Challenges and Opportunities for an Aging Society: New Directions in Medicine, Health Care, and Social Policy

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Jonathan Woodson

Director, Institute for Health System Innovation & Policy; Larz Anderson Professor & Professor of the Practice, Questrom School of Business
Suzanne Mitchell

Assistant Professor
Family Medicine and Palliative Care, MED
Serious Illness and End of Life Care
Serious Illness and Vulnerable Populations

- SIMCAT
  Addressing Unmet Social Need in Serious Illness Management

- Anxiety Management in Serious Illness
  Role of CBT

- Peer v Professional Advance Care Planning
  Engaging the Disability Community in Advance Care Planning
Andrew Budson

Chief, Cognitive & Behavioral Neurology & Associate Chief, Staff for Education, VA, Boston Healthcare System; Associate Director & Education Core Leader, BU Alzheimer’s Disease Center; Professor, Neurology, MED; Lecturer in Neurology, Harvard Medical School
Improving memory in Alzheimer’s disease, mild cognitive impairment & healthy older adults
Chris Malone, Andrew Budson, & others

- 16 per group. Ages 55-85, mean 76 years. Education mean 16 years. 67% Male (VA population)
- MMSE, OC 28.0, MCI 27.8, AD 24.4
- Delayed recall 10 words: OC 6.8, MCI 3.6, AD 1.4.
- Categorized word list paradigm. Study: sparrow, eagle, hawk, dove… Test: sparrow, *robin*

<table>
<thead>
<tr>
<th>No Strategy</th>
<th>Item-Specific Encoding</th>
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<tbody>
<tr>
<td></td>
<td>Study: What is one unique or personal characteristic of this item…?</td>
</tr>
<tr>
<td>Conservative Responding</td>
<td>Combination Strategy</td>
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<tr>
<td>Test: Only say OLD if you are certain…</td>
<td>Uses both the item-specific encoding and conservative responding instructions.</td>
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</tbody>
</table>
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**d' by Group**

- **OC**
- **MCI**
- **AD**

categories: No strategy, Conservative, Item Specific, Combined
Kate Silbaugh

Professor of Law and
Law Alumni Scholar,
LAW
Households, Families, and Design

When does Law Impede Better Living Arrangements?

- **Households, Families, and Churn**
  - We should encourage policy that promotes and preserves proximity among family members

- **Rise in Multigenerational Living**
  - Partly due to rising housing costs and weaker job opportunities for young adults
  - Partly a rebound from the post-WWII decline in multigenerational households
  - Post-war decline was a housing policy product, influenced by lending and zoning
  - Nuclear family households are not more normative than multigenerational households

- **Zoning should Facilitate Multigenerational Housing**
  - The challenge of the single family home: mismatched to needs
  - Accessory Dwelling Units
  - Attached micro-units and flexible unit size: inflexible unit size drives household membership
  - Section 8 housing policy around linked individuals and households
Deborah Carr

Professor
Sociology, CAS
Why did you complete a living will/appoint a DPAHC? (n=138)

- Own health: 21.7%
- Other's deaths: 18.8%
- Estate planning: 14.5%
- Want preferences met: 13%
- Learned about ACP: 10.9%
- Old age: 8.7%
- Protect family: 8%
- Traveling: 3.6%
- Religious reasons: 0.7%

Source: New Jersey End-of-Life Study (D. Carr, PI)
Open-Ended Interviews Shed Light on Survey Data

- Loved ones’ deaths provide a lesson in what *not* to do.
  - “my brother had a stroke . . . and now he has a feeding tube and catheter and normally he wouldn’t want that.”
  - “my husband’s mom had Alzheimer’s and that initiated our planning. I saw what she was going through. She didn’t have a living will and was in such a bad state…”

- **ACP protects dying older adults’ family members…**
  - “Us kids knew who it [DPAHC] was so there was no bickering or issue.”
  - “You have to make a decision and you have to do it rather quickly. If people are wishy-washy about it, the living will takes that away; at least it did for me.”

- **…especially in complex or conflicted families.**
  - “We had both been married before and had children. His oldest son felt that maybe he should make decisions for his dad instead of myself.”
  - “My father was unable to make the decision to pull life support, which fell to me. [I knew] it was the right thing to do, not letting her live like that, but my brothers wanted her alive. It helped that one person was responsible for the decision.”

Sources: NJEOL and Wisconsin Study of Families and Loss (WISTFL, D. Carr, PI)
Alice Cronin-Golomb

Professor

*Psychological & Brain Sciences, CAS;*
*Director, Vision & Cognition Laboratory and Center for Clinical Biopsychology*
Parkinson’s Disease

1) Problems
   - Loss of automaticity in walking and cognition, reliance on external cues
   - Dual-tasking (cognitive-motor)

2) Strategy
   - Train ATTENTION to improve lots of different aspects of PD (cognition, motor)
Far-transfer motor: Gait and postural control

10 persons with PD improved on postural instability and gait dysfunction (not on tremor) post-training. The beneficial effect of training was restricted to aspects of motor function that are modified by attention.

- Unified Parkinson's Disease Rating Scale, motor exam, section Postural Instability and Gait Dysfunction (PIGD) (mean score)
Teaching old dogs new tricks:
Recent research on health effects of caregiving and depression

Lisa Fredman

Professor and Director of Faculty Development
Epidemiology, SPH
Health effects of caregiving:

- 34.2 million caregivers to persons $\geq$ 50 years (NAC, 2015)
  - Caregivers are more stressed than non-caregivers
  - Stress theory: caregiving $\Rightarrow$ worse health outcomes
- Caregivers have lower mortality and better functioning than non-caregivers

Healthy Caregiver Hypothesis:

1. Healthier people continue as caregivers. Those whose health declines stop caregiving.
2. Caregiving confers health benefits, such as feeling appreciated, having a purpose, being active.
3. Caregivers have more stress, but better health outcomes than non-caregivers.

(Fredman et al, 2015)

- We are examining this theory using different methods and datasets.
Health effects of depression

• 11% of adults aged ≥ 70 report depression (Steffens et al, 2009)
  • Depressed adults have higher risk of impaired functioning, cognitive decline, and mortality in some studies

• Low Positive Affect, not high Negative Affect, accounts for health effects

In older community-dwelling women we found:

• High Positive Affect ➔ better survival + functioning than Low Positive Affect; no difference between Depressed and Low Positive Affect

• High Positive Affect ➔ lower risk of weight loss

• Implications for interventions to increase Positive Affect

In conclusion: our research results are not teaching old dogs new tricks, but are a new twist on old saws about aging
Does oral health matter?

Is the mouth connected to the body?

Raul I. Garcia, DMD
Professor and Chair,
Health Policy & Health Services Research, SDM
Center for Research to Evaluate & Eliminate Dental Disparities
President (2017-2018), American Association for Dental Research
Is the mouth connected to the body?

“Oral health-related quality of life”


Oral infection/inflammation and systemic health outcomes

Bottom line? The Relationship between Periodontal Interventions and Healthcare Costs and Utilization. Nasseh K et al., Health Econ 2017;26:519.
Is the mouth connected to the body?

The Story of Beauty, Inequality, and the Struggle for Oral Health in America

How Dental Inequality Hurts Americans
The New York Times, February 19, 2018

Oral health care is NOT covered by Medicare!
Judith G. Gonyea

Professor and Associate Dean of Research
School of Social Work
What I Do in Four Minutes (Or “MY ELEVATOR TALK in Four Floors”)

- My research focuses largely on older marginalized and/or disadvantaged populations with the goal of reducing disparities. I use an intersectionality lens to explore how individuals’ multiple social identities (e.g., gender, race, social class) shape their aging experiences. I also bring a feminist perspective to my work; I engage in quantitative and qualitative methods of inquiry. There are 2 main streams to my research.

- The 1st focuses on aging & the intertwining of individuals’ & families’ lives. I am interested in how changes in families’ structures, roles and norms are impacting multigenerational relations & caregiving. For ex., how our cultural norms of the “good mother” & the “good daughter” influence adult daughters’ feelings of “caregiver guilt” & psychological well-being.

- I also look at the intersection of culture, illness, mental health & stigma. For ex., this led to a RCT of a Spanish language, culturally tailored CBT intervention to help Latino Alzheimer’s families manage & cope with the disease’s neuropsychiatric symptoms.

- My work extends to policy analysis. For ex, the ways in which women’s much greater rates of temporary or earlier exits from the paid labor force for caregiving (e.g., child, parent) contribute to their greater economic vulnerability in old age.
The 2nd stream focuses on the intersection of health and environment, particularly around the themes of neighborhood, housing and homelessness. Much of this work has focused on the role of social capital on health behaviors and outcomes.

1 set of these studies focus on older, lower-income residents of urban subsidized housing and the much greater prevalence of clinically-relevant depression in these communities. For ex., I’ve explored the relationship between perceptions of neighborhood safety and depression and the mediating effects of loneliness and sense of community belonging.

A 2nd set of my studies examines the growing problem of older homelessness. For ex., I’m currently in engaged in a project, “Falling through the Cracks: Policy and Program Gaps Experienced by Older Homeless Women”—which has a particular focus on women in their 50s—often referred to as “tweeners”-- as they are too young to be eligible for old-age benefits but also not parenting and thus lack access to many family safety net programs.

Finally, I am interested in the global age-friendly communities movement—which focuses on the interrelationship between cities’ built environments and social environments and the promotion of healthy aging.
Christopher Martin

Professor
English, CAS
Joanne M. Murabito

Associate Professor

Medicine, Section of General Internal Medicine, MED
Goal: Identify Factors Associated with Longevity & Healthy Aging

Setting: Framingham Heart Study: Multi-generational Family Study

Repeated exams over adulthood capturing all domains of aging

Multi-omics Approach to Biology of Healthy Aging

Genetics

Epigenetics

Gene Expression

Metabolomics

GWAS Human Longevity
Mhealth and digital devices in the community: Novel phenotyping & Interventions to Improve Health

- Assess digital connectedness
- Behavioral Economics Framingham Incentive Trial to Increase Physical Activity – BE FIT RCT
- eFHS: custom mobile app paired with wireless devices
Marie Saint-Hilaire

Professor
Neurology, MED;
Director, Parkinson’s Disease and Movement Disorder Center
APDA Advanced Center of Research
Unmet Needs in Parkinson’s Disease

1. Biomarker
   PPMI, BioFind, MicroRNA, Calcium Signaling Pathways

2. Disease Modification
   Parkinson Study Group, Inosine, Isradipine, Biogen (BIIB054)

3. Cognition and Other Non-Motor Symptoms
   Social Self-Management, Vision and Cognition Laboratory

4. Gait, Freezing, Falls
   Center of Neurorehabilitation

5. Health Disparities
   BU Neurology
Centenarians: The Longer They Live, The Healthier They Have Been

Paola Sebastiani

Professor
Biostatistics, SPH
We studied almost 2,000 centenarians from the New England Centenarian Study, directed by Dr. Thomas Perls, and showed that centenarians delayed substantially the onset of disability and morbidity (compression of morbidity).


Questions: How? What is in it for us?
How? Rare protective genetics variants.

Mortality

Genetics

Disability

Morbidity

What is it in for us?

Molecular Data

Translation

Challenges and Opportunities for an Aging Society: New Directions in Medicine, Health Care, and Social Policy
John Snyder

Professor
Chemistry, CAS
The Curcumin Project: ISE2

Lucia Pastorino, Neuroscience
John Snyder, Chemistry

Goal - Bring meaningful, interdisciplinary research projects into the undergraduate laboratory curriculum

The Focus – Alzheimer’s Disease

Strategy – Take a pharma approach, isolate a natural product & synthesize analogues in the organic chem lab, then carry out Alzheimer related bioassays in the neuro/bio lab

Bioactivities – (1) APP – Processing – inhibition of plaque formation
(2) Binding to plaques – diagnosis and disaggregation
(3) Impact on neuronal cultures

Continuous SAR – One year informs the next year’s synthetic design – Small Molecule Library Development
Outcome: Scientific & Educational

APP Processing – Curcumin reduces “bad cleavage” ~30%

Plaque Binding – Curcumin binds well

ISE2 Small Molecule Library
Now has 14 Compounds

Michael Acceptor

Metal Chelator

Extended $\pi$-System - Forms Aggregates

Boston University Office of the Vice President and Associate Provost for Research
The Biology of Sarcopenia and Frailty

LaDora V. Thompson

Travis M. Roy Professor and Chair
Physical Therapy & Athletic Training, SAR
Hallmarks of Aging and Sarcopenia
Discover Biomarkers

- Altered intercellular communication
- Stem cell exhaustion
- Cellular senescence
- Mitochondrial dysfunction
- Deregulated nutrient-sensing
- Genomic instability
- Telomere attrition
- Epigenetic alterations
- Loss of proteostasis

Lopez-Olin et al., 2014
Preclinical Mouse Model

**Aging** → **Frailty** (3 or more)  →  **Intermediate Frailty** (2 criteria)

- Weight loss (10 lbs in yr)
- Exhaustion
- Weakness (grip)
- Slow walking
- Low physical activity (EE)

**Disability**

**Approaches**

- Muscle, cell, & protein function

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*Boston University Office of the Vice President and Associate Provost for Research*
BRAIN AGING BEYOND GENES, LIFESTYLE & STATINS

Jennifer Weuve

Associate Professor
Epidemiology, SPH
BRAIN AGING

Non-"lifestyle," non-genetic, ground-shifting risk factors

ENVIRONMENTAL EPIDEMIOLOGY

Air pollution, Heavy metals, PCBs

METHODS

Are study designs and analyses giving us the wrong answers on cognitive aging?
BRAIN AGING

Non-“lifestyle,” non-genetic, ground-shifting risk factors

Racial disparities: fostered by education? narrowing?

Exposure to air pollution: cognitive decline, olfactory path

Education: robustness, strategy for intervention

Occupation: traits, unemployment

Psychological trauma

Exposure to lead