pathways to pursue to facilitate resilience for aging in place.

Keywords: Aging in place, Covid-19, Older people, Phenomenon

Identity and Belonging

Activities and Values

Care and maintenance of one’s home   Ability to “stay close to those closest to you”   Choice of spaces for social connection

Access to outdoors and physical exercise   Pursuit of hobbies and goals   Affirmation of values and inner beliefs

Figure 3. Characteristics of aging in a “right” place during the pandemic.

Technology is a two-edged sword; for many people, (it) expanded options […], but the individuals who don’t have technology…that is obviously a bigger issue.

Seniors who were receiving services in offices for mental health support were cut off … [they] are low-income, struggle with technology and isolation …

So many people didn’t have situations in place where they could be home and be safe without being connected to resources …
4

Resilience through Environmental Design
Domains of Resilience in Aging

Urban Resilience Framework

Systems-Level Urban Resilience Framework (ACAT): A Continuum Driven by Resilience Characteristics

Level of Resilience

Resilience Characteristics

- Robustness – Redundancy
- Inclusiveness
- Coordination
- Reflectiveness

AWARENESS
- Identify risks
- Enhance knowledge and preparedness
- Support resilient actions and behaviors

COPING
- Systems are able to: withstand shocks
- maintain essential functions
- quickly recover

ADAPTING
- Behavioral and institutional changes as a result of learning and reflection on past experience

TRANSFORMING
- Policies and investments unlock suppressed economic and social potential

Why Older People Managed to Stay Happier Through the Pandemic

New surveys over the last year show that the ability to cope improves with age.
Resilient Place

"A place that enables individuals to identify and withstand challenges while helping them to adapt and transform their environment"
A place that enables individuals to identify and withstand challenges while helping them to adapt and transform their environment.
1. Resilient Place through Increasing Awareness

Macro/Meso Level
- Community / neighborhood scale
  - Spatial Mapping Techniques
  - Detection of Outdoor Fall Risks

Micro Level
- Household / streetscape
  - Deep Learning Techniques
2. Resilient Place through Coping Mechanisms

Nature Rx Pilot Study
This pilot project focuses on identifying older people’s unique challenges and needs when designing nature-based mental health interventions

Collaborating Partners

Madsen Health Center

https://www.harp.utah.edu/projects/nature-rx-pilot-study
3. Resilient Place through Adaptation

CAPABLE Study
A national study combining handyman services with nursing and occupational therapy to improve mobility and decrease healthcare costs

35 locations across the country

https://capablenationalcenter.org
Cobblestone Mat Walking Study

3-month cobblestone walking program led to increasing physical function and decreasing blood pressure compared to conventional walking.

Table 2. Outcome Scores by Group at Baseline and Postintervention

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Mat Walking (n = 54)</th>
<th>Regular Walking (n = 54)</th>
<th>P-value* Group × Time Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional reach, inches</td>
<td>12.89 ± 2.67</td>
<td>11.17 ± 2.68</td>
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<tr>
<td>Static standing (range 0–4)</td>
<td>3.87 ± 0.39</td>
<td>3.57 ± 0.60</td>
<td>.009</td>
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<tr>
<td>Chair stands, seconds</td>
<td>9.40 ± 2.62</td>
<td>10.98 ± 3.99</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>50-foot walk speed, seconds</td>
<td>10.60 ± 2.45</td>
<td>11.62 ± 2.32</td>
<td>.01</td>
</tr>
<tr>
<td>Up and Go, seconds</td>
<td>5.87 ± 1.23</td>
<td>6.62 ± 1.65</td>
<td>.14</td>
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<tr>
<td>Systolic blood pressure, mmHg</td>
<td>125.98 ± 13.17</td>
<td>130.97 ± 11.45</td>
<td>.01</td>
</tr>
<tr>
<td>Diastolic blood pressure, mmHg</td>
<td>72.83 ± 10.63</td>
<td>74.89 ± 7.63</td>
<td>.008</td>
</tr>
</tbody>
</table>

Thank You!

Let’s Connect

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NEIGHBORHOODS AND RESILIENCE AMONG OLDER ADULTS RECOVERING FROM DISABLING INJURIES AND ILLNESSES

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Michelle Shardell, PhD
Daniel Mullins, PhD
Ongoing Work

• Quantitative analysis of neighborhood deprivation and outcomes after fall trauma

• Qualitative evaluation of facilitators and barriers to community mobility among older adults with a new catastrophic disability
Mechanisms of Catastrophic Disability Among Older Adults

- Fall-related hip fracture or head injury
- Critical Illness
- Amputation
Outcomes of Catastrophic Disability Among Older Adults

• Incidence of catastrophic disability among older adults is 9.7% (Gill, 2019)

• 38% of non-disabled older adults who experience catastrophic disability do not regain independence (Gill, 2020)
Home Time As a Marker of Resilience

• Days spent at home after injury may be a marker of resilience

• High priority outcome for patients
  – As few as 7 days difference in home time considered meaningful between two hypothetical treatments (Auriemma et al, 2023)

• May prefer to go home with elevated needs versus an institution
From Clinical Outcomes to Community Outcomes

- Alive and at Home Instead of a Nursing Home or Other Facility
- High Quality Aging in Place
- Unrestricted Participation in Social Activities

Home but homebound is not good enough!
Community Mobility as a Marker of Resilience After Traumatic Injury

Non-community level mobility

Community level mobility

@JRayFalvey
Community Mobility Demands of Older Adults

Average Distance Walked to Important Destinations Among Older Adults

**Doctor:** 38 to 64 meters  
**Pharmacy:** 82 to 216 meters  
**Religious Facility:** 48 to 212 meters  
**Hospital Visitation:** 171 to 749 meters

*Compare this to 150 foot goal common in post-acute and home health care for older adults*

Community Mobility Demands of Older Adults

Favorite Activities of Community-Dwelling Older Adults

- Walking/jogging (14%)
- Outdoor maintenance (13%)
- Playing sports (8.9%)

Value of Community Mobility to Older Adults with a New Disability

What was one thing outside your home that you were really excited to get back to outside the house?

**Participant:** “Going to the stores without calling on children. Able to get back on MTA bus without being afraid that I’m going to fall. Just being mobile again is very important to me.”
Value of Community Mobility to Older Adults with a New Disability

Okay. How did you feel about getting out to the mobility bus...how did it feel? Did you feel ready to do that?

“I had no other choice. I was not going to stay in the house and pop pills all day. I was not going to become a basket case. I had to get up, I had to get out. I had to do what I had to do”
-Participant 3
Community Mobility

25% of older adults cannot walk 2-3 blocks outside unassisted

• 17% can’t with a device

1 in 10 older adults lose the ability to walk community distances each year

Hardy, 2004; Mathis et al, in preparation
Implications of Limited Community Mobility

• Inability to walk ¼ mile (2-3 blocks) associated with
  – ~3 fold increase in mortality rates over 1 year
  – 22 more hospitalizations per 100 people

• Limited ability to access public transportation, visit family and friends, attend medical appointments, participant in religious services or clubs

Hardy, 2004; Falvey et al, in preparation
Implications of Limited Community Mobility

• Less able to relocate during disasters/public health emergencies
  – COVID-19, natural disasters, wildfire smoke*

• Increasing disability, need for caregiver support, and risk for institutionalization

• Social isolation and loneliness (Kuang, 2023)
Precipitants for Community Mobility Loss

- Restricted Activity: 144% increase in risk
- Hospitalization: 621% increase in risk

Suggests we do not do a great job of helping people restore community ambulation after acute admissions

Gill, 2012
Shrinking Life-Space Increases Social Isolation for Older Adults
Impact of Neighborhood Environment on Disability Recovery
Major Neighborhood Factors Influencing Resilience

- Built Environment
- Social and Economic Environment
- Access to Healthcare
Built Environment Quality and Mobility

Living in neighborhoods with broken sidewalks, cracks, or curbs:
~4.5 times the odds of mobility disability (inability to walk 2-3 blocks)


Built Environment Quality and Mobility

Lack of continuous sidewalks: 27% increase in the odds of being a recurrent faller (Okoye, 2021)


@JRayFalvey
Squats Don’t Address Social Determinants of Health!
Older Adult Perspectives on How Built Environment Impacts Community Mobility

“I go 10 blocks out the way on a bus to get to a sidewalk that I can walk on that's not raggedly and that's even. So, yes, I do dumb stuff like that.

I'll get on a bus and I'll go 10 blocks away so that I can come down on this side of the street instead of walking up on the side of the street that's raggedly.”
Neighborhoods and Recovery from Disability

Drew data from Yale Precipitating Events Study (Gill, PI)

Critically ill patients (n=239 admissions) followed for monthly 1 year after admission

Living in a disadvantaged neighborhood: **15% higher** disability burden over 1 year

Falvey et al, 2021; Critical Care Medicine

https://journals.lww.com/ccmjourn/Abstract/9000/Neighborhood_Socioeconomic_Disadvantage_and.95048.aspx
Neighborhoods and Recovery from Disability

Drew data from VALIANT, a cohort study of older COVID survivors (Ferrante/Cohen, mPI)

Older COVID-19 survivors followed for 6 months

Persistently higher symptom burden for older adults

Falvey et al, under review

https://journals.lww.com/ccmjournal/Abstract/9000/Neighborhood_Socioeconomic_Disadvantage_and.95048.aspx
Neighborhood Social Environments

The true meaning of life lies in the connections we forge with others

-James Joyce
Neighborhood Social Environments and Resilience After New Disability

• Social connectedness is a critical aspect of recovery after developing a new disability

• Low individual level social connections associated with more post-hospitalization disability (Falvey et al, 2021)

• Low neighborhood cohesion and trust also associated with poorer outcomes
Social Isolation Impedes Recovery From Disabling Hospitalizations

119% elevated risk for death between most and least socially isolated

Falvey et al, JAMA Internal Medicine (2021)
Social Isolation and Disability

50% higher disability burden between most and least socially isolated

Falvey et al, JAMA IM (2021)
Older Adults Unable to Walk 3 Blocks Independently in the United States, NHATS 2015-2020

Falvey et al, in prep
Low Neighborhood Social Cohesion Impacts Community Mobility

Falvey et al, in prep

% Unable to walk 3+ blocks

Low Social Cohesion

High Social Cohesion

Falvey et al, in prep
"I think that my neighbors are great. Luckily I've been in the neighborhood for quite a while and thank goodness. When you build a rapport, I think that's almost essential....So I think that my neighbors have been wonderful."

"If I need a little help coming in the house, if I have too many bags, they're very helpful. I live in a big building with a lot of people, so someone is always there to help."
Importance of Neighborhood Safety

Study Participant #1

“It's just this atmosphere of Baltimore. I'm scared that a bullet don't have no name on it, so I'm just scared”

Falvey et al, in preparation
Importance of Neighborhood Safety

Study Participant #3

“I don't feel like ducking bullets outside. Like I tell people I can't get down no more. I can't run.”

Falvey et al, in preparation
Importance of Neighborhood Safety

Study Participant #9

“The store's probably two and a half blocks at least. I can't walk that distance. I'm afraid really to walk that much, because things go on around this block....I'm not in position that where if I was to go out there, that if something, happened I would be a sitting target. There would be no escape for me.”

Falvey et al, in preparation
Lower Access to High-Quality Care

Residents of high-poverty zip codes tabulation areas receive lower quality home-based and nursing home care

• Increase in those living in poverty associated with lower quality in SNFs (Park, 2018)

• Readmission rates higher for home health agencies serving a high proportion of patients in low-income areas (Joynt Maddox, 2017)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6056600/
Lower Access to High-Quality Care

Preliminary work from collaborative work with NYU School of Nursing (Co-PIs Travers/Falvey)

Jasmine Travers, AGPCNP-BC, CCRN, PhD, RN
Staffing in Nursing Homes Located in Disadvantaged Areas

Difference in Hours Worked Relative to More Advantaged Facilities, per 100-patient days

Falvey et al, Journal of the American Geriatrics Society, 2022
Accessing Outpatient Care Harder in Disadvantaged Neighborhoods

• Nearly 10% of older adults regularly use public transportation (Gimie et al, 2022)
  – 600,000 use public transportation regularly to get to their doctor
~20% of older adults in some urban areas must walk >500 meters to access fixed-route public transit (Clarke et al, 2011)

More transit stops in a neighborhood is associated with better mobility for older adults (Hirsch, 2014)

https://americanhealth.jhu.edu/sites/default/files/2021-09/JHU-016%20Transit%20Equity%20Report-FINAL_0.pdf
In Baltimore, low transit density is more common in the most economically deprived neighborhoods.
Frailty
Probable vs No Dementia
Possible vs No Dementia
Vision Impairment
Hearing Impairment
Unable to Walk 3 Blocks
Uses Walker Vs Cane/No Device
Uses Wheelchair Vs Cane/No Device
Any ADL Disability
Financial Strain
**Broken/Cracked Sidewalks Near Home**
No Working Cell Phone
No Working Computer

Less Likely to Report Transit Use  More Likely to Report Transit Use
Current Gaps in Rehabilitation Care to Promote Community Mobility

**Acute Care and Rehabilitation Settings:**
- Minimal outside ambulation for older adults, minimal practice navigating environmental hazards
- Functional outcome tools **max out at 150 feet**
- Rehab not as available in facilities in high-poverty areas

**Home Health Care:**
- Homebound requirement for older adults, often leads to artificial barriers on community mobility practice
- Gaps between home health outcomes and demands for outpatient care are high

**Outpatient Care:**
- Rarely focuses on community mobility, transit access, or other barriers
- Requirements for seeing multiple patients at one time does not allow optimal care
- DME requirements only allow devices for use in home, not community
Moving for Mobility Equity
Addressing Neighborhood Barriers to High Quality Aging in Place After Hip Fracture

Aim 1: Evaluate the impact and relative influence of neighborhood factors on high-quality aging in place.

Aim 2: Filter through the experiences of community stakeholders.

Engaging Community and Municipal Stakeholders to Promote High Quality Aging In Place After Hip Fracture
Take-Home Points

• Community mobility is important to older adults, but not often prioritized in rehabilitation
• Failure to recover community mobility impacts minoritized and vulnerable older adults most
• Interventions should address physical limitations and structural barriers to be maximally effective
Questions
End of Life Care: Transition from CG to Survivorship

Kara Dassel, PhD, FGSA, FAGHE
Rocky Mountain Geriatrics Conference
September 26th, 2023
DISCLOSURES & FUNDING

• I have no business or financial conflicts to disclose.

• Research Funding
  – Center on Aging Pilot Grant
  – Burton Foundation
  – Alzheimer’s Association
  – National Institute on Aging
OBJECTIVES

- Importance of advance care planning (ACP)
- Unique aspects of ACP in Alzheimer’s disease and Alzheimer’s disease-related dementias (AD/ADRD)
- Creation of a dementia ACP planning guide
- Preliminary intervention results & next steps
- Additional ACP resources
ADVANCE CARE PLANNING

ACP is a communication process that empowers adults of any age and any state of health to articulate and share their personal
• values
• life goals, and
• preferences regarding future medical care.3

Components:
• Conversations
  – 5 D’s (death, decline, diagnosis, divorce, decade)
• Documentation
  – Medical Advance directive
  – Values & preferences
• Revisiting and revising
  – Not static!
# BENEFITS OF ACP

**Patient**
- Reduce unnecessary medical interventions\(^{15-16}\)
- Lower rate of hospital readmissions\(^{15-16}\)
- Fewer transitions between health care settings,\(^{15-16}\)
- Lower end-of-life health care costs\(^{6,17}\)

**Caregiver**
- Decreased physical pain and emotional distress
  - Improve subjective well-being\(^{26}\)
  - Lower burden\(^{19-20}\)
  - Lower anxiety\(^{24-25}\)
  - Higher levels of decision-making confidence\(^{27-28}\)
  - Greater ACP congruence\(^{32-34}\)
ACP WITHIN THE CONTEXT OF AD/ADRD

Important!
End-of-life health care decisions rely on the substituted judgment of caregivers after the PWD loses decision-making abilities.5-9

But...less likely to:
• complete an advance directive,10,11
• appoint a surrogate decision-maker,12,13
• or engage in ACP conversations with family.14
ACP CAN HELP AVOID STRESS

I wish I knew what mom would want.

I don’t want to be a burden to my family.

I can’t put him in a ‘home.’

I don’t recognize my family, I’m ok to ‘go.’

I feel so guilty…
NEED FOR DEMENTIA FOCUSED ACP TOOLS

• Designed for use in specific healthcare settings:  
  – primary care, 14, 49-52 nursing homes, 13, 53-57 & hospitals 46, 58, 59

• Many require a third party to facilitate 51, 52, 60

• Not theoretically developed or psychometrically validated 61-63

• Don’t promote active engagement in meaningful conversations 60, 64, 65

• Don’t focus on increasing knowledge and competence of the caregiver 40, 42, 66-68

• Don’t focus on decisions across the disease trajectory 24, 69
MAKING A CASE...

A Comparison of the Influence of Anticipated Death Trajectory and Personal Values on End-of-Life Care Preferences: A Qualitative Analysis

Katherine P. Supiano PhD, LCSW, Nancy McGee MS, MBA, Kara B. Dassel PhD & Rebecca Utz PhD

The Influence of Hypothetical Death Scenarios on Multidimensional End-of-Life Care Preferences

Kara B. Dassel, PhD¹, Rebecca Utz, PhD², Katherine Supiano, PhD, LCSW³, Nancy McGee, MS, MBA¹, and Seth Latimer, MStat¹
THE LEAD GUIDE

Part 1: End-of-life documents
- Living will/advance directive
- DNR
- Medical power of attorney

Part 2: Values
- Quality vs. length of life
- Burden (financial, emotional, physical)
- Decision-making (autonomy vs. shared)

Part 3: Preferences
- Location for ongoing care
- Life-prolonging measures
- Location of death
- Control over the timing of death

Available at: utahgwp.org under Resources
FOUR WAYS TO COMPLETE THE LEAD GUIDE

1. By yourself
2. With the person you have named or wish to name as your medical power of attorney
3. Use it to guide general conversations about your future care
4. Use it to help your healthcare providers understand your end-of-life wishes

There are many ways to use the LEAD Guide:

1. You can use it by yourself. The LEAD Guide will take you through a series of questions about values and preferences associated with what types of care you want or do not want at the end of life. Note: Even if you complete the LEAD Guide by yourself, it is a good idea to share it with your family, friends, or healthcare provider (doctor, nurse practitioner, physician assistant, etc.).

2. Use the LEAD Guide with the person you have named or wish to name as your medical power of attorney. Using the guide will help your medical power of attorney understand what care you want to receive if you develop dementia.

3. You may also use it for a more general conversation with your family and friends. This way, the people you trust will understand what care you want to receive if you develop dementia. Using the LEAD Guide will help your family and friends have a shared understanding of your preferences and may prevent conflict in the future.

4. You may use it to help your healthcare providers understand your preferences for your end-of-life care. This information will help them honor your preferences for end-of-life care if you develop dementia.

5. Regularly revisit the LEAD Guide as your circumstances and preferences may change.

Is the LEAD Guide the same as an advance directive?
No. An advance directive is a legal document that broadly states what care you want to receive at the end of your life. It also says when you want to make decisions for you if you cannot do so for any reason. While important, advance directive documents do not cover all the end-of-life decisions that can arise with dementia. We advise everyone to complete advance directive documents in their home state. The advance directive documents are available on your state government’s website.

Is the LEAD Guide a legally binding document?
No. The LEAD Guide is an end-of-life planning tool that supplements legal documents such as an advance directive, do not resuscitate order, or medical power of attorney. The LEAD Guide does not replace those documents. We recommend completing both legal documents and the LEAD Guide.
THREE WAYS THE GUIDE FACILITATES ACP

1. Review what steps you’ve taken regarding preparing for your future end-of-life care
2. Share your values about how you envision your end-of-life
3. Share your preferences for your care at the end of life
PART 1: END-OF-LIFE DOCUMENTATION

Review End-of-Life Documents

1. Advance Directive
2. No Not Resuscitate Order
3. Medical Power of Attorney
PART 2: END-OF-LIFE VALUES

Burden
• Financial, emotional, physical

Quality vs. Length of Life
• Importance of each
• Conditional responses
• Open-ended response to define “quality of life”

Decision Making
• Self, family, doctor
• Situation specific
PART 3: END-OF-LIFE PREFERENCES

AD/ADRD Trajectory

1) Today, when you can make decisions for yourself
2) Later stages of dementia when decision-making abilities are lost
PART 2: END-OF-LIFE PREFERENCES

Location of care
- Nursing home, home, hospice, or hospital

Life-Prolonging Measures
- Feeding tube, ventilator, brain dead, and pain

Controlling the Timing of Death*
- VSED, self-directed, or MAID
SUPPLEMENTAL INFORMATION

- Summary of wishes
- Additional preferences
- Glossary
- Next steps
  - Share with family & healthcare provider(s)
  - Complete a medical advance directive
  - Update regularly
NEW SPANISH LEAD GUIDE!

In collaboration with Alliance Community
• Culturally adapted
• Translated
• Next steps
  – Pilot intervention in Hispanic/Latino community-based AD/ADRD population
DOES THE LEAD GUIDE “WORK”? 

- N=51 dyads
- Decision-making self-efficacy scores improved
- Relationship strain declined
- ACP concordance improved

The LEAD Intervention is a **feasible** and **effective** platform to promote ACP planning in community-based AD/ADRD dyads
NEXT STEPS: WEB-BASED CLINICAL TRIAL

• 5-year clinical trial
• 20-week self-administered web-based ACP intervention
• + Outcomes: subjective well-being and anxiety
• Community-based AD/ADRD dyads
  – Recruitment begins January 2024
  – lead@utah.edu
IN SUMMARY, THE LEAD GUIDE

• Assesses end-of-life **values** that we believe to be static and representative of the individual’s wishes
• Evaluates end-of-life care **preferences** that may be malleable as caregiving situation AD/ADRD progression
• Has strong psychometric validity and reliability
  – Utility in research & practice
• Applicable for all older adults
• Improves ACP concordance & decision-making self-efficacy
• Reduces relationship strain
OTHER ACP RESOURCES
The goal of UGEC is to improve long-term health care through education of the workforce

- Utahgwep.org
- Education & Trainings
  - Motivational interviewing
  - Goals of care Conversations
THANK YOU!

KARA.DASSEL@NURS.UTAH.EDU

OFFICE: 801-646-4667
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REFERENCES


REFERENCES

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Resilience in Aging Brain Research: 
How does the Aging Brain Respond to Stressors?

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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 and aging

2) Frameworks and semantics in resilience research – Friends, not Foes

3) Linking my Concept of Resilience to My Love of the Aging Brain
   -Case Example: Vision loss and the aging brain
   -Case Example: Vascular insults and the aging brain
One Patient’s Story

Mrs. M
A widow in Durham, North Carolina, USA

She was diagnosed with colon cancer about 6 weeks before I met her.
Mrs. M’s Story

She is 91 years old
- Independent in caring for herself, lives alone
- Teaches Sunday school and sings in the choir, “spry”
- Has 3 daughters, 1 son
  “Mama is still large and in charge.”

Past medical history:
  **Vascular**: Type II diabetes, hypertension, hyperlipidemia, obesity
  **Non-vascular**: Arthritis, H/o Breast cancer in 1996

Went to see her primary doctor for rectal bleeding ->
Diagnosed with colorectal cancer
A hard decision: Surgery or no surgery?
Mrs. M’s Story

**Day 1:** Blood pressure dropped (78/50); Bleeding from surgical site
- Transfused 2 units of blood and received medicines to keep blood pressure normal

**Day 2:** Massive Heart Attack. Emergency cardiac catheterization shows many blockages. Because of the damage from the heart attack, the heart was failing as a pump.
Unable to immediately open the clots in her heart, in setting of surgical site bleeding.
She was placed on a **ventilator** to support breathing and a “**balloon pump**” was inserted to support her heart.
  She remained lucid; giving “thumbs up” sign
“A Week of Hellish Uncertainty”

My team is consulted on Day 3 to assist with decision-making and prognosis in this older and now critically ill patient.

Multiple conversations about family and patient preferences and expectations.
Questions I asked myself all week

• How much stress can she take and still regain homeostasis/equilibrium?
• What reduced state will the system be in, when or if it regains stability?
• Is the system showing signs of impending tipping points? Have we reached the point of critical failure (no return)?
• What can we do NOW to best support a system that is in distress and flux?
• Are there tests we could do NOW (or should have done BEFORE) to predict her outcome?
Mrs. M’s Course

Day 9: Surgery site bleeding is finally under control enough to undergo cardiac catheterization and removal of clots in heart arteries. Balloon pump removed.
   Remains lucid: smiling, nodding appropriately
   Slowly weaning from ventilator (a good sign)

Day 11: Ventilator requirements increase; diagnosed with vent-associated pneumonia. Self-extubates in early a.m., and had to be re-intubated within hours. First sign of confusion.

Day 12: **Cardiac Arrest, resuscitated**; IV medications to maintain blood pressure have to be restarted, a sign that her heart is failing.
   Holiday weekend – family wants to wait to make decisions until full team can participate in conversations.
Mrs. M’s Course

Day 14: Kidney function worsens.

Day 16: Patient is confused again (alert, trying to communicate, unable to use alphabet board)

   Status Changed: Do Not Attempt Resuscitation

Day 17-20: Some signs of improvement – a little more lucid; kidneys are improving; blood pressure more stable; slow weaning from the ventilator
Mrs. M’s Course

**Day 21:** Sudden pulmonary hemorrhage and cardiac arrest. Mrs. M died with family at her bedside.
In real patients, one stressor often leads to another, and subsystems do not always exhibit the same resilience.
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.
Diseases can diminish biologic resilience… and lower resilience makes us vulnerable to the next disease…
...and all of these molecular pathways exhibit decline with age (over time), even in the absence of serious disease.
But the rate of decline is not the same for everyone. Why?

And sometimes our patients really surprise us…
What influences recovery of function after any health stressor?
Resilience is Everywhere in Medical Research

Chair: LaVerne L. Brown, Ph.D in Office of Dietary Supplements
Resilience is Everywhere in Medical Research

GOAL

The Collaboratory on Research Definitions for reserve and resilience in cognitive aging and dementia has provided a platform for the exchange of ideas towards developing a framework.
A Brief (and surely incomplete) History of Resilience in Aging Research

- Wagnild & Young 25-item Resilience Scale (1993)
- Many tools in psychosocial literature (2012)
- Cognitive reserve elaborated by Yaakov Stern (2011)
- NIA Workshop on Measuring Resilience in Laboratory Animals (2014)
- NIA Workshop on Measures of Physiologic Resiliencies in Human Aging (2016)
- 1st Workshop on Research Definitions for Reserve and Resilience in Cognitive Aging & Dementia (2019)
- AGS/NIA Workshop on Overview of the Resilience World (2022)
1) **Brain Connectivity in Age-related Macular Degeneration**

How does the aging brain respond to the stressor of AMD?

2) **Stressors across the lifespan and risk of Alzheimer’s Disease**

The example of cerebrovascular disease
Example #1:
How does the aging brain respond to the stressor of age-related macular degeneration?
Sensory impairments are linked to dementia, but why?

American Geriatrics Society and National Institute on Aging Bench-to-Bedside Conference: Sensory Impairment and Cognitive Decline in Older Adults

Cognitive Load

Brain Structure, Function Networks

Depression

Social Isolation

Reduced Activity

Impaired Cognitive Functioning

Common Etiology (e.g., aging, vascular disease)

Whitson et al., J Am Geriatr Soc 66:2052–2058, 2018
Cognition and Brain MRI in People with and without AMD

81 AMD patients
85 age-matched controls
Mean age 75.5 years
Data collected at baseline and 2-year follow-up:

**Neurocognitive Testing**: Verbal fluency, working memory, episodic memory, processing speed, semantic integrity, attention-switching

**Health/Life surveys**

**Audiometry** – Pure-tone, Speech-in-Noise, word recognition

**Ophthalmological Data**: Dx/Rx, visual acuity, visual function, OCT/photos

**Brain MRIs in eligible participants** - functional MRI (fMRI) & diffusion tensor imaging (DTI)  (n=33 AMD patients, 39 controls)
As expected, AMD group under-performed on cognitive tests

<table>
<thead>
<tr>
<th></th>
<th>AMD N=81</th>
<th>Controls N=85</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Episodic Memory</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Wechsler Logical Memory</td>
<td>24.4</td>
<td>25.1</td>
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<tr>
<td>Item Recall</td>
<td>5.6</td>
<td>5.6</td>
<td>0.96</td>
</tr>
<tr>
<td><strong>Working Memory</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit Span Backwards</td>
<td>3.9</td>
<td>3.9</td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Verbal Fluency</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Letter Fluency (FAS)</td>
<td>34.3</td>
<td>38.5</td>
<td>0.05</td>
</tr>
<tr>
<td>Animal Naming</td>
<td>17.7</td>
<td>19.4</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Semantic Tasks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warrington Synonyms</td>
<td>19.0</td>
<td>20.3</td>
<td>0.01</td>
</tr>
<tr>
<td>Semantic Decision Speed</td>
<td>1754 ms</td>
<td>1601 ms</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
1) AMD group has worse white matter integrity in certain tracts: splenium and several left-sided ventral and cerebellar tracts
AMD group has worse White Matter Integrity, compared to Controls, especially in splenium

Group Connectometry Analysis
Zhuang et al. *Neuroimage: Clinical* 2021
KEY DISCOVERIES (SO FAR)

2) AMD group has a faster rate of deterioration in white matter tracts, especially on the left side
Comparing Change in White Matter (FA) over 2 Years:
Decrease is greater in AMD group vs. Controls

Left Right

[unpublished, in revisions]

\[ p = 0.01 \]
3) We observed a resting-state **functional connectivity pattern** associated with cognitive resilience in AMD

Cognitive resilience defined here as intact/good cognition, despite AMD or despite AMD-associated differences in white matter integrity
Are brain-behavior relationships different in people with AMD-related vision loss vs. age-matched controls?

We were especially interested in how functional connectivity within language-relevant networks might be associated with performance on verbal fluency tasks.
In AMD patients, but not controls, better verbal fluency was associated with **stronger connectivity in right-sided regions of the fronto-temporal network**

AMD patients with better cognitive performance were:
- Better educated
- Exhibited stronger connectivity in right-sided frontotemporal regions

P < 0.05 for AMD vs. control interaction

Zhuang et al. 2018 *Neurobiol Aging* 2018
Summary of these findings

• The group with age-related macular degeneration (AMD) tend to under-perform on several cognitive tasks, particularly related to language/semantics

• AMD patients had worse structural integrity in tracts that are involved in vision and semantic processing.

• Higher connectivity within right-sided regions of a frontotemporal brain network was associated with cognitive resilience in AMD.

Working Hypothesis: Efficient recruitment of supplemental brain regions may support cognitive performance in the face of structural brain deficits.

Underlying neuropathology (e.g., amyloid/tau) may make it more difficult to cope with vision loss, and vice versa
Example #2:
The Duke/UNC Alzheimer’s Disease Research Center views Alzheimer’s disease as a disease that reflects age-related changes in the brain’s resilience to stressors.
In early 2020, Duke and UNC established a new partnership to apply jointly for an Alzheimer’s Disease Research Center.
Duke/UNC ADRC Theme: Alzheimer’s disease develops across the lifespan

Genes and Environment

Comorbidities

Influenced by Exposures, Lifestyle

Biological Aging

Development, Progression, & Experience of Alzheimer’s disease

Factors that evolve with age and change over the lifespan
Lancet Commission Conclusion:
Modifying 12 risk factors across the lifespan can prevent or delay up to 40% of dementia cases.
Interconnected Systems and Sub-systems constantly moving, transitioning, and adapting to changing environments and new stressors
Our goal is to offer unique data to the global fight against AD

Our participants are younger and more diverse
- Under-represented groups: Black, NA/AI, and people from rural North Carolina
- Biofluids and data across early and mid-life
- Peri-menopausal women

We collect novel data and biomarkers
- Retinal imaging
- Digital biomarkers
- High resolution, advanced MRI techniques
- Sensory and mobility measures

Actively recruiting!
- ~20% UREGs; ~30% from rural zip codes; > 80% donated CSF
Dementia represents a heterogeneous mix of pathologies

Kwon S et al., Neurotherapeutics 17, 935–954 (2020)
Targeting changes in the brain’s resilience to vascular insults across mid- to late-life
A patient case: 79 year old male for dementia workup

Retired statistics professor
2-3 years of subjective executive dysfunction, memory loss
PMH: HTN, prostate cancer

Montreal Cognitive Assessment (MoCA): 22/30
Over the next 3.5 years:
• Progressive cognitive decline
• Multiple episodes of delirium
• Worsening balance, multiple falls
A patient case: 43 year old male presents to ED

“One side of my mouth has been funny since I left the gym this morning.”

Symptoms developed ~10 hours earlier
• Left-sided peri-oral numbness
• Hyper-salivation
A patient case: 43 year old male presents to ED

MRI:
Punctate acute or subacute infarct in the right frontal corona radiata.

Diagnosis:
Subcortical ischemic stroke
Post-stroke: Patient is now 49

- Residual symptoms very minor; no functional limitations
- Remains attentive to diet and exercise; gave up cigars
- NEW MEDICATIONS; SBP target <120
Hypertension management: the SPRINT-MIND trial

- 9361 participants age 50+ with SBP > 130 + CVD risk factor
- Randomized to
  - Standard BP control (target SBP <140)
  - Intense BP control (target SBP <120)

Intense BP control over 5 years lowered risk of MCI/dementia
So many questions remain about vascular risk factors & Alzheimer’s disease

- Risk of dementia is lower in people who do not have:
  - Obesity
  - Type 2 diabetes
  - Hyperlipidemia

- Does treatment of these risk factors in mid- or late-life lower dementia risk or amyloid/tau?
- At the molecular level, how do these risk factors interact with amyloid/tau pathology?
- Or do ischemic injuries simply reduce a brain’s ability to maintain cognition when amyloid and tau proteinopathies are present?
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!!
Thank you and Questions

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