Delirium After Acute Care Hospitalizations in Both Institutional and Home Settings

Presenters: Chan Mi Park, MD, MPH and David Levine, MD, MPH, MA

Time	Section
02:18	**Introduction of Chan Mi Park and David Levine**
03:40	**Persistence of Delirium in Post-acute Care at Skilled Nursing Facilities (Chan Mi Park)**
04:34	**Study Design and Data** • Cross-sectional study • 5% Medicare random sample • Minimum Data Set (MDS) assessments between January 1 and December 31 in 2014 and 2019 o MDS is a federally mandated assessment for nursing home residents and should be assessed at the time of the admission and discharge and quarterly and annually for long-term care residents. Also performed when there is a significant change in status, such as delirium
05:14	**Study Population and Exposure** • Older adults who were admitted to an SNF with delirium+ after acute hospitalization in 2014 and 2019 • Exposure: Year 2019 compared with year 2014 o Why comparing these two years? → because those years straddle implementation of the IMPACT Act, giving a natural experiment to examine

05:56	**Improving Medicare Post-Acute Care Transformation (IMPACT) Act**
	• Implemented in 2014
	• Requires all post-acute care providers to collect and report standardized patient assessment data
	• Aims:
	  o Improved care coordination
	  o Discharge planning
	  o Feedback to PAC providers on their performance with respect to quality measures
	  o Intends for standardized post-acute care data to improve Medicare beneficiary outcomes through shared-decision making, care coordination, enhanced discharge planning
	• So comparing implementation year 2014 with 2019, can test whether those policies translated to better delirium outcomes

06:46	**Measurement** • Demographic information (age, sex, and race) • Patient characteristics (cognitive function scale [intact, mild, moderate, or severe], comorbidity, functional status, behavioral symptoms, hearing and speech impairment, frailty [claims data]) • SNF-related factors (restraint use, antipsychotic use, physical and occupational therapy minutes during the SNF stay, length of stay)→ modifiable factors, important targets for future interventions
07:58	**Outcomes of Interest** • All started with delirium, so interested in the change of delirium within 30 days (defined by CAM) • Resolved delirium within 30 days • Persistent delirium within 30 days • Death within 30 days
08:53	**Study Population and Design** • Acute Hospital→ Skilled Nursing Facility→Delirium+→ Delirium resolution OR Persistent Delirium OR Death (within 30 days) • Repeated this for year 2019, then compared the rates of change in delirium between these 2 years
09:39	**Statistical Analysis** • Multinomial logistic regression o Comparing probabilities of persistent delirium or death to resolved delirium (ref) between 2014 and 2019

	○ Sequentially included different sets of variables (patient demographic, patient health-related variables, SNF care-related variables • All within SNF outcome correlations using robust variance (NPI)
10:33	**Results** • Figure 1. Study Flowchart ○ 2014: 4.3% delirium rate at SNF admission ○ 2019: 2.5% delirium rate at SNF admission • Table 1. Patient Characteristics for 2014 and 2019→ they are not that different ○ SNF related factors: antipsychotic use and restraint use slightly higher in 2014; length of stay and physical therapy duration shorter in 2019 • Table 2. Comparison of Rate of Persistent Delirium and Mortality Between 2014 and 2019 ○ 2019 had more resolved delirium and fewer persistent delirium than 2014 ○ 4 models: model 1-unadjusted, 2- model 1 plus demographic factors, 3- model 2 plus health-related conditions, 4- model 3 plus SNF care-related factors ▪ The adjustment did not alter the estimate of 0.68, meaning that patient and SNF related factors do not explain the improvement of delirium change in 2019 compared to 2014 • Figure 2. Comparison of Outcomes Between 2014 and 2019 • Table 3. Comparison of Rates of Persistent Delirium and Mortality between 2014 and 2019 stratified by age, sex, frailty, and dementia status after multivariable adjustment ○ All estimates were consistent throughout all the subgroups
15:50	**Discussion** • Notable improvements in delirium resolution among patients admitted to SNF from 2014 to 2019 with reduction in persistent delirium and death • These improvements were not attributable to differences in demographic characteristics, health-related conditions, and SNF care-related factors • However, approximately 50% still have delirium during their SNF stay • Potential factors (indirect influences) ○ Enhanced care coordination ○ Quality reporting ○ MDS assessments updates ○ HELP ○ Age-Friendly Health Systems Initiatives
18:11	**Limitations** • CAM assessment in MDS • Missing follow-up CAM assessment • Unmeasured confounding ○ Facility-level factors (e.g. bed size or staff-to-patient ratios) ○ Other policy changes
19:51	**How Can We Impact Delirium With Advanced Home-Based Care (David Levine)**
20:36	**Objectives** • Discuss 2 out of 3 topics→ Topics selected: (1) Describe the ADRD pre-enrolled home hospital care model and (3) Discuss incident reduction in delirium for home hospital patients
22:12	**Skipping the Hospital: Acute hospital care at home for people living with dementia (Topic #1)** • NIA funded trial and have not started enrolling yet
22:35	**Why Home Hospital for PLWD?** • The Need ○ Hospitalization is a common occurrence for many PLWD (PLWD are hospitalized at twice the rate as older adults without ADRD

	○ The harm of hospitalization is magnified for PLWD (5 times the odds of an adverse event) ○ Few home hospital efforts specifically care for PLWD (perceived risk, lack of clear goals of care)
23:18	**What is pre-enrollment for Home Hospital?** • Study design, Model, Preliminary inclusion/exclusion criteria, Preliminary outcomes
23:26	**Study Design** • Flowchart: enroll them before an acute illness, get randomized to either home hospital or usual care ○ In home hospital arm, if acute illness occurs, patient can use tablet to talk with nurse and get evaluated and then if need in person care a paramedic can come to the patient's home, and then can home hospitalize if necessary
24:48	**Pre-enrolled Services** • Structured serious illness conversation • Caregiver burnout resources • Home safety assessment • Video and vital sign equipment • Acute illness evaluation on-demand (video & in-home) • Direct-from-home hospitalization
25:21	**Home Hospital Services** • 2 daily nurse/medic visits • 1 daily doctor visit • IV medications • Respiratory treatments • Remote vital signs monitoring • Diagnostic testing • 24/7 phone, video & urgent visit availability • Additional home health aide care • Delirium prevention measures • Structured ongoing SIC (serious illness conversations)
25:50	**Framework** • Flowchart
26:42	**Operating Characteristics** • 1.5 year enrollment (October 1, 2025 through March 31, 2027) • About 200 patients total with about 100 patients to the intervention with a goal of about 3 enrollments weekly
26:58	**Preliminary Inclusion/Exclusion** • Inclusion: ○ Diagnosis of moderate or severe dementia ○ Resides in a private or assisted living residence with or nearby (<15 min travel time) to a family caregiver ○ Resides within the MGB home hospital catchment area ○ Has had a least 1 hospitalization in the last 12 months • Exclusion: ○ Undomiciled ○ No heat (in winter) or A/C (in summer) ○ DV, police custody ○ Resides in a SNF ○ On ventilator ○ Requires IV controlled substances ○ Family caregiver unable to maintain communication with team

	○ Additional secondary conditions
27:48	**Outcomes** • Primary Outcome: ○ Time at home→ days at home after acute care episode • Secondary Outcomes: ○ 30-day post-acute events (30-day unplanned readmission or mortality) ○ Delirium (UB-2 and 3D-CAM) ○ Health related quality of life (DEMQOL, DEMQOL-Proxy) ○ Physical activity (time supine & sedentary during acute episode) • Exploratory Outcomes ○ SIC (SIC and MOLST completion) ○ Time at home (days at home over 1 year) ○ Patient experience (Picker Survey-15) ○ Functional status (ADCS ADL Inventory) ○ Safety (Adverse event) ○ Acute episode utilization (Diagnostics, treatments, consultations) ○ 30-day post-acute events (ED< observation, and SNF use) ○ Cost (medical expenditure, direct cost accounting) ○ 1-year utilization (institutionalization, office visits [primary, specialty care], admissions, diagnostics [lab, imaging]) ○ Cognitive status (dementia severity)
29:30	**Safe at Home: Patient Safety During Home Hospital (Topic #3)**
30:16	**Definition of Adverse Event (AE)** • Unintended physical injuries resulting from or contributed to by healthcare management (including the absence of medical treatment) that require additional monitoring, treatments, or hospitalizations, or that result in death ○ AEs may occur with appropriate care or as a result of medical error ○ AEs encompass both non-preventable and preventable events
30:47	**Methods** • Setting & Design ○ 3 home hospital programs in Boston ○ Feb 2020-Aug 2023 ○ EHR retrospective review ○ Irrespective of arm, entire episode analyzed • Exclusions ○ Undomiciled, resides in skilled nursing facility, domestic violence screen positive, resides beyond catchment, hemodialysis, acute myocardial infarction, acute stroke, acute substance use disorder, acute psychiatric exacerbation, code status, IV opioids, SBP>200, HR>150, RR>35, or T>103.9 • Propensity Score (day by day re-assessed control patients) ○ Sex, age, race, ethnicity, partner status, education, employment, preferred language, payor status, area deprivation index, elixhauser comorbidity, smoking status, BMI, # of hospitalizations prior 6 months, # ED visits prior 6 months, code status, calendar quarter, eCART score at admission, emergency severity index, site, day clinically eligible • Diagnosis-Specific Criteria ○ Pneumonia & Heart Failure (separate propensity score for each diagnosis) • Automated AEs and Triggers ○ Inpatient mortality, mortality within 72hrs of discharge, hospital-acquired pressure injury, CLABSI, CAUTI, Hospital-acquired AKI, Hospital-acquired delirium, Severe hypoglycemia,

	Hospital-acquired C Dif, Hospital-acquired MRSA, code or rapid response, home to BAM transfer, ED visit within 48hrs of discharge, Diphenhydramine administration, PTT>100

34:04	**Results**
	• Sociodemographics
	  o Home and BAM were well matched for sociodemographic characteristics
	• Chronic Clinical Characteristics
	  o Home and BAM were well matched for chronic clinical characteristics (fairly sick group)
	• Acute Clinical Characteristics
	  o Home and BAM were well-matched for acute clinical characteristics, except BAM was less emergent
	• Diagnoses
	  o Home and BAM had similar frequencies for diagnoses
	• Pneumonia Characteristics
	  o Home and BAM were well-matched for specific pneumonia criteria
	• Adverse Events
	  o Seeing incident reductions in adverse events for Home vs. BAM
	  o Drastic difference in delirium events for Home vs. BAM
	• Triggers
	  o Home was associated with fewer triggers than BAM for nearly all triggers
	• Total Harm
	  o Home was associated with fewer safety events per patient than BAM
	  o Took out delirium to look at everything else since delirium was so significant
	• Harm by Diagnosis
	  o Home was associated with fewer AEs than BAM across all diagnoses
	• Utilization
	  o Home was associated with less utilization than BAM

38:38	**Discussion** • Reductions in adverse events and real-world data • Rigorous matching • Real-world data

38:57	**Limitations**
	• Still to come
	  o Manual chart review for exclusions in unstructured data
	  o Adjudication for AEs
	• Missed AEs not in the EHR
	• Generalizability: 3 sites
	• Association, not causation

39:45	**Urgent Call** • To home hospitalize our patients • To identify evidence-based interventions to curtail harm at home- few exist
40:09	**New Journal: JAHM- The Journal of Advanced Home Medicine**
40:40	**Questions and Answers**