Persistence of Delirium in Post-acute Care at Skilled Nursing Facilities

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Disclosure

- Supported by NIA
  - R33AG071744 (Dr. Inouye)
  - P01AG031720 (Dr. Inouye)
  - R01079864 (Dr. Vasunilashorn)
  - R01AG071809 (Dr. Kim)
  - K24AG073527 (Dr. Kim)
- Dr.Park received grants from NIA outside of this work

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

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

**Why compare year 2019 to year 2014?

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

  - Improved care coordination

  - Discharge planning

  - Feedback to PAC providers on their performance with respect to quality measures

  - Intends for standardized post-acute care data to improve Medicare beneficiary outcomes through shared-decision making, care coordination, enhanced discharge planning.

Measurement

- Demographic information (age, sex, and race)

- Patient Characteristics
  - Cognitive Function Scale (intact, mild, moderate, or severe)
  - Comorbidity
  - Functional status
  - Behavioral symptoms
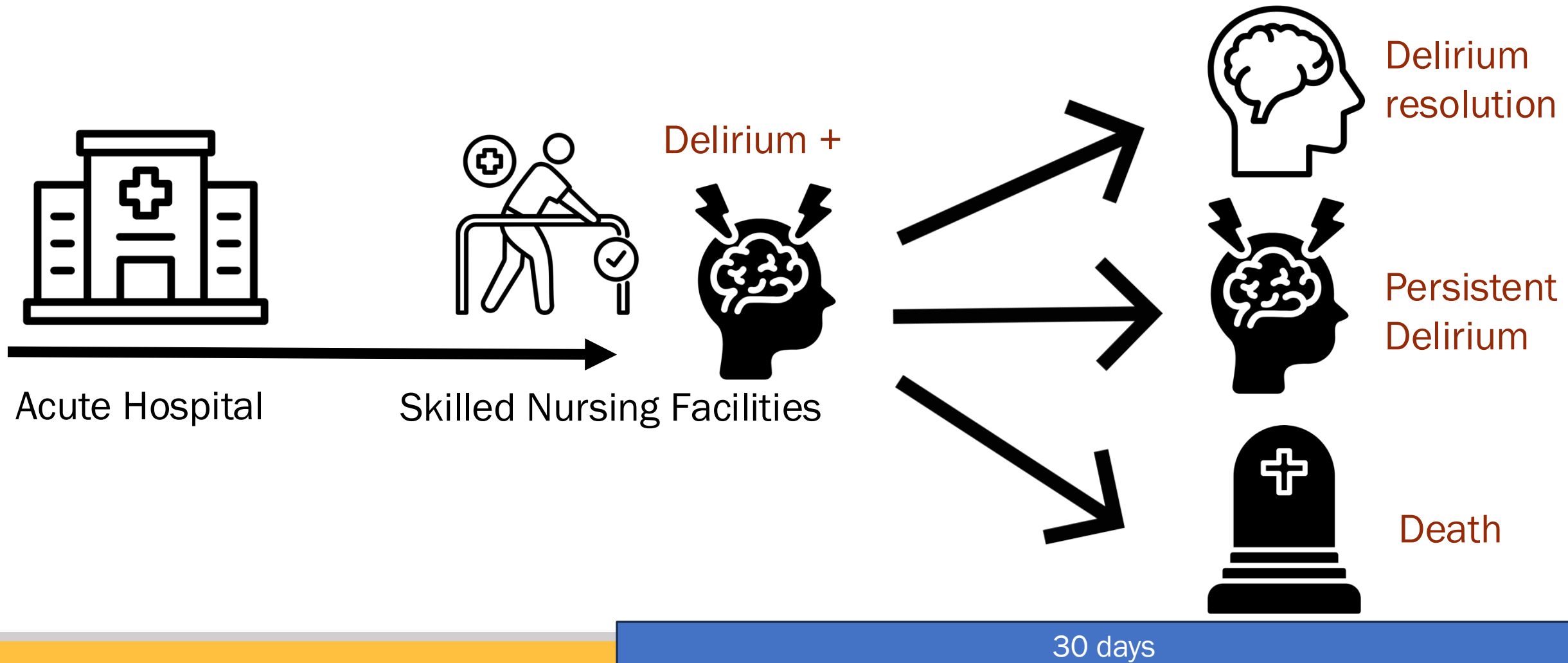 - Hearing and speech impairment
  - Frailty

Measurement

- SNF-related factors
  - Restraint use
  - Antipsychotic use
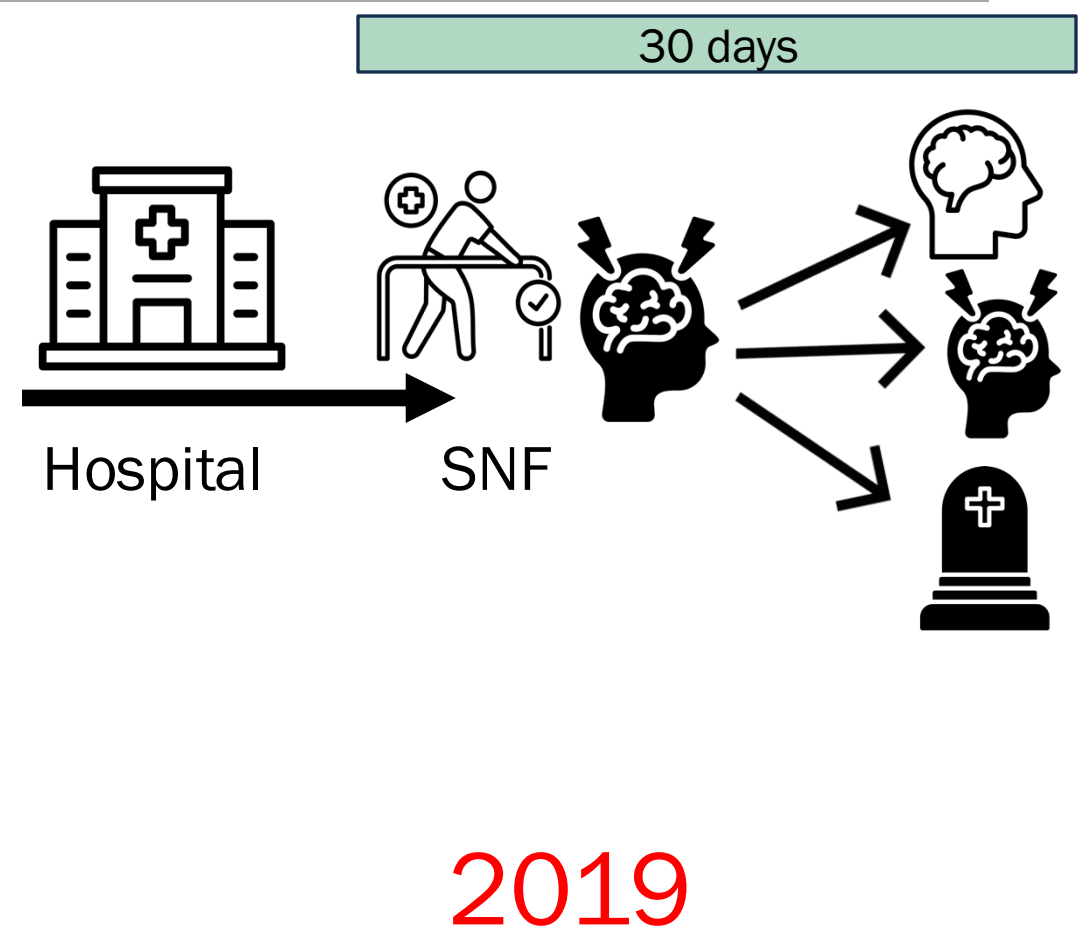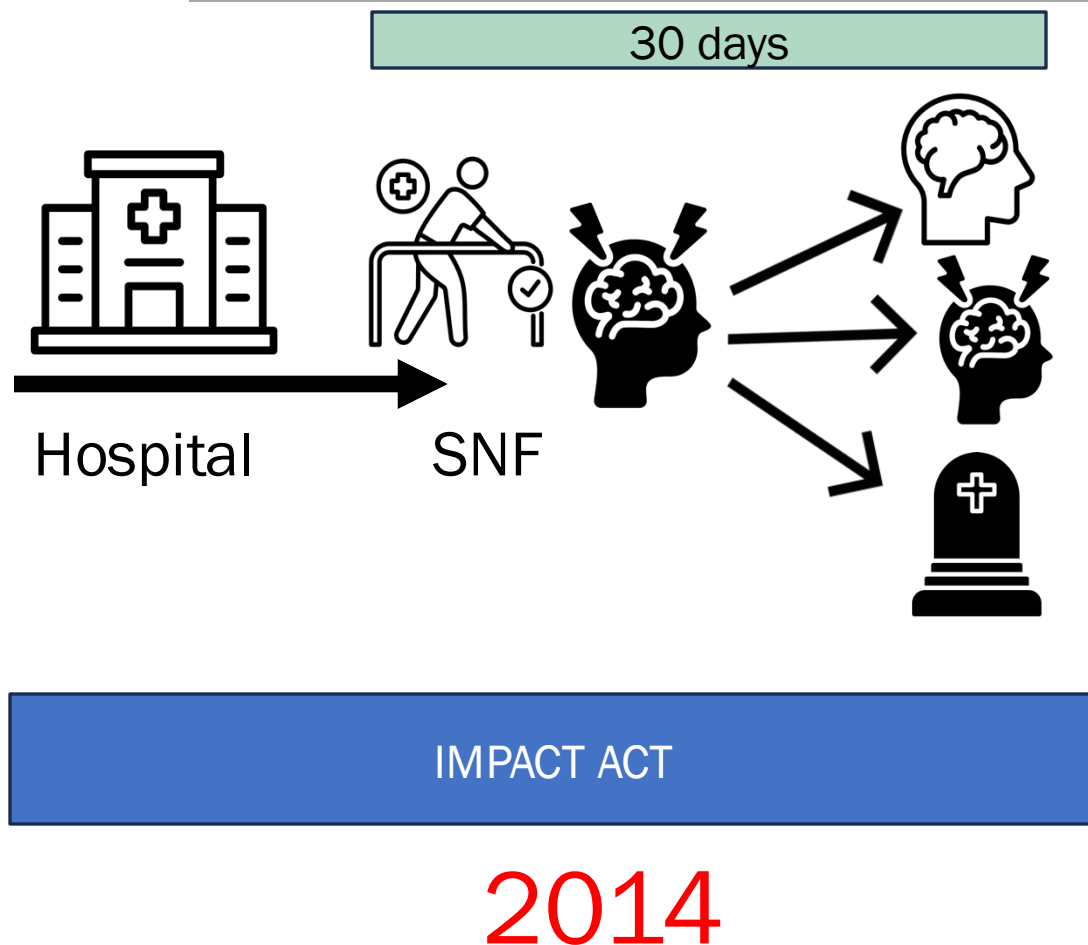 - Physical and occupational therapy minutes during the SNF stay
  - Length of stay

Outcomes

- Resolved delirium within 30 days

- Persistent delirium within 30 days

- Death within 30 days

Study Population and Design

Acute Hospital   Skilled Nursing Facilities

Delirium +

Delirium resolution

Persistent Delirium

Death

30 days

Study Population and Design

Statistical Analysis

- Multinomial logistic regression
  - Comparing probabilities of persistent delirium or death to resolved delirium (ref) between 2014 and 2019
  - Sequentially included different sets of variables
    1) Patient demographic
    2) Patient health-related variables
    3) SNF care-related variables
  - All within SNF outcome correlations using robust variance (NPI)

RESULTS

Figure 1. Study Flowchart

432 037	MDS assessments in 2014 and in 2019
226 039	Year 2014
205 998	Year 2019

127 570	Excluded
52 351	Not the first SNF admission assessment
29 105	No acute hospitalization before admission to SNF
25 803	Lacked admission assessment at SNF admission
17 780	Assessments did not include CAM measure
1623	No follow-up CAM assessments
908	Missing facility National Provider Identifier

304 467 Patients with CAM assessments <30 d of SNF admission

295 593 CAM negative at baseline

8874 Patients with CAM positive at baseline analyzed
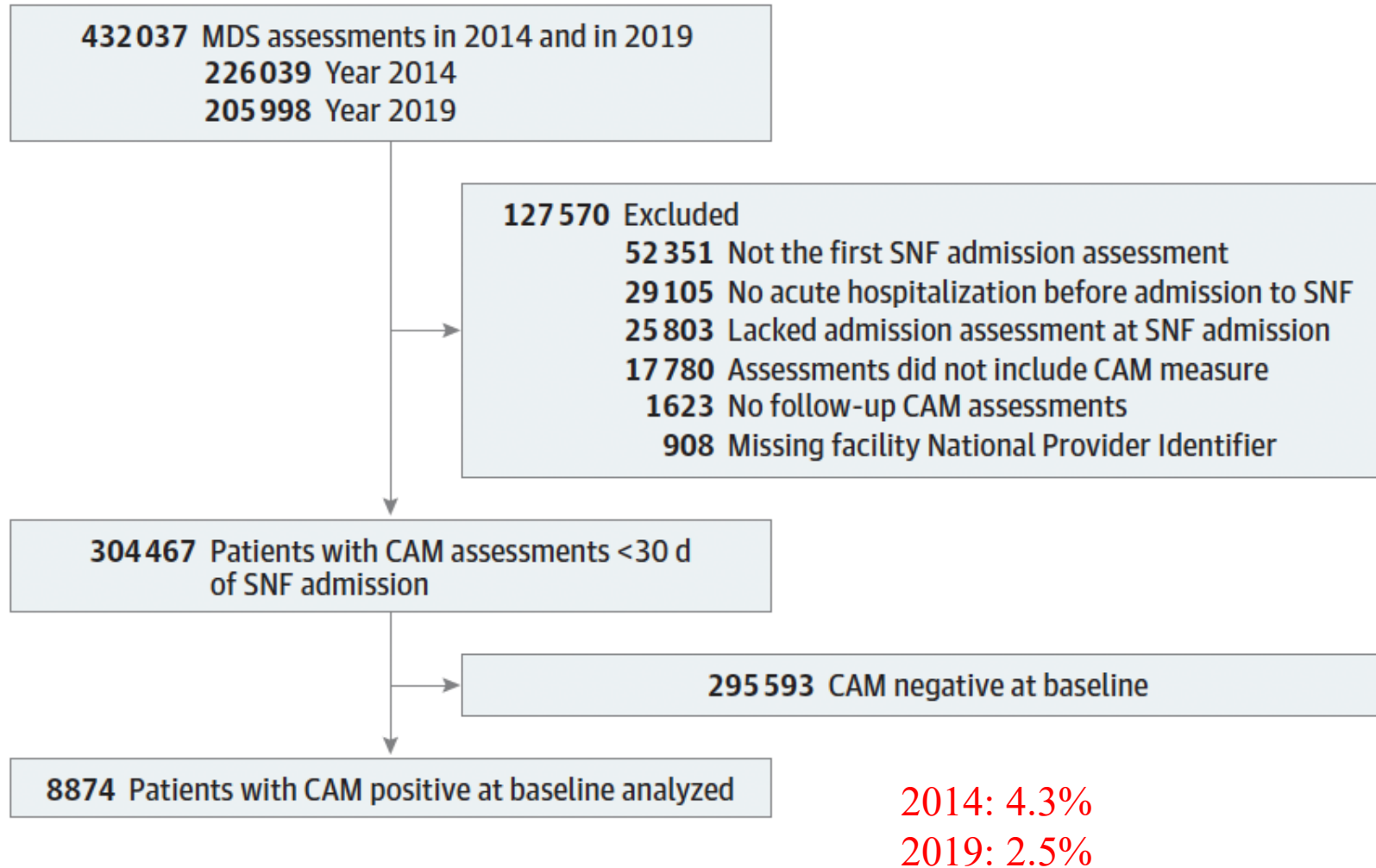
2014: 4.3%
2019: 2.5%

Table 1. Patient Characteristics and Skilled Nursing Facility Care–Related Variables for Patients With Delirium in 2014 and 2019[a]

Characteristics	Patients, No. (%)		P value
	2014 (n = 6096)	2019 (n = 2778)	
Patient characteristics			
Age, mean (SD), y	80.6 (11.0)	80.2 (10.7)	.07
Sex			
Female	3565 (58.5)	1546 (55.7)	.01
Male	2531 (41.5)	1232 (44.4)	
Race and ethnicity			
Black	603 (9.9)	290 (10.4)	
Hispanic	211 (3.5)	79 (2.8)	.41
White	4985 (81.8)	2269 (81.7)	
Other[b]	297 (4.9)	140 (5.0)	
Cognitive Function Scale score			
Cognitively intact	491 (8.1)	223 (8.0)	
Mild impairment	1151 (18.9)	540 (19.4)	.01
Moderate impairment	3479 (57.1)	1641 (59.1)	
Severe impairment	975 (16.0)	374 (13.5)	
Hearing impairment	2011 (33.0)	856 (30.8)	.01
Speech impairment	1525 (25.0)	586 (21.1)	<.001
Activities of daily living dependency			
Bed mobility	5788 (95.0)	2618 (92.2)	.04
Personal hygiene	5836 (95.7)	2625 (94.5)	.04
Dressing	5959 (97.8)	2698 (97.1)	.19
Bathing	6011 (98.6)	2717 (97.8)	.02
Toileting	5936 (97.4)	2683 (96.6)	.04
Eating	3378 (55.4)	1315 (47.3)	<.001

Comorbidity			
Diabetes	2833 (46.5)	1288 (46.4)	.92
Atrial fibrillation	1743 (28.6)	711 (25.6)	.003
Heart failure	3179 (52.2)	1278 (46.0)	<.001
Ischemic heart disease	3985 (65.4)	1736 (62.5)	.009
Chronic obstructive pulmonary disease	2525 (41.1)	1057 (38.1)	.003
Osteoporosis	1876 (30.8)	782 (28.2)	.01
Chronic kidney disease	3125 (51.3)	1613 (58.1)	<.001
Hip fracture history	1081 (17.7)	457 (16.5)	.14
Cancer	1188 (19.5)	531 (19.1)	.68
Dementia	4430 (64.2)	2281 (63.5)	.49
Behaviors (physical and verbal aggression)			
No behaviors	4090 (67.1)	1903 (68.5)	
Mild to moderate behaviors	1241 (20.4)	604 (21.7)	<.001
Severe to very severe behaviors	765 (12.6)	271 (9.8)	
Patient Health Questionnaire-9			
Minimal depression	3307 (54.3)	1613 (58.1)	
Mild depression	1349 (22.1)	513 (18.5)	<.001
Moderate to severe depression	1440 (23.6)	652 (23.5)	
Skilled nursing facility care-related variables			
Antipsychotic use in the past week			
Not used	4345 (71.3)	2028 (73.0)	.23
≥1 d	1751 (28.7)	750 (27.0)	
Use of restraints in the past week	189 (3.1)	29 (1.0)	<.001
Occupational therapy duration, mean (SD), min	207.5 (108.8)	204.2 (109.2)	.19
Physical therapy duration, mean (SD), min	217.5 (114.2)	210.5 (120.1)	.009
Length of stay, mean (SD), d	19.0 (9.0)	17.8 (8.8)	<.001

Table 2. Comparison of Rates of Persistent Delirium and Mortality Between 2014 and 2019

Outcomes (n = 8874)	Events, No. (%)[a]	
	2014 (n = 6096)	2019 (n = 2778)
Resolved	1734 (28.4)	1010 (36.4)
Persistent delirium	3347 (54.9)	1316 (47.4)
Death within 30 d	1015 (16.7)	452 (16.3)

-Reduction in the risk of persistent delirium vs. resolved delirium in 2019 compared with 2014

-Sequential adjustment for patient demographics, health-related variables, and SNF care-related factors did not change the estimates.

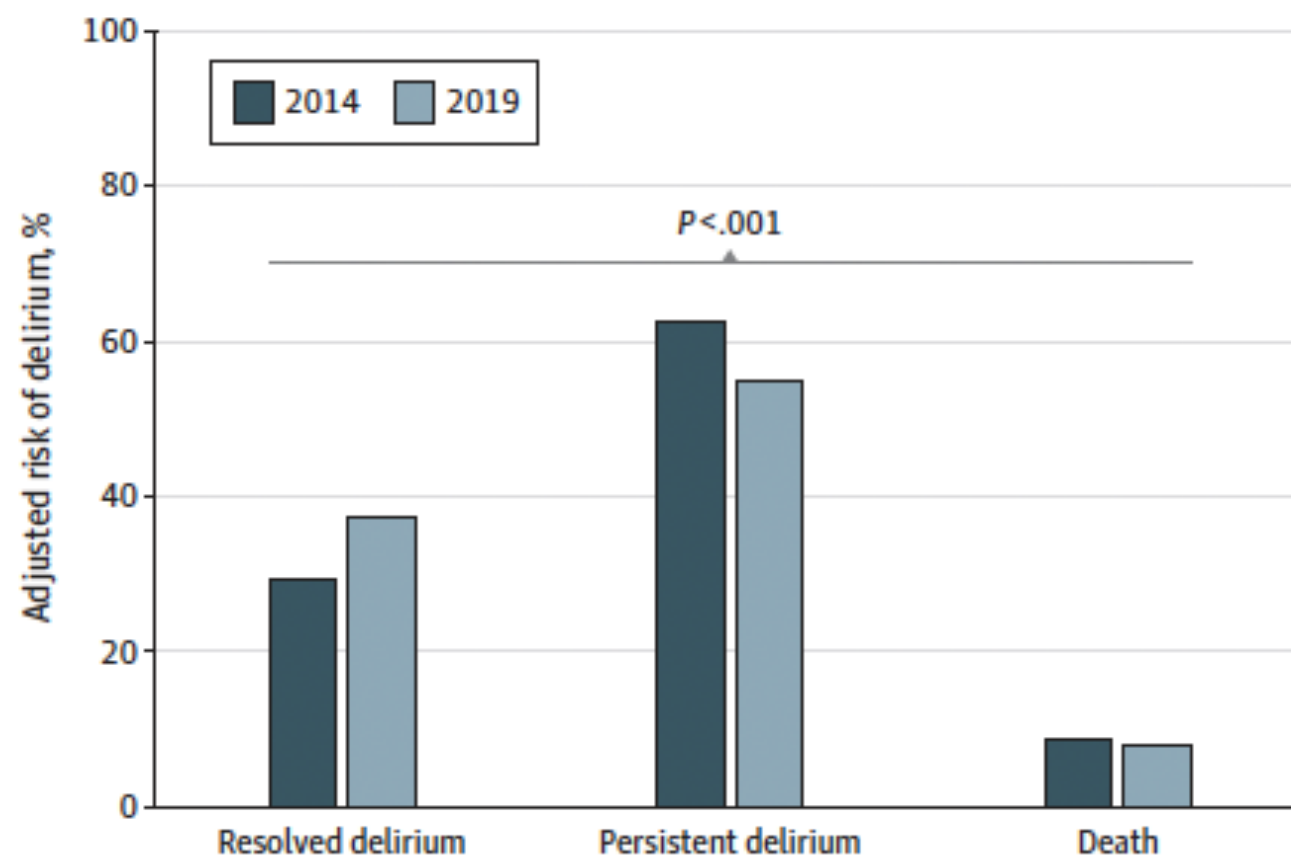Figure 2. Comparison of Outcomes Between 2014 and 2019

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

Subgroups	Outcome: persistent delirium		Outcome: death within 30 d	
	2019 vs 2014, RRR (95% CI)	P value	2019 vs 2014, RRR (95% CI)	P value
Age, y				
<80 (n = 3554)	0.69 (0.58-0.81)	<.001	0.65 (0.50-0.83)	.001
≥80 (n = 5320)	0.68 (0.59-0.78)	<.001	0.78 (0.63-0.96)	.02
Sex				
Male (n = 3763)	0.70 (0.60-0.83)	<.001	0.83 (0.66-1.04)	.12
Female (n = 5111)	0.66 (0.58-0.77)	<.001	0.64 (0.51-0.79)	.51
Frailty				
Nonfrail[a] (n = 1617)	0.78 (0.61-1.00)	.05	1.01 (0.67-1.54)	.96
Frail[a] (n = 3664)	0.64 (0.54-0.75)	<.001	0.85 (0.65-1.11)	.25
Dementia				
No dementia (n = 3097)	0.70 (0.58-0.84)	<.001	0.73 (0.57-0.93)	.01
Dementia (n = 5777)	0.68 (0.59-0.77)	<.001	0.72 (0.59-0.89)	.002

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

Discussion

- Potential factors (indirect influences)
  - Enhanced care coordination

  - Quality reporting

  - MDS assessments updates

  - HELP

  - Age-Friendly Health Systems Initiatives

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

THANK YOU!