Delirium in the Elderly: New Insights into Cognitive Vulnerability and the Journey from Hospital to Home

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• Employed by the University of Connecticut
• No funding from industry
Lessons to be learned from our elderly patients

It is much more important to know what sort of a patient has a disease than what sort of a disease a patient has.

To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all.

Center on Aging
UCONN HEALTH CENTER
A real real-world clinical case

- 82 yr old retired accountant lives with his 78 yr old wife
- He is forgetful but fully independent
- Meds include furosemide, lisinopril, metformin, donepezil
- He is admitted to the hospital for worsening of CHF
- He is discharged home
- At FU appt wife tells PCP that “my husband is not quite himself”
- He has made errors paying bills and became lost driving
- A good sleeper had bad “nightmares” in hospital requiring meds
- Declines in short-term recall and attention on MMSE, MOCA
- Gradual improvement and return to baseline over 2-3 months
- Sees PCP for lost appetite, lethargy and decreased interest in reading
- Responds well to citalopram
- Wife takes patient to ED with sudden confusion, agitation and high fever
Agenda:

- So much changes with old age and not the same way for all
- 3Ds of cognitive decline: Dementia, Depression and Delirium
- Delirium in Older Adults: Finding Order in the Disorder
- Why transitional care is such a big deal in geriatrics
- “Peeling the onion” via transitional care Q&A
- Physical vulnerability (COPD, CHF…)
- Cognitive vulnerability (Dementia, depression and Delirium)
- The path forward…?
- PCORI 3D Team Care for Cognitively Vulnerable Older Adults
The compelling demographic story
Inter-individual variability in aging
Highly variable trajectories and vulnerability with aging

Frailty Index

Drivers of Aging and Frailty (e.g. Inflammaging & Multimorbidity)
Older adults with multiple chronic conditions are vulnerable and account for most healthcare costs.
Individual Preferences, Outcomes and Biomarkers

- Hospitalized patients asked to rank impact of states of functional disability as compared to death

Rubin et al. JAMA Int Med (2016)
Why not focus on factors that predict resilience as opposed to those that are involved in frailty?
An example of remarkable resilience in youth: Alistair Urquhart

- Japanese prisoner of war 1942-1945 (1,332 days)
- He survived the capture of Singapore, forced marches, transport in sealed steel container, venomous snake bites, malaria, starvation, heat, dehydration, gangrene, beatings, solitary confinement in submerged cage, cholera, dysentery, beriberi, malaria (again), life on Japanese “hellship”, sinking of Japanese “hellship”, major burns, life on another Japanese “hellship”, torpedo attack…and finally…blast injuries from atomic bomb dropped on Nagasaki
- His weight dropped from 135 to 82 lbs
- He fully recovered and lived until age 97
- After a career in business he died in 2016 at 97
Examples of Clinically Relevant Resilience:

- Avoiding fall on uneven or slippery surface
- Avoiding syncope on standing
- Recovering physical function after bedrest
- Avoiding delirium following anesthesia and surgery
- Rapid and effective wound healing
- Avoidance or rapid recovery from influenza infection
- Avoidance of bone marrow toxicity after chemoRx
Strategies to Enhance Resilience, Promoting Function and Independence
Delirium: General Features

- Sudden or subacute change in mental status
- Often first clue to the onset of serious illness in older adults
- Differential Diagnosis:
  - Chronic confusion (dementia) with behavioral symptoms
  - Lewy Body Dementia

<table>
<thead>
<tr>
<th></th>
<th>Delirium</th>
<th>Dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Rapid</td>
<td>Slow</td>
</tr>
<tr>
<td>Duration</td>
<td>Days</td>
<td>Years</td>
</tr>
<tr>
<td>Course</td>
<td>Fluctuation</td>
<td>Slow</td>
</tr>
<tr>
<td></td>
<td>Mostly Reversible</td>
<td>Irreversible</td>
</tr>
<tr>
<td>Consciousness</td>
<td>Altered ↓ or ↑</td>
<td>Normal</td>
</tr>
<tr>
<td>Attention</td>
<td>Poor</td>
<td>Normal</td>
</tr>
</tbody>
</table>
Consider delirium when:

• Observation or report of **any** change in orientation, concentration, mood, behavior, judgment, memory

• Includes hallucinations and delusions

• Occurs over hours to days

• Change from baseline obtained on caregiver history

• May be hyperactive (~25%)

• Hypoactive (~35%) is often mixed

• Mixed with fluctuating features is very common
ICD-10 Diagnostic Criteria:

- Clouding of consciousness with reduced ability to focus, sustain or shift attention
- Disturbance of cognition
- At least one disturbance of psychomotor function
- Disturbance of sleep-wake cycle
- Rapid onset and fluctuating course
- Objective evidence from evaluation of an underlying disease that can cause above symptoms
Confusion Assessment Method (CAM):

1. **acute** onset of mental status changes and **fluctuating** course
   AND
2. **inattention**
   AND EITHER
3. disorganized thinking
   OR
4. altered level of consciousness
CAM Modifications:

CAM-ICU: for mechanically ventilated patients.
- [http://www.mc.vanderbilt.edu/icudelirium/](http://www.mc.vanderbilt.edu/icudelirium/)

FAM-CAM: family or caregiver interview to diagnose delirium

I-CAM: CAM + assessment of psychomotor behavior
Epidemiology:

**Prevalence** among hospitalized elderly

- ICU (80%)
- Medical units (10%)
- Surgical units (10-50%) highest in ortho and cardiac
- In presence of dementia (~ 2/3)

**Associated risks:**

- Increased hospital LOS
- Increased risk of institutionalization
- Functional dependence, lost ADL function, mortality
Cognitive Outcomes of Delirium:

- Does not always resolve
- In some cases persists for weeks to months
- Often in less than “full-blown” version
- Risk factors include
  - Advanced age
  - Underlying dementia
  - Functional impairment
  - Multi-morbidity
  - Severe delirum
  - Use of physical restraints
Cognitive Function after Delirium:

Cognitive Trajectories after Postoperative Delirium


Physical Function after Delirium:

Trajectory of Functional Recovery After Postoperative Delirium in Elective Surgery

Tommy T. Hsieh, MD,* ‡‡ Jane Szczylik, PhD, §§ Ruyon Gou, MA, † Edward Marcantonio, MD, ‡‡‡
Richard N. Jones, ScD, ||| Eva Schmitt, PhD, † Zara Cooper, MD, ** Douglas Ayres, MD, † John Wright, MD,**
Thomas G. Travis, PhD, †‡ and Sharon K. Iwana, MD†, †, on behalf of the SAGES Study Group

(Ann Surg 2017;265:647–653)
Importance of Transitional Care in Geriatrics

Rehospitalizations among Patients in the Medicare Fee-for-Service Program

Stephen F. Jencks, M.D., M.P.H., Mark V. Williams, M.D., and Eric A. Coleman, M.D., M.P.H.


Figure 1. Rates of Rehospitalization within 30 Days after Hospital Discharge.
The rates include all patients in fee-for-service Medicare programs who were discharged between October 1, 2003, and September 30, 2004. The rate for Washington, DC, which does not appear on the map, was 23.2%.
# Importance of Transitional Care in Geriatrics

<table>
<thead>
<tr>
<th>Condition at Index Discharge</th>
<th>30-Day Rehospitalization Rate</th>
<th>Proportion of All Rehospitalizations</th>
<th>Most Frequent</th>
<th>2nd Most Frequent</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>21.0</td>
<td>77.6</td>
<td>Heart failure (8.6)</td>
<td>Pneumonia (7.3)</td>
</tr>
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<td>Heart failure</td>
<td>26.9</td>
<td>7.6</td>
<td>Heart failure (37.0)</td>
<td>Pneumonia (5.1)</td>
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<td>Pneumonia</td>
<td>20.1</td>
<td>6.3</td>
<td>Pneumonia (29.1)</td>
<td>Heart failure (7.4)</td>
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<tr>
<td>COPD</td>
<td>22.6</td>
<td>4.0</td>
<td>COPD (36.2)</td>
<td>Pneumonia (11.4)</td>
</tr>
<tr>
<td>Psychoses</td>
<td>24.6</td>
<td>3.5</td>
<td>Psychoses (67.3)</td>
<td>Drug toxicity (1.9)</td>
</tr>
<tr>
<td>GI problems</td>
<td>19.2</td>
<td>3.1</td>
<td>GI problems (21.1)</td>
<td>Nutrition-related or metabolic issues (4.9)</td>
</tr>
</tbody>
</table>
## Importance of Transitional Care in Geriatrics

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Postoperative Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>15.6 22.4 Heart failure (6.0) Pneumonia (4.5)</td>
</tr>
<tr>
<td>Cardiac stent placement</td>
<td>14.5 1.6 Cardiac stent (19.7) Circulatory diagnoses (8.5)</td>
</tr>
<tr>
<td>Major hip or knee surgery</td>
<td>9.9 1.5 Aftercare (10.3) Major hip or knee problems (6.0)</td>
</tr>
<tr>
<td>Other vascular surgery</td>
<td>23.9 1.4 Other vascular surgery (14.8) Amputation (5.8)</td>
</tr>
<tr>
<td>Major bowel surgery</td>
<td>16.6 1.0 GI problems (15.9) Postoperative infection (6.4)</td>
</tr>
<tr>
<td>Other hip or femur surgery</td>
<td>17.9 0.8 Pneumonia (9.7) Heart failure (4.8)</td>
</tr>
</tbody>
</table>
Fragmentation of Care in Geriatrics

The patient acts as the only link between fragmented systems. In these systems, high-quality, bidirectional communication between sites is frequently nonexistent.

Focus on Physical Vulnerability

Figure 2
National Medicare Readmission Rates Started to Fall in 2012

NOTES: National readmission rates include Medicare fee-for-service unplanned hospitalizations for any cause within 30 days of discharge from an initial hospitalization for either heart failure, heart attack, or pneumonia. Rates are risk-adjusted for certain patient characteristics, such as age and other medical conditions.

SOURCE: Kaiser Family Foundation analysis of CMS Hospital Compare data files.
Focus on Physical Vulnerability

Figure 1. Non-obstetric adult 30-day readmission rates were consistently higher among Medicaid than privately insured patients for any number of comorbidities, 2007

Source: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2007, from the following ten states: AR, AZ, FL, HI, MO, NE, NH, NY, SC, TN.
Focus on Cognitive Vulnerability

30 day risk of readmission is elevated after delirium episode:

- In Post Acute Care  (Kosar et al, JAGS 2017)
- Post-spinal surgery  (Elsamadicy et al, J Clin Nsc 2017)
- In Nephrology Unit (Jasinski et al Psychosom)
- Post TAVI and SAVR in older adults  (Eide et al BMJ 2016)
- Episode severity during admission  (Vasunilashorn et al JGIM 2016)

Health care utilization and costs of the 3Ds in a Medicare advantage population?
Excess Healthcare Utilization & Costs Associated with Cognitive Vulnerability in a Medicare Advantage Population

Richard H. Fortinsky, PhD
Professor & Health Net, Inc. Chair in Geriatrics and Gerontology
UConn Center on Aging
University of Connecticut School of Medicine
Farmington, Connecticut

Presented at 2015 Annual Meeting of the Gerontological Society of America, November 20, 2015, Orlando, FL
Acknowledgements

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  – James Grady, PhD
  – George A. Kuchel, MD
  – David C. Steffens, MD
  – Yu-Bo Wang
  – Giresh Yemparala

• At ConnectiCare, Inc.:
  – Derik Del Cegno
  – Deborah Forrest
30% of all Medicare beneficiaries now enrolled in Medicare Advantage plans; numbers continue to grow every year.

Cognitive vulnerability (CV) in Medicare population due to dementia and depression known to be associated with many adverse health-related outcomes.

- Little known in Medicare Advantage populations

CV due to delirium clinically associated with dementia and depression, but little known about delirium’s adverse effects in Medicare Advantage populations.
Overriding Research Questions

• In a statewide Medicare Advantage population, to what extent is the presence of cognitive vulnerability associated with:
  – Likelihood of hospitalization in a 12 month period
  – Likelihood of emergency department visit (ED) without hospitalization in a 12 month period
  – Amount of hospitalization costs
  – Amount of ED costs
  – Amount of prescription drug costs

• After controlling for sociodemographic characteristics and multiple comorbidities
Table 1.

Sample Characteristics (N = 33,516)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>74.61</td>
<td>±6.67</td>
<td>65</td>
<td>104</td>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>(%)</th>
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</thead>
<tbody>
<tr>
<td>Sex</td>
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<tr>
<td>Male</td>
<td>18,846</td>
<td>56.23</td>
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<tr>
<td>Female</td>
<td>14,670</td>
<td>43.77</td>
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</table>

<table>
<thead>
<tr>
<th>Age Group</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>65-74</td>
<td>20,001</td>
<td>59.68</td>
</tr>
<tr>
<td>75-84</td>
<td>10,048</td>
<td>29.98</td>
</tr>
<tr>
<td>85-94</td>
<td>3266</td>
<td>9.74</td>
</tr>
<tr>
<td>95+</td>
<td>201</td>
<td>0.60</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Race</th>
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<tbody>
<tr>
<td>White</td>
<td>31,160</td>
<td>92.97</td>
</tr>
<tr>
<td>African American</td>
<td>1127</td>
<td>3.36</td>
</tr>
<tr>
<td>Other</td>
<td>1229</td>
<td>3.67</td>
</tr>
</tbody>
</table>

| Hispanic  | 90    | 0.27 |
| Dual Eligible | 6260 | 18.68|

<table>
<thead>
<tr>
<th>All 3D*</th>
<th>9506</th>
<th>28.36</th>
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</thead>
<tbody>
<tr>
<td>Dementia**</td>
<td>2565</td>
<td>7.65</td>
</tr>
<tr>
<td>Depression**</td>
<td>7918</td>
<td>23.62</td>
</tr>
<tr>
<td>Delirium**</td>
<td>2132</td>
<td>6.32</td>
</tr>
</tbody>
</table>

*All 3D: one or more of Dementia, Depression and Delirium

**Alone or in combination with other 3Ds
Stepwise Regression Model Template for Results

Block 1

ALL-3D (Person with Dementia/Depression/Delirium/All)

Block 2

ALL-3D (Person with Dementia/Depression/Delirium)

Pre-Disposing Variables

Age Group
Gender
Race

Block 3

ALL-3D (Person with Dementia/Depression/Delirium)

Pre-Disposing Variables

Age Group
Gender
Race

Enabling Variable

Dual Eligible

Block 4

ALL-3D (Person with Dementia/Depression/Delirium)

Pre-Disposing Variables

Age Group
Gender
Race

Enabling Variable

Dual Eligible

Need Variables

Congestive Heart Failure
Peripheral Vascular Disease
Cerebrovascular Disease
Chronic Pulmonary Disease
Diabetes without complications
Diabetes with complications
Renal Disease
Cancer
Stepwise logistic regression results predicting any hospitalizations

Odds ratio likelihood estimates (N=33,516)

<table>
<thead>
<tr>
<th>All 3Ds¹</th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.122***</td>
<td>3.056***</td>
<td>2.956***</td>
<td>2.134***</td>
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<tr>
<td>Age Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75-84 (vs 65-74)</td>
<td>1.601</td>
<td>1.539</td>
<td>1.195</td>
<td></td>
</tr>
<tr>
<td>85-94 (vs 65-74)</td>
<td>2.314***</td>
<td>2.162***</td>
<td>1.401*</td>
<td></td>
</tr>
<tr>
<td>95+ (vs 65-74)</td>
<td>2.533**</td>
<td>2.317**</td>
<td>1.374</td>
<td></td>
</tr>
<tr>
<td>Female (vs Male)</td>
<td>0.792***</td>
<td>0.755***</td>
<td>0.986</td>
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</tr>
<tr>
<td>African-American (vs White)</td>
<td>1.315**</td>
<td>1.242*</td>
<td>1.092</td>
<td></td>
</tr>
<tr>
<td>Other Race (vs White)</td>
<td>1.011</td>
<td>0.980</td>
<td>1.097</td>
<td></td>
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<tr>
<td>Dual Eligible</td>
<td></td>
<td>1.496***</td>
<td></td>
<td>1.180***</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td></td>
<td></td>
<td>3.339***</td>
<td></td>
</tr>
<tr>
<td>Peripheral Vascular Disease</td>
<td></td>
<td></td>
<td>1.478***</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td></td>
<td></td>
<td>1.905***</td>
<td></td>
</tr>
<tr>
<td>Chronic Pulmonary Disease</td>
<td></td>
<td></td>
<td>1.848***</td>
<td></td>
</tr>
<tr>
<td>Diabetes without complications</td>
<td></td>
<td></td>
<td>1.120*</td>
<td></td>
</tr>
<tr>
<td>Diabetes with complications</td>
<td></td>
<td></td>
<td>1.215**</td>
<td></td>
</tr>
<tr>
<td>Renal Disease</td>
<td></td>
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<td>1.629***</td>
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<tr>
<td>Cancer, any type</td>
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<td>1.934***</td>
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</tr>
</tbody>
</table>

¹“All 3Ds” represents all individuals with any cognitive vulnerability (dementia, depression, and/or delirium)

***p<0.001, **p<0.01, *p<0.05
Stepwise logistic regression results predicting any hospitalizations

**Odds Ratio Likelihood Estimates for Each of the 3Ds (N=33,516 )**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
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</thead>
<tbody>
<tr>
<td>Any Hospital Admissions</td>
<td>Dementia</td>
<td>1.414***</td>
<td>1.214**</td>
<td>1.208**</td>
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<tr>
<td>Depression</td>
<td>1.557***</td>
<td>1.643***</td>
<td>1.593***</td>
<td>1.349***</td>
</tr>
</tbody>
</table>

***p<0.001, **p<0.01, *p<0.05
Stepwise logistic regression results predicting any ER visits

Odds Ratio Likelihood Estimates (N=33,516)

<table>
<thead>
<tr>
<th></th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>All 3Ds</td>
<td>2.641***</td>
<td>2.529***</td>
<td>2.439***</td>
<td>1.969***</td>
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<tr>
<td>Age Group</td>
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<td>75-84 (vs 65-74)</td>
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<td>85-94 (vs 65-74)</td>
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<tr>
<td>95+  (vs 65-74)</td>
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</tr>
<tr>
<td>Female (vs Male)</td>
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<tr>
<td>African American (vs White)</td>
<td>1.457***</td>
<td>1.365***</td>
<td>1.282**</td>
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<tr>
<td>Other Race (vs White)</td>
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<td>0.954*</td>
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<td>Dual Eligible</td>
<td>1.599***</td>
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<td>1.180***</td>
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<tr>
<td>Congestive Heart Failure</td>
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<td>1.818***</td>
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<td>1.144**</td>
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<td>1.243***</td>
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<tr>
<td>Cancer, any type</td>
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<td>1.363***</td>
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***p<0.001, **p<0.01, *p<0.05
Stepwise logistic regression results predicting any ER Visits

Odds Ratio Likelihood Estimates for Each of the 3Ds (N=33516)

<table>
<thead>
<tr>
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<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
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<tr>
<td>Any ER Visits</td>
<td>1.581***</td>
<td>1.365***</td>
<td>1.355***</td>
<td>1.277***</td>
</tr>
<tr>
<td>Pre dementia &amp; Dementia</td>
<td>1.588***</td>
<td>1.622***</td>
<td>1.568***</td>
<td>1.411***</td>
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<tr>
<td>Depression</td>
<td>5.177***</td>
<td>4.780***</td>
<td>4.708***</td>
<td>3.470***</td>
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</tbody>
</table>

***p<0.001, **p<0.01, *p<0.05
Stepwise Regression Results: Hospital, ER, and Prescription Drug Costs
Effects of All 3D, Controlling for other Predictors

Hospital costs (N=4,102)

<table>
<thead>
<tr>
<th>In patient admission costs</th>
<th>Block 1</th>
<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>All3D</td>
<td>1.0809**</td>
<td>1.1153***</td>
<td>1.1137***</td>
<td>1.0583*</td>
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</tbody>
</table>

ER Visit costs (N=7,402)

<table>
<thead>
<tr>
<th>ER Visit Costs</th>
<th>Block 1</th>
<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>All3D</td>
<td>1.2617***</td>
<td>1.2560***</td>
<td>1.2457***</td>
<td>1.2271***</td>
</tr>
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</table>

Prescription Drug costs (N=31,027)

<table>
<thead>
<tr>
<th>Prescription (Rx) Costs</th>
<th>Block 1</th>
<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>All3D</td>
<td>2.2935***</td>
<td>2.2771***</td>
<td>2.1619***</td>
<td>1.7822***</td>
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</tbody>
</table>

***p<0.001, **p<0.01, *p<0.05
Stepwise Regression Results: Hospital, ER, and Prescription Drug Costs
Effects of Each of the 3Ds, Controlling for other Predictors

### Hospital costs (N=4102)

<table>
<thead>
<tr>
<th>In patient admission costs</th>
<th>Block 1</th>
<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre –Dementia &amp; Dementia</td>
<td>0.8526***</td>
<td>0.8940**</td>
<td>0.8942**</td>
<td>0.8946**</td>
</tr>
<tr>
<td>Depression</td>
<td>1.0145</td>
<td>1.0253</td>
<td>1.0238</td>
<td>1.0085</td>
</tr>
<tr>
<td>Delirium</td>
<td>1.2935***</td>
<td>1.3115***</td>
<td>1.3108***</td>
<td>1.2462***</td>
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</tbody>
</table>

### ER Visit costs (N=7402)

<table>
<thead>
<tr>
<th>ER Visit Costs</th>
<th>Block 1</th>
<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre –Dementia &amp; Dementia</td>
<td>1.1802**</td>
<td>1.1806**</td>
<td>1.1791**</td>
<td>1.1722**</td>
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<tr>
<td>Depression</td>
<td>1.1510***</td>
<td>1.1518***</td>
<td>1.1435***</td>
<td>1.1399**</td>
</tr>
<tr>
<td>Delirium</td>
<td>1.2327***</td>
<td>1.2306***</td>
<td>1.2276***</td>
<td>1.2225***</td>
</tr>
</tbody>
</table>

### Prescription Drug costs (N=31,027)

<table>
<thead>
<tr>
<th>Prescription (Rx) Costs</th>
<th>Block 1</th>
<th>Block 1+2</th>
<th>Block 1+2+3</th>
<th>Block 1+2+3+4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre –Dementia &amp; Dementia</td>
<td>1.1485***</td>
<td>1.0996**</td>
<td>1.0834*</td>
<td>1.0444</td>
</tr>
<tr>
<td>Depression</td>
<td>2.2150***</td>
<td>2.2482***</td>
<td>2.1536***</td>
<td>1.9185***</td>
</tr>
<tr>
<td>Delirium</td>
<td>1.6615***</td>
<td>1.6184***</td>
<td>1.5595***</td>
<td>1.0838*</td>
</tr>
</tbody>
</table>

***p<0.001, **p<0.01, *p<0.05
PCORI 3D Team Care for Cognitively Vulnerable Older Adults
PI: R Fortinsky, PhD

Background and Significance:

This study addresses how to achieve better outcomes for cognitively vulnerable community-dwelling older adults and their families. Cognitive vulnerability means living with dementia, depression, and/or delirium (the 3Ds). Cognitive vulnerability in older adults is often overlooked by primary care and hospital-based providers, and represents a marker for overall vulnerability or frailty often missed when disease-specific approaches are emphasized in the care for older adults. Such patients often cannot adequately self-manage their co-morbidities. Many studies of older adults and their families have demonstrated the great burden of living with cognitive vulnerability. We will test the effectiveness of home-based clinical care teams (3D Teams) guided by nurse practitioners with geriatrics expertise. The 3D Team intervention will focus on all of these conditions and will evaluate impact on outcomes of interest to patients and families.
PCORI 3D Team Care for Cognitively Vulnerable Older Adults

Study Aims:

Specific aims are to determine 3D Team care effects on hospitalization or emergency department (ED) use and other outcomes, including depression, disability, and quality of life. We also will determine other, new outcomes of importance to these patients and families.

Long-term objectives are to determine whether 3D Team care can become a widely available approach for improving healthcare systems for older adults with cognitive vulnerability and their families, while improving outcomes of importance to these patients and families.

A project steering committee that includes cognitively vulnerable patients and family caregivers will provide extensive input into all aspects of the research process.
PCORI 3D Team Care for Cognitively Vulnerable Older Adults

**Study Description:** The study population will be members of a Medicare Advantage (MA) insurance plan aged 65 and older living at home in the state of Connecticut. Eligible members and their family caregivers assigned to the 3D Team will be compared with those assigned to receive care management services currently available to high-risk members in the participating MA plan. We will enroll 760 MA members—380 receiving 3D Team care and 380 receiving available care management. Study participants will be followed for 12 months by the 3D Team or the available care management program. Patient-specific outcomes will include: hospitalized or visited an ED, depression, disability, and quality of life. Family caregiver-specific outcomes will include well-being, depression, and burden. New outcomes will also be developed, based on open-ended questions to patients. For our primary test of success, we will statistically compare the proportion of 3D Team versus care management group participants who experience hospitalization or ED use without hospitalization during the 12 months they are enrolled in the project. Focus groups and key informant interviews will be conducted, audiotaped, and transcribed, and qualitative analysis techniques employed, to determine 3D Team feasibility and acceptability.
Some parting words on the UCONN Center on Aging

- Multidisciplinary center with faculty in 6 different clinical and basic science depts
- 30th anniversary celebrations in 2017
- “To improve the lives of older adults through research, education and improved clinical care”
- Research efforts span the bench, the clinical research setting and community
- Broad research portfolio (~ $ 5.5 million funding per research faculty member)
- 4,000 sq ft Clinical Research Unit
- Center on Aging Research Cores:
  1. Human Subject Recruitment
  2. Data and Geriatric Outcomes
  3. Evaluation & Population Assessment
  4. Biomarkers & Preclinical Studies
Our Research Agenda

Traditional approach to translational research:

- Laboratory
- GCRC
- Community

A “geriatric” approach to translational research:

1. Identify needs at level of individuals or populations
2. Define risk factors
3. Discover mechanisms
4. Design interventions
5. Conduct clinical trials
6. Conduct “real world” validation
7. Perform preclinical testing
8. Conduct clinical trials
9. Perform preclinical testing
10. Design interventions
11. Discover mechanisms
12. Identify needs at level of individuals or populations
The goal at the UConn Center on Aging is to prevent or minimize disability in vulnerable older adults through an interdisciplinary and translational research program which develops and tests innovative interventions, develops a mechanistic understanding of disability and trains future academic leaders in geriatrics and gerontology.

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Ongoing Center On Aging Studies</th>
<th>Funded by</th>
</tr>
</thead>
<tbody>
<tr>
<td>George A. Kuchel, MD</td>
<td><strong>Combination Adjuvants to Activate Human Dendritic Cell Subsets and B Cells</strong></td>
<td>Jackson Labs/ U01 NIAID</td>
</tr>
<tr>
<td>George A. Kuchel, MD</td>
<td><strong>Genomics and Epigenomics of the Elderly Response to Pneumococcal Vaccines</strong></td>
<td>Jackson Labs/ R01 NIA</td>
</tr>
<tr>
<td>George A. Kuchel, MD</td>
<td><strong>Immune Response to High-Dose vs. Standard Dose Influenza Vaccine</strong></td>
<td>NIH/NIA R01</td>
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<td>NIH/NIA P01</td>
</tr>
<tr>
<td>Yazeed Maghaydah, MD</td>
<td><strong>Imaging Dementia—Evidence for Amyloid Scanning (IDEAS) Study:A Coverage with Evidence Development Longitudinal Cohort Study</strong></td>
<td>American College of Radiology Imaging Network (ACRIN)</td>
</tr>
<tr>
<td>Richard Fortinsky, PhD</td>
<td><strong>Care Management for Cognitively Vulnerable Older Adults: PCORI 3D Team</strong></td>
<td>Patient Centered Outcomes Research Institute (PCORI)</td>
</tr>
<tr>
<td>Richard Fortinsky, PhD</td>
<td><strong>Translation of COPE for Publicly-Funded Home Care Clients and Their Families</strong></td>
<td>NIH/NIA R01</td>
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<tr>
<td>Richard Fortinsky, PhD</td>
<td><strong>Community Ambulation Following Hip Fracture</strong></td>
<td>NIH/NIA R01</td>
</tr>
<tr>
<td>Lisa Barry, PhD</td>
<td><strong>Aging Inmates’ Suicidal Ideation and Depression (Aging Inside) Study</strong></td>
<td>NIH/NIMH R01</td>
</tr>
<tr>
<td>Julie Robison, PhD</td>
<td><strong>Money Follows The Person (MFP Evaluation)</strong></td>
<td>CT Department of Social Services</td>
</tr>
<tr>
<td>Julie Robison, PhD</td>
<td><strong>Planning &amp; Demo Grant for Testing Exp. &amp; Functional Tools in Comm-Based Long Term Services &amp; Supports (TEFT)</strong></td>
<td>UConn Storrs/DSS</td>
</tr>
<tr>
<td>Julie Robison, PhD</td>
<td><strong>CT OAA Programs Evaluation</strong></td>
<td>CT State Department on Aging (SDA)</td>
</tr>
</tbody>
</table>
**Mission:** improve the lives of older adults through clinical care, education and research

**NOW**

1. Provide high quality comprehensive care for older adults.
2. Train the next generation of leaders in Geriatrics and Gerontology.
3. Improve function, independence and quality of life for older adults through research

**MOVING FORWARD**

1. Provide high quality comprehensive care for older adults regardless of the point of care within UCHC.
2. Train the next generation of health providers across all disciplines with required skills in senior care and geriatrics.
3. Develop a Proactive and Personalized approach to Gerontology (PPG), targeting mobility, behavioral, voiding and host defense issues
Bioscience Connecticut

- More than just buildings
- Center for Healthy Aging and Geriatric Care
- UCONN Health Medical Director for Senior Care (Patrick Coll, MD)
- Improved care, care coordination and outcomes for all older patients, irrespective of site of care
Clinical

**Ambulatory:**
- January 2015 - Moved into New Ambulatory Tower
- Center for Healthy Aging and Geriatrics
- James EC Walker MD Memory Assessment Program (Geriatrics, Psychology, Psychiatry, Neurology, Neuroimaging, Social Work, Nursing, Pathology, Genetics)
- Beta-Testing and Validation of Gait Velocity Detection Device

**JDH:**
- JDH Task Force on Senior Health
- ACE (Advanced Care for the Elderly) Unit

**Off-Campus:**
- Nearly ½ of our work
- Seabury (Bloomfield), Middlewoods (Farmington), Middlewoods (Newington), Atrium (Rocky Hill), Riverside Health and Rehab (East Hartford)
- Patrick Coll’s leadership

**Plans:**
- Avon Health Care (Avon) and others (July 2015)
- Expansion to East Hartford and Storrs (July 2016)
What’s over the horizon?

- New field of Geroscience
- Aging and common chronic diseases share common pathways
- Efforts to target those pathways could not only slow aging processes but might also delay the onset of these diseases