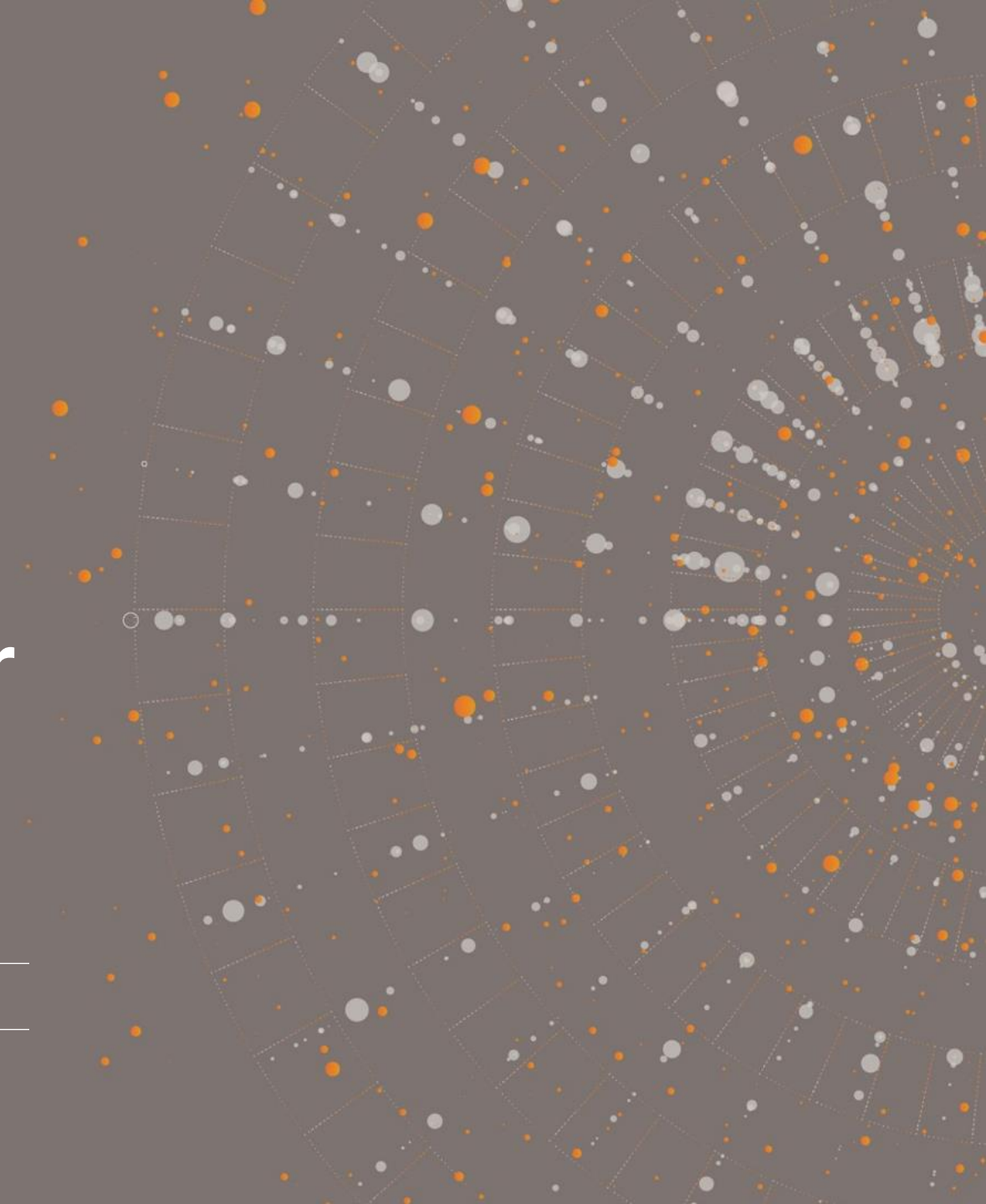


An Analysis of Health Outcomes Among Senior Housing Residents

Research funded by the National Investment Center
on Seniors Housing & Care (NIC)

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Dianne Munevar, Alex Hartzman, Tyler Oberlander, Claudia Gorman



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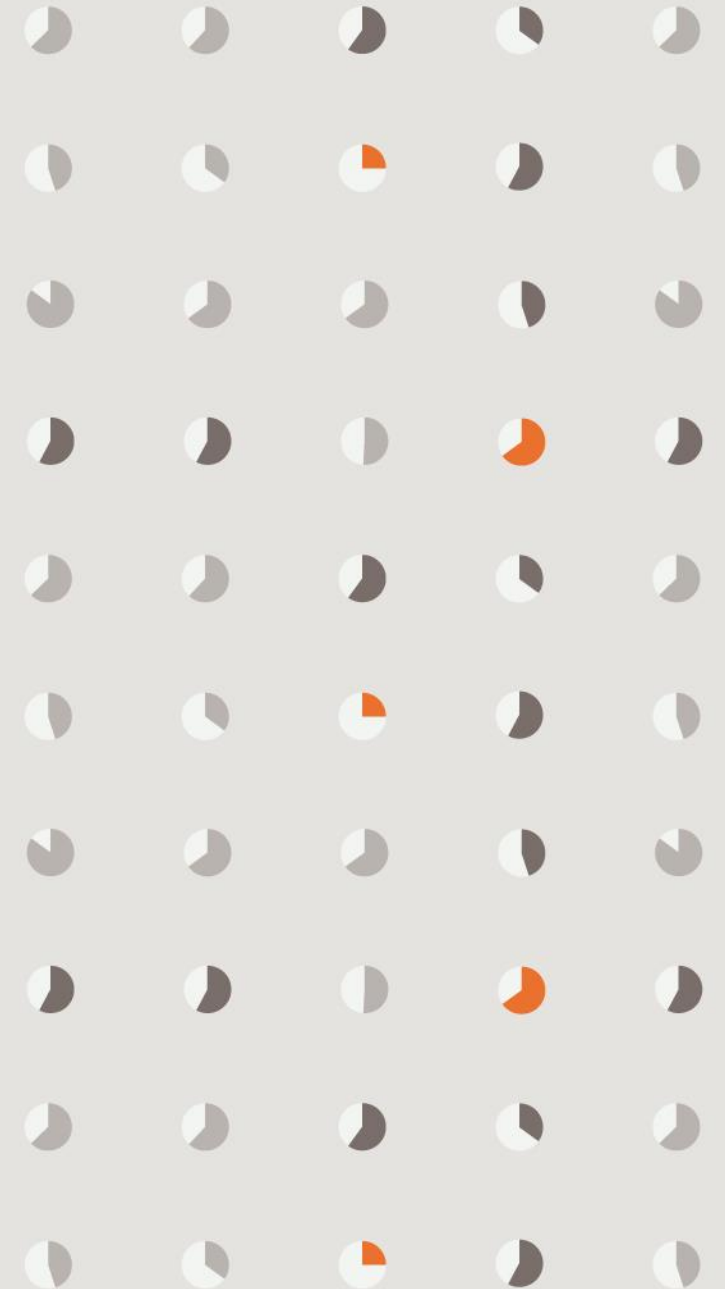
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This research measures differences in health outcomes among individuals who moved into senior housing facilities compared to older adults living in the community

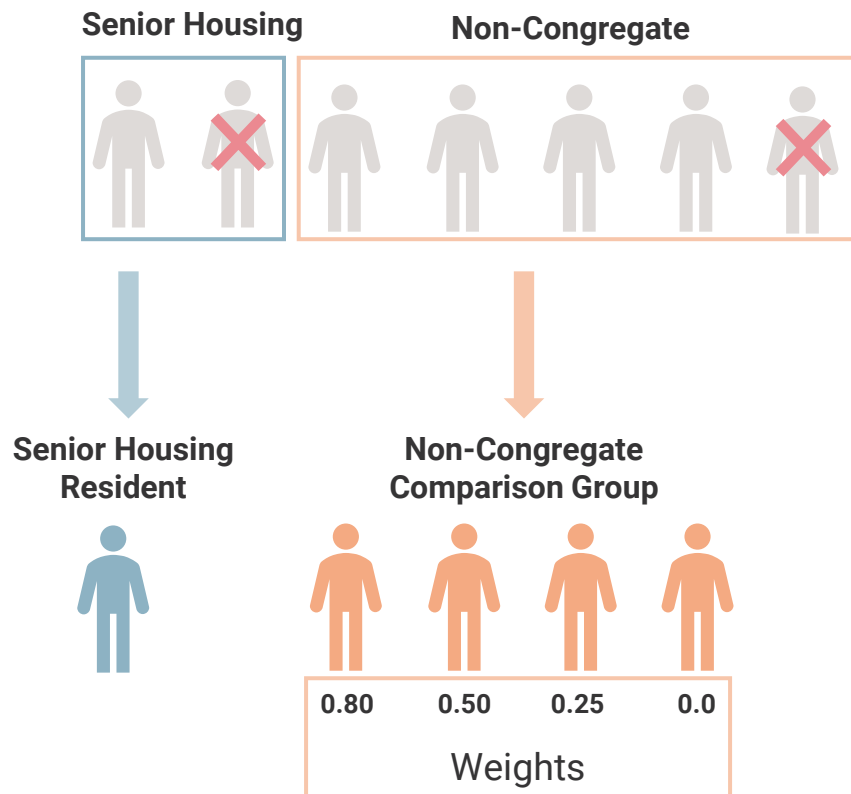
- Senior housing has the potential to support the **housing and healthcare needs** of vulnerable older adults.
- People move into senior housing for a multitude of reasons, often because they've become medically complex and **can no longer live independently**. Changes in relationship dynamics and living situations, like widowhood or dependents moving away, also impact older adults' ability to live independently.
- This is a **vulnerable time for older adults**—characterized by an increase in frailty, adverse health events, and a higher risk of mortality.
- Previous NORC analyses found that older adults who move into senior housing **experience decreased vulnerability to adverse health outcomes** and **increased access to physician services**, and that **senior housing residents experience greater longevity** than the non-congregate comparison group in the first two years following move-in.

The National Investment Center on Seniors Housing & Care (NIC) commissioned NORC at the University of Chicago (NORC) to assess the relationship between senior housing and health outcomes for older adults

- NORC conducted a comparative analysis of **emergency department (ED) visits, hospital inpatient stays, hospitalizations for physical injury and/or falls, and select Prevention Quality Indicators (PQIs)**.
- The study **focuses on older adults who moved into senior housing properties in 2017** and resided in properties until their death, or the end of the two-year study period. We tracked individuals for **two years (730 days) following their move-in date**.
- Individuals who moved into senior housing properties (“senior housing residents”) were **matched with a comparable non-congregate population** (“non-congregate peer group”) based on age, gender, frailty (claims-based frailty) level groups, and select chronic conditions.

NORC's risk adjustment methodology relied on establishing a comparison group that closely resembled the non-congregate population

NORC used a weighting approach to create an analogous non-congregate comparison group. The specific approach used is called "entropy balancing".



1. Attribute Medicare beneficiaries to senior housing or non-congregate comparison group
2. Remove beneficiaries who do not meet study inclusion criteria (i.e., must live in a NIC Map Vision property zip, not have hospice in prior year, etc.)
3. This approach assigns a weight to every member of the non-congregate group based on how similar they are to the senior housing group
 - Frailty (CFI) groups
 - Demographics (e.g., age, gender)
 - Enrollment information (e.g., Duals status)
 - Select condition groups
4. Multiply weights against each observation's outcomes measures to form an average weighted outcome to give the most apt population comparison

Executive Summary

- The Outcomes study evaluated health care utilization and outcomes for **individuals who moved into a senior housing property** in 2017 over a two-year period (2017-2019, or until death) compared with a matched community-dwelling peer group.¹
- Older adults who recently moved into private pay senior housing **experienced the same or better outcomes across several preventive care measures** compared to their matched non-congregate peers.
- These findings suggest that **senior housing operators have been effective in managing resident clinical risk**, even during the transition to senior housing—a particularly vulnerable time for older adults.
- **Further research is needed** to estimate the resulting cost savings for Medicare and to evaluate the potential impact of new value-based arrangements with senior housing facilities.

¹ Please see Appendix for details about the methodology, data sources, and study limitations.

Measures were selected for their clinical significance, relevance to health outcomes, and influence on quality of life for older adults

- **Emergency Department Visits**
- **Hospitalizations for Physical Injuries:**
 - Hip fractures
 - Wounds
- **Prevention Quality Indicators (PQIs),** hospitalizations for:
 - Chronic Obstructive Pulmonary Disorder (COPD)
 - Hypertension
 - Dehydration
 - Urinary Tract Infections (UTIs)
 - Community-acquired pneumonia
 - Uncontrolled diabetes

Measures of high-cost, high-acuity events are important to a variety of stakeholders and audiences, including consumers; senior housing owners, operators, and investors; and ultimately CMS and Medicare Advantage (MA) plans

- CMS quality programs for MA plans emphasize prevention of high-cost, high-acuity events through high-quality preventive care, screening, and chronic condition management
- PQIs identify admissions that may have been avoided through effective preventive and rehabilitative care
- This information is vital for consumers and caregivers in considering where to live safely and independently

Senior housing residents experienced the following outcomes, relative to a matched non-congregate peer group

Lower rates of...

Inpatient admissions from the Emergency Department

Inpatient admissions due to:

Physical injury

Hip fracture

Wounds

COPD

Dehydration

UTIs

Higher rates of...

Emergency Department utilization

Not meaningful differences* in rates of...

Inpatient admissions due to:

Falls

Hypertension

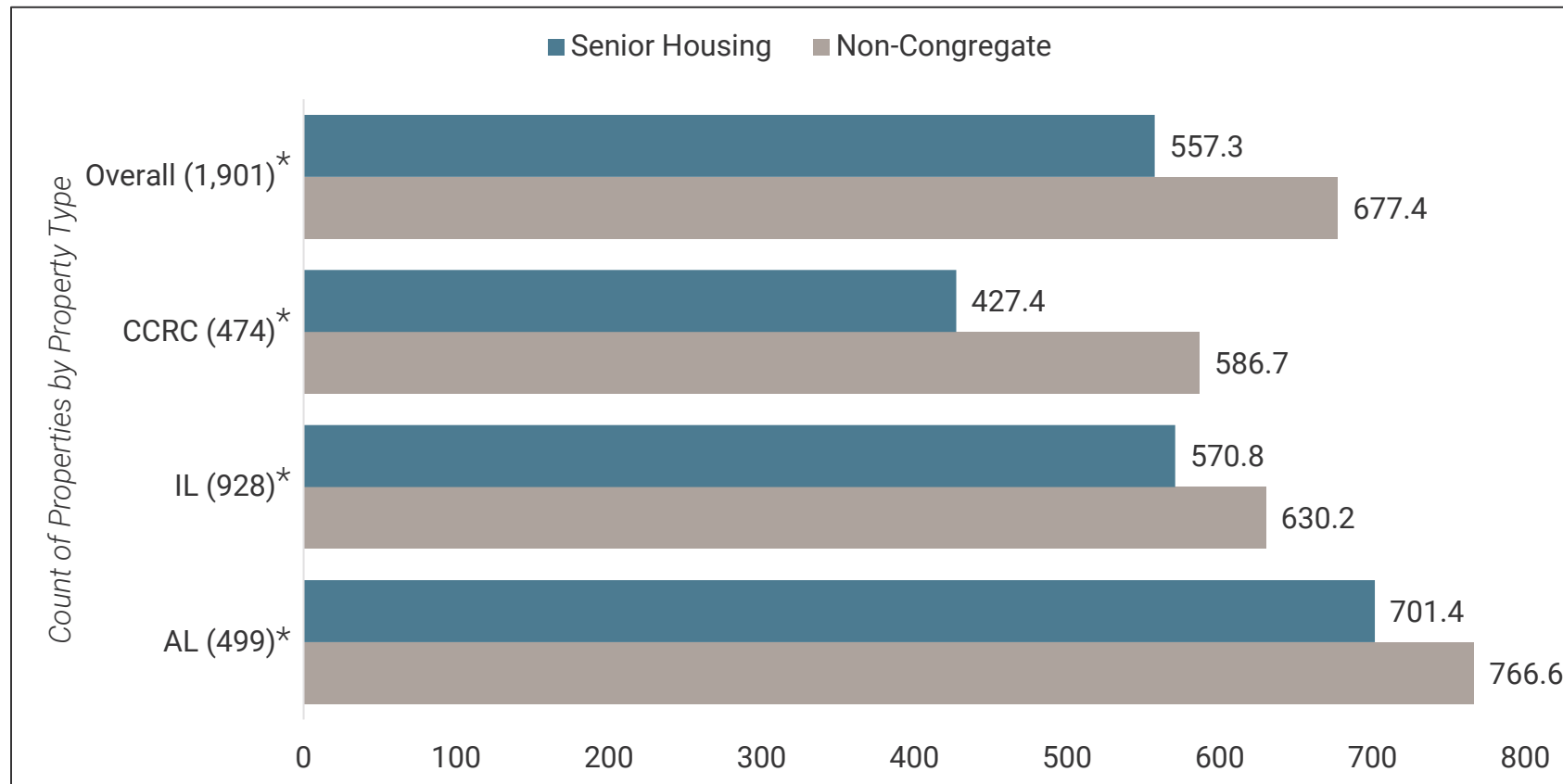
Community-acquired pneumonia

Uncontrolled diabetes

These findings demonstrate alignment between the role that senior housing owners and operators play while considering consumers' need for improved access to high-quality, safe and equitable care for older adults.

*Not statistically significant at $p < 0.05$

Across all property types, individuals in senior housing were **admitted to the hospital from the ED less frequently** than their non-congregate peers

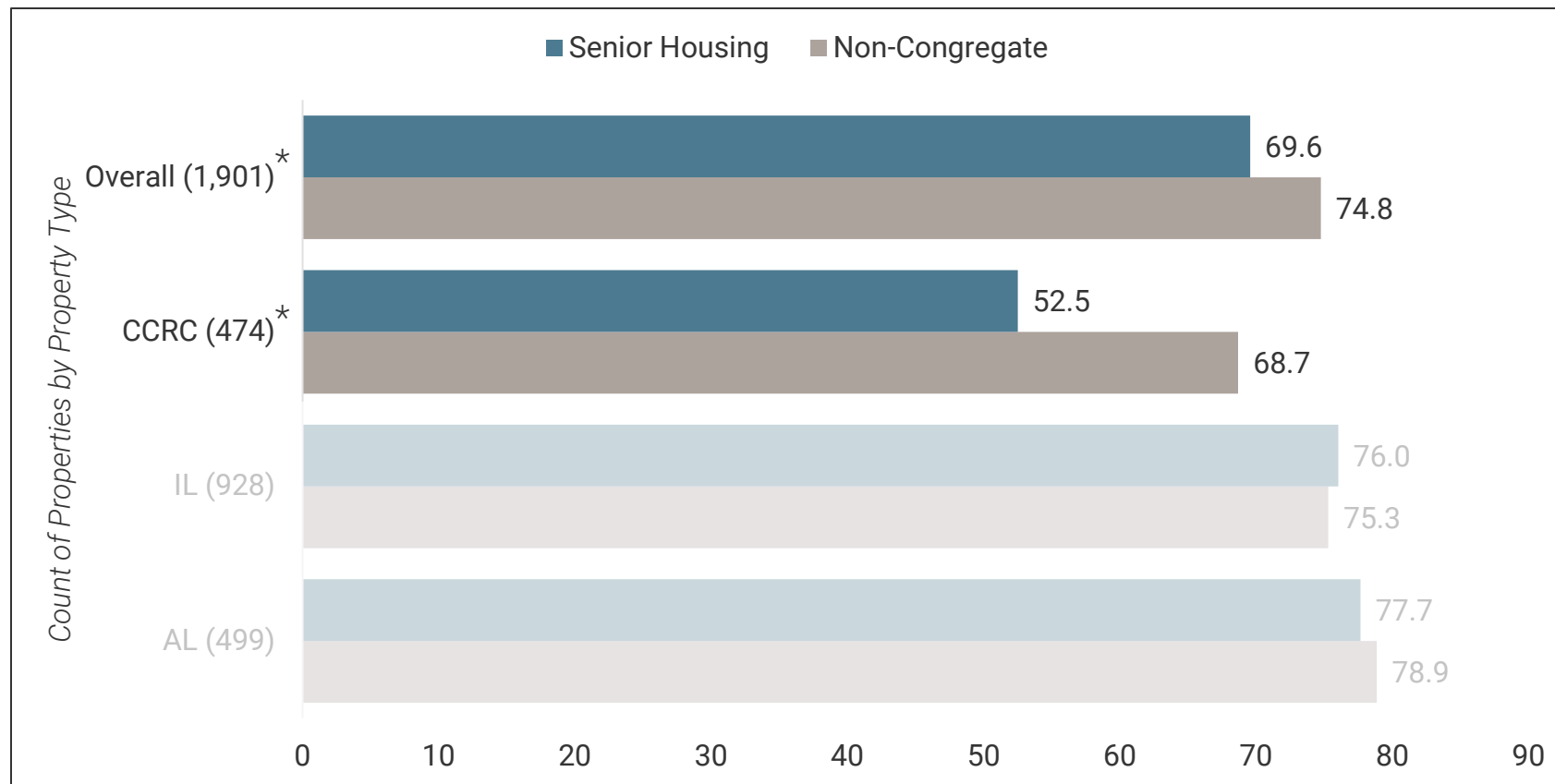


Senior housing residents experienced **18% fewer hospitalizations from ED** compared to their non-congregate peers (557.3 claims per 1,000 beneficiaries vs. 677.4 claims per 1,000 beneficiaries, respectively).

* The difference in means are statistically significant at $p < 0.05$.

Measure Definition: Any Inpatient Fee-For-Service (FFS) claim with at least one line item containing an ED Revenue Center code (mirrors the CCW's Inpatient Emergency Room Visits annual summary measure).

CCRC residents had **24% fewer hospitalizations for physical injuries** compared to their matched counterparts



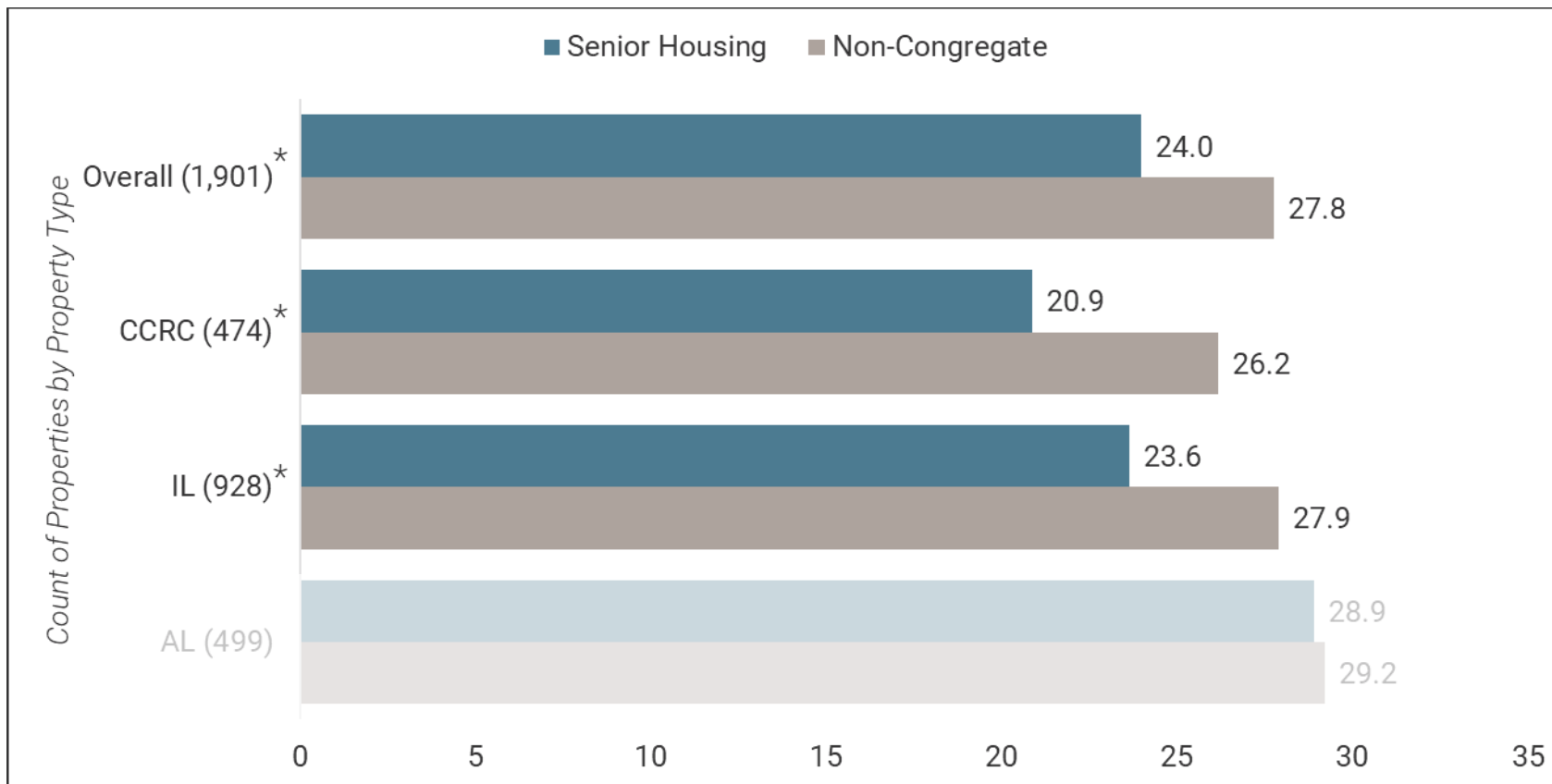
Overall, senior housing residents **had fewer inpatient admissions for physical injuries** than their non-congregate peers, largely driven by CCRC performance.

* The difference in means are statistically significant at $p < 0.05$.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Any Inpatient FFS claim with a principal ICD-10 Diagnosis code in the S00 to S99 range or T14.

Overall, senior housing residents experienced about **four fewer hospitalizations due to a hip fracture**, per one thousand residents, compared to their non-congregate peers



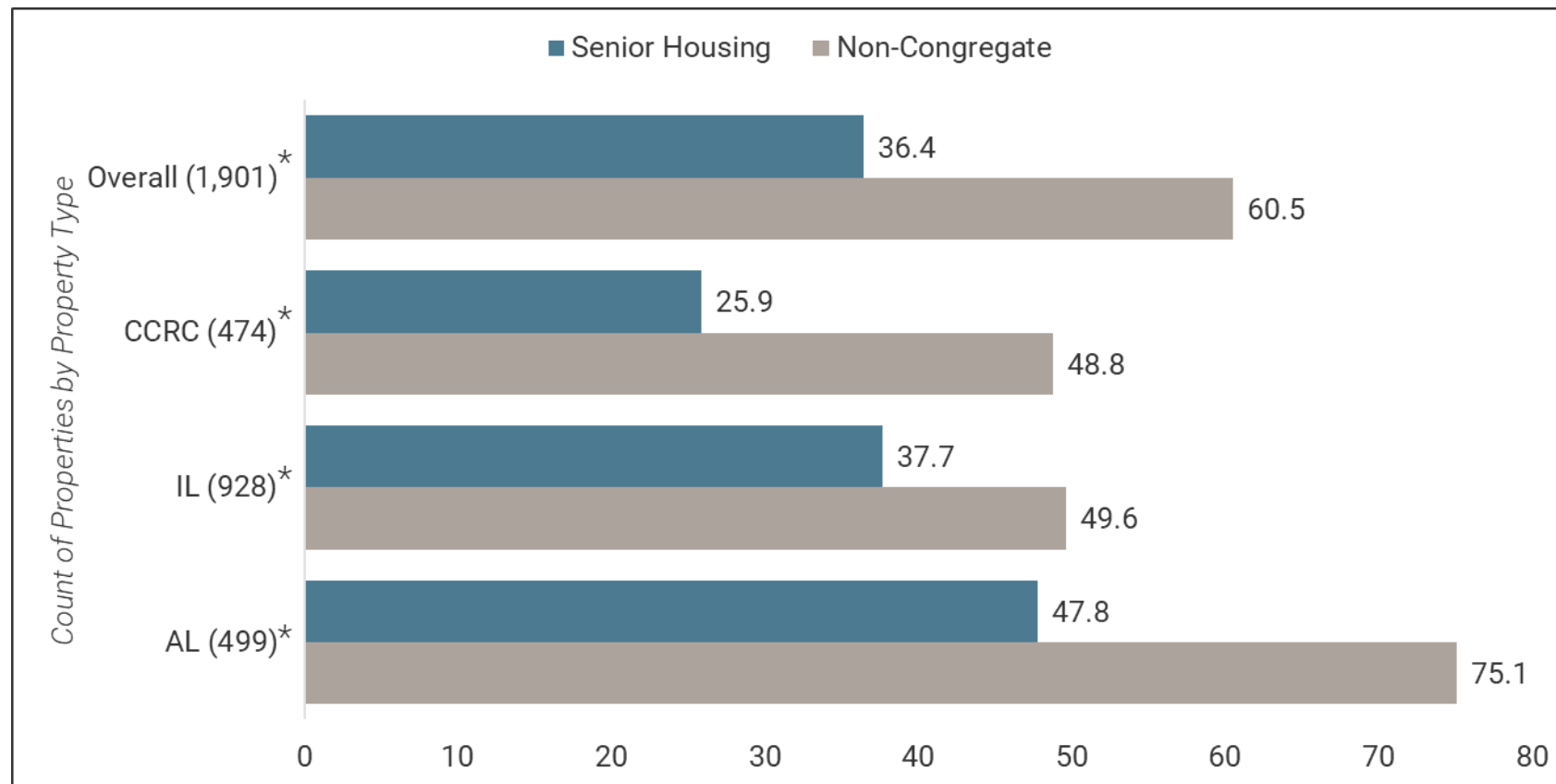
IL residents experienced **15% fewer hospitalizations due to hip fractures** compared to their matched counterparts (23.6 claims per 1,000 residents vs. 27.9 per 1,000 matched beneficiaries).

* The difference in means are statistically significant at $p < 0.05$.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Any Inpatient FFS claim with a principal ICD-10 Diagnosis code matching any ICD-10 code from CMS' Comprehensive Care for Joint Replacement Model value set for a hip fracture diagnosis.¹

Senior housing residents **experienced fewer hospitalizations for wounds** than their non-congregate peers across all settings

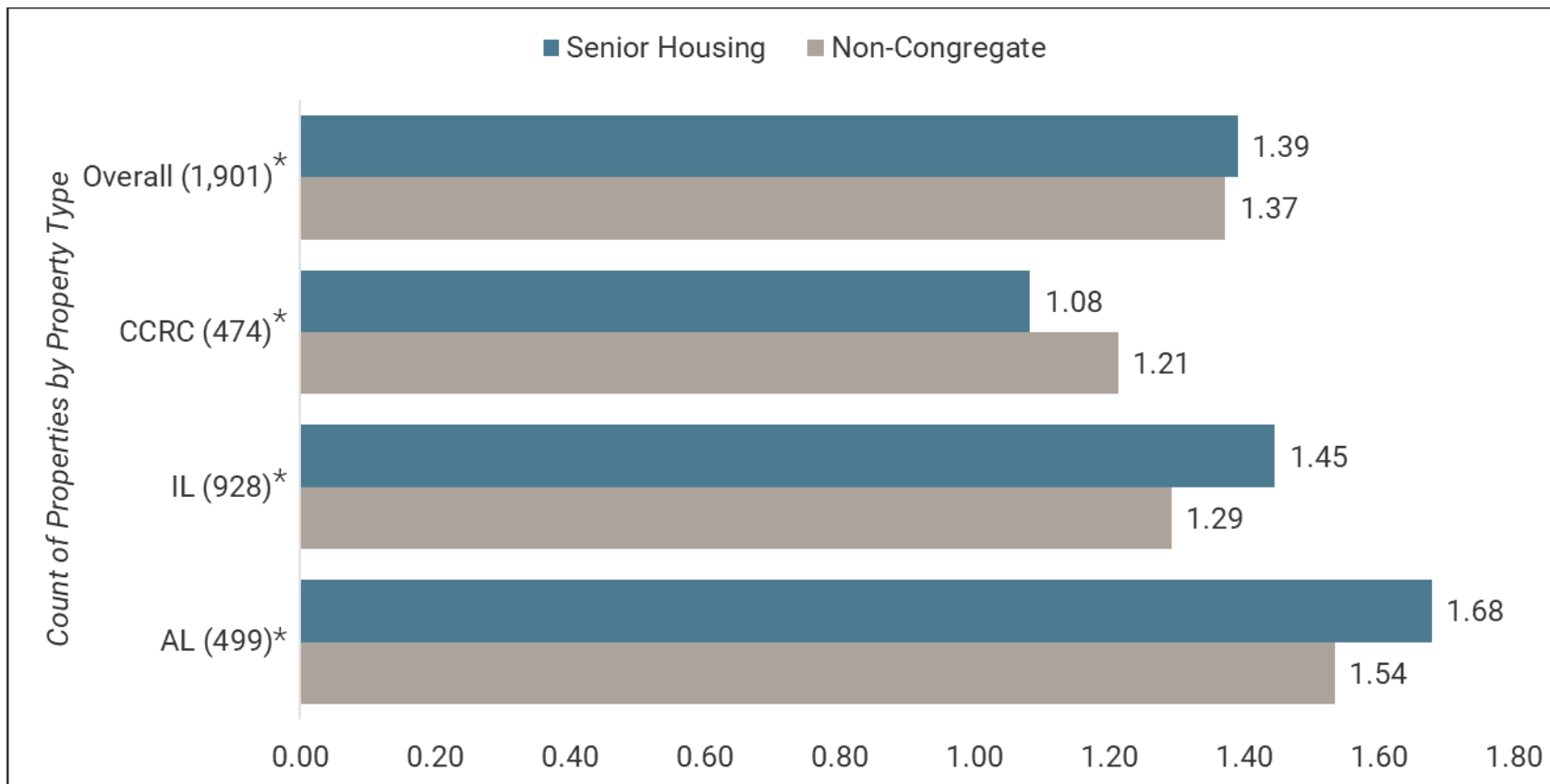


AL residents experienced **36% fewer hospitalizations for wounds** compared to their matched counterparts (47.8 claims per 1,000 residents vs. 75.1 claims per 1,000 matched beneficiaries).

* The difference in means are statistically significant at $p < 0.05$.

Measure Definition: Any Inpatient FFS claim with ICD-10 Diagnosis code matching CMS MS-DRG value set for Diseases & Disorders of the Skin, Subcutaneous Tissue & Breast Skin Ulcers¹, that was present on admission.

Overall, senior housing residents **used the ED more frequently** than their non-congregate peers

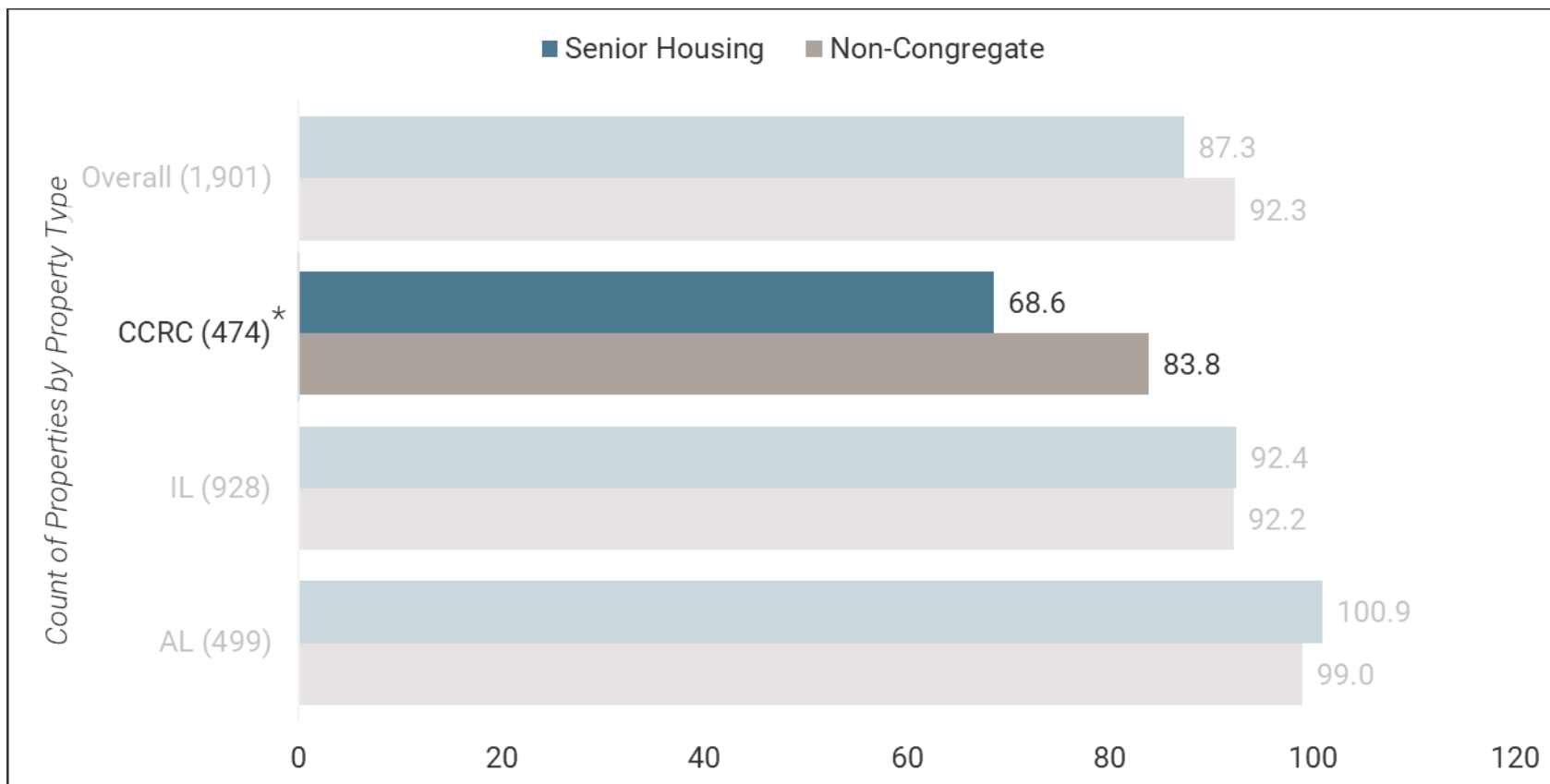


CCRC residents experienced **11% fewer ED visits** per beneficiary compared to their matched counterparts (1.08 visits on average, per beneficiary vs. 1.21 visits per average, per beneficiary, respectively).

* The difference in means are statistically significant at $p < 0.05$.

Measure Definition: Count of distinct visits to the emergency department per Beneficiary during the study period. This measure includes ED visits that resulted in discharge to home, hospital observation, or hospital admission.

CCRC residents experienced **18% fewer hospitalizations due to falls** compared to their matched counterparts



Overall, there is **no meaningful difference** between the number of hospitalizations due to falls between senior housing residents and those residing in a non-congregate setting.

* The difference in means are statistically significant at $p < 0.05$.

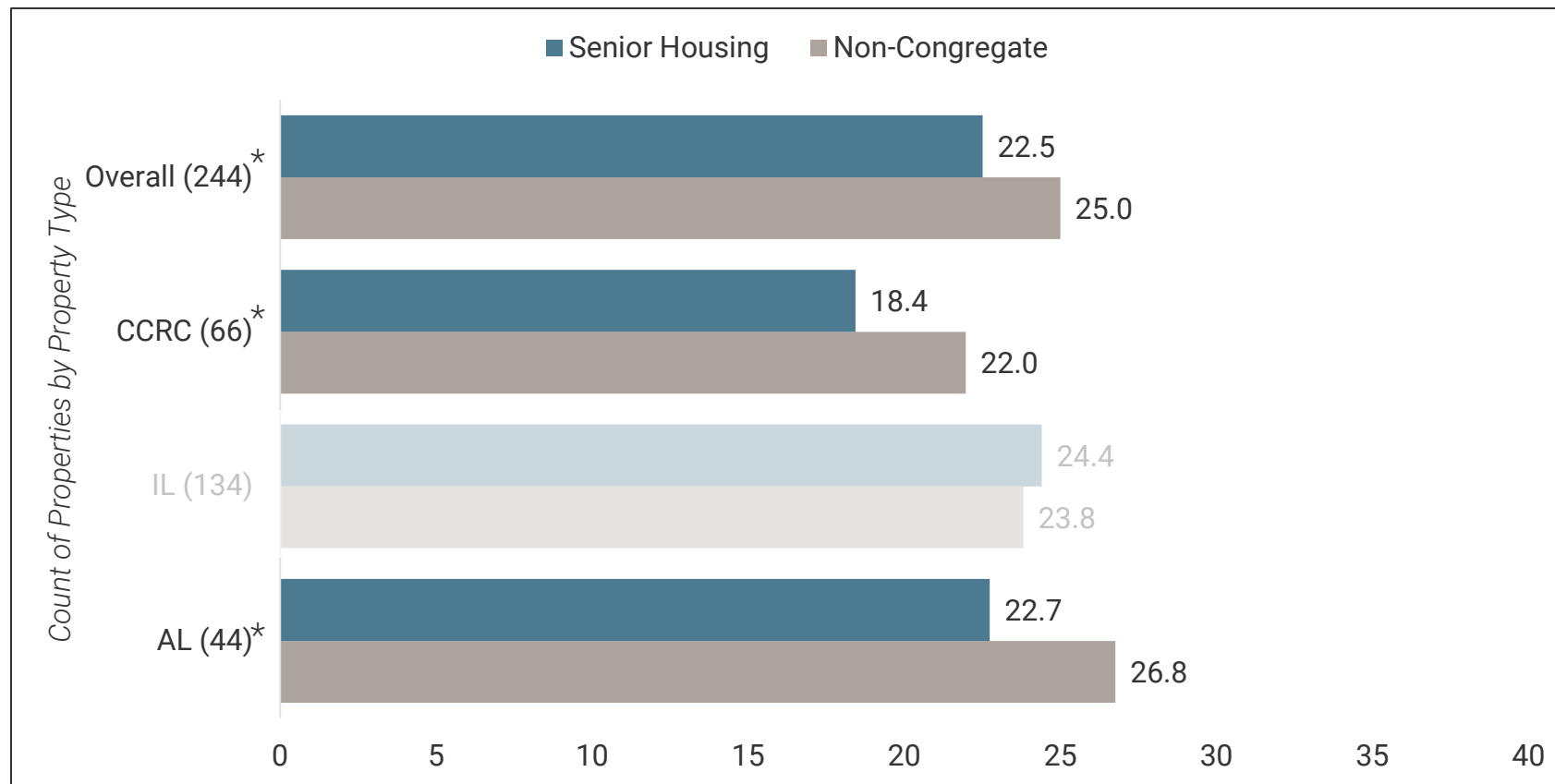
Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Any Inpatient FFS claim with at least one line item containing an ED Revenue Center code and a primary ICD10 external cause code of a fall (W00 to W19).

NORC implemented Prevention Quality Indicators (PQIs) to evaluate the extent to which living in a senior housing community reduced the risk of hospitalizations for potentially-preventable conditions

- PQIs were developed by the Agency for Healthcare Research and Quality (AHRQ) to monitor hospitalizations that may have been avoided through **high-quality preventative and rehabilitative care**.
- These are **rare events** among beneficiaries who have recently moved into senior housing—for some PQI measures, **fewer than 1% of residents experienced an event during the study period**.
- In several cases, we were not able to detect statistically significant differences in outcomes for senior housing residents compared to their non-congregate peers.

Older adults who recently moved into senior housing **had fewer hospital admissions resulting from COPD/Asthma** compared to their matched peers



AL residents experienced **15% fewer hospitalizations** due to COPD compared to their matched peers (22.7 claims per 1,000 residents vs. 26.8 per 1,000 matched beneficiaries, respectively).

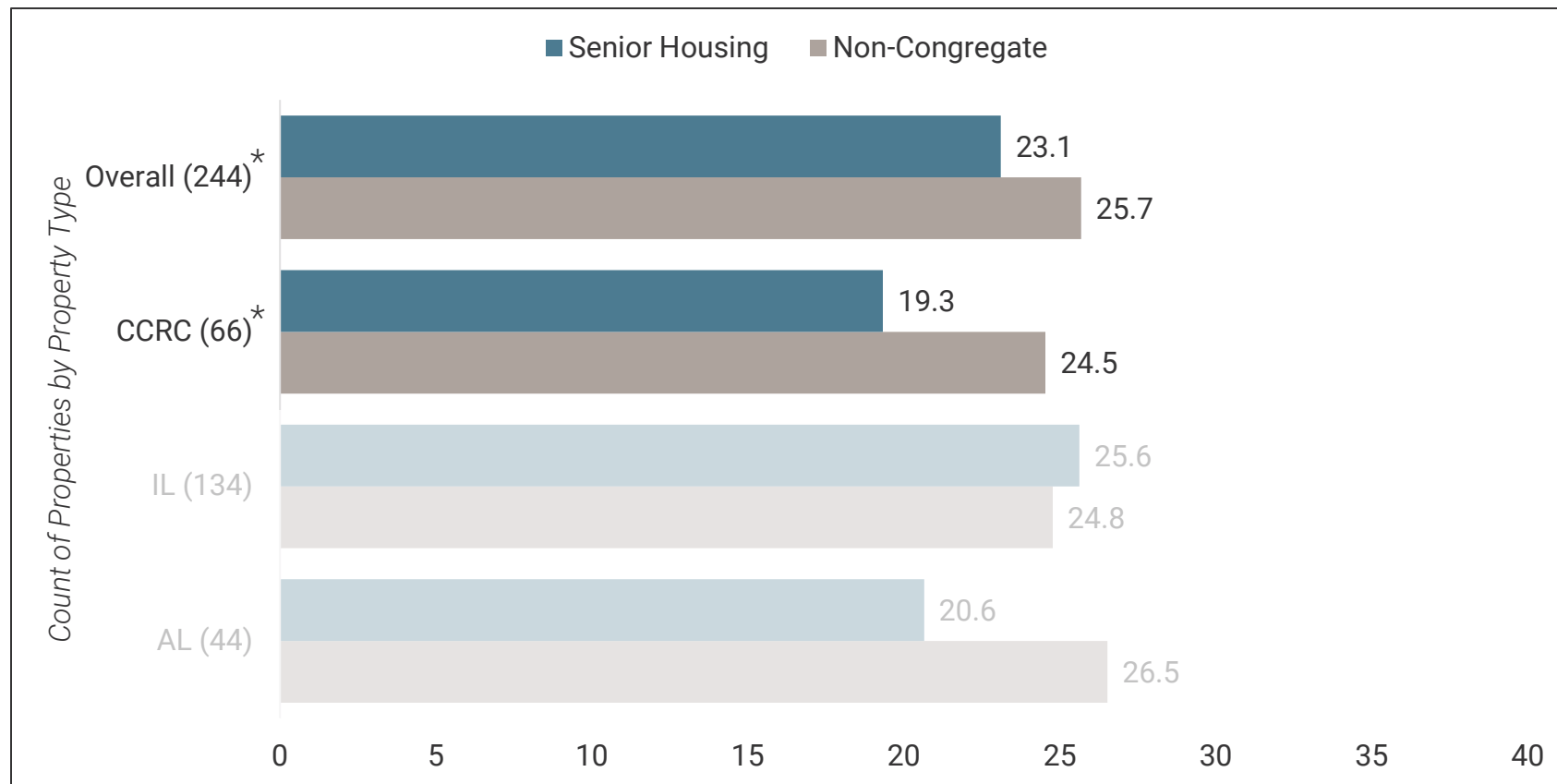
* The difference in means are statistically significant at $p < 0.05$.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Inpatient FFS admissions with a principal diagnosis of Chronic Obstructive Pulmonary Disease (COPD) or asthma; rate per thousand beneficiaries.

NOTE: Findings relevant among people with a hospitalization for a PQI-qualifying event.

Hospital admissions for dehydration were 21% lower for CCRC residents compared to their non-congregate peers



There were **fewer hospital admissions due to dehydration** for senior housing residents compared to their matched peers, largely driving by CCRC performance.

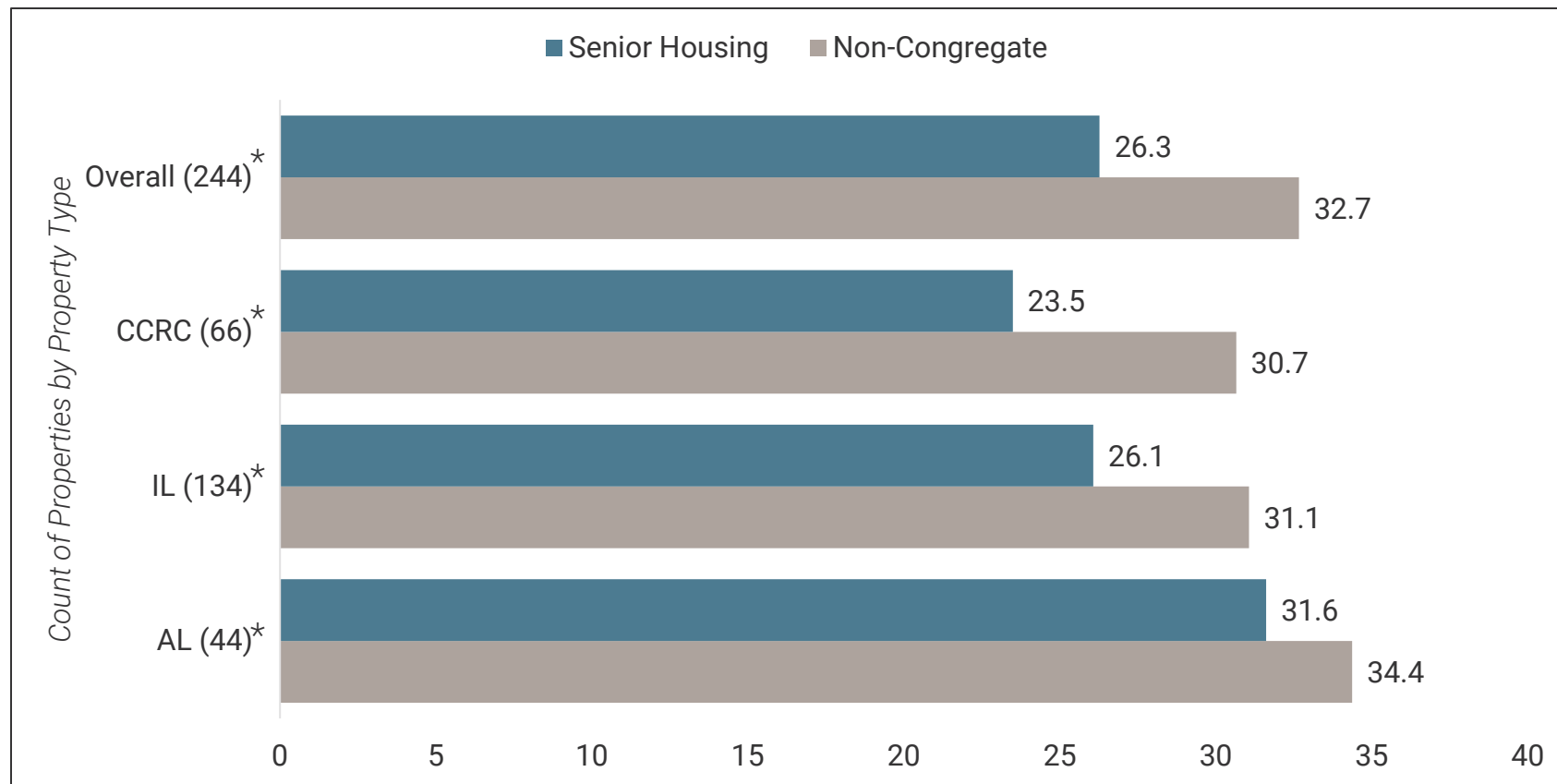
* The difference in means are statistically significant at $p < 0.05$.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Inpatient FFS admissions with a principal diagnosis of Dehydration OR secondary diagnosis of Dehydration with a principal diagnosis of either Hyperosmolality and/or Hyponatremia, Gastroenteritis, or Acute Kidney Injury; rate per thousand beneficiaries.

NOTE: Findings relevant among people with a hospitalization for a PQI-qualifying event.

The incidence of **hospitalizations due to UTIs was lower** across all senior housing property types compared to their non-congregate peers

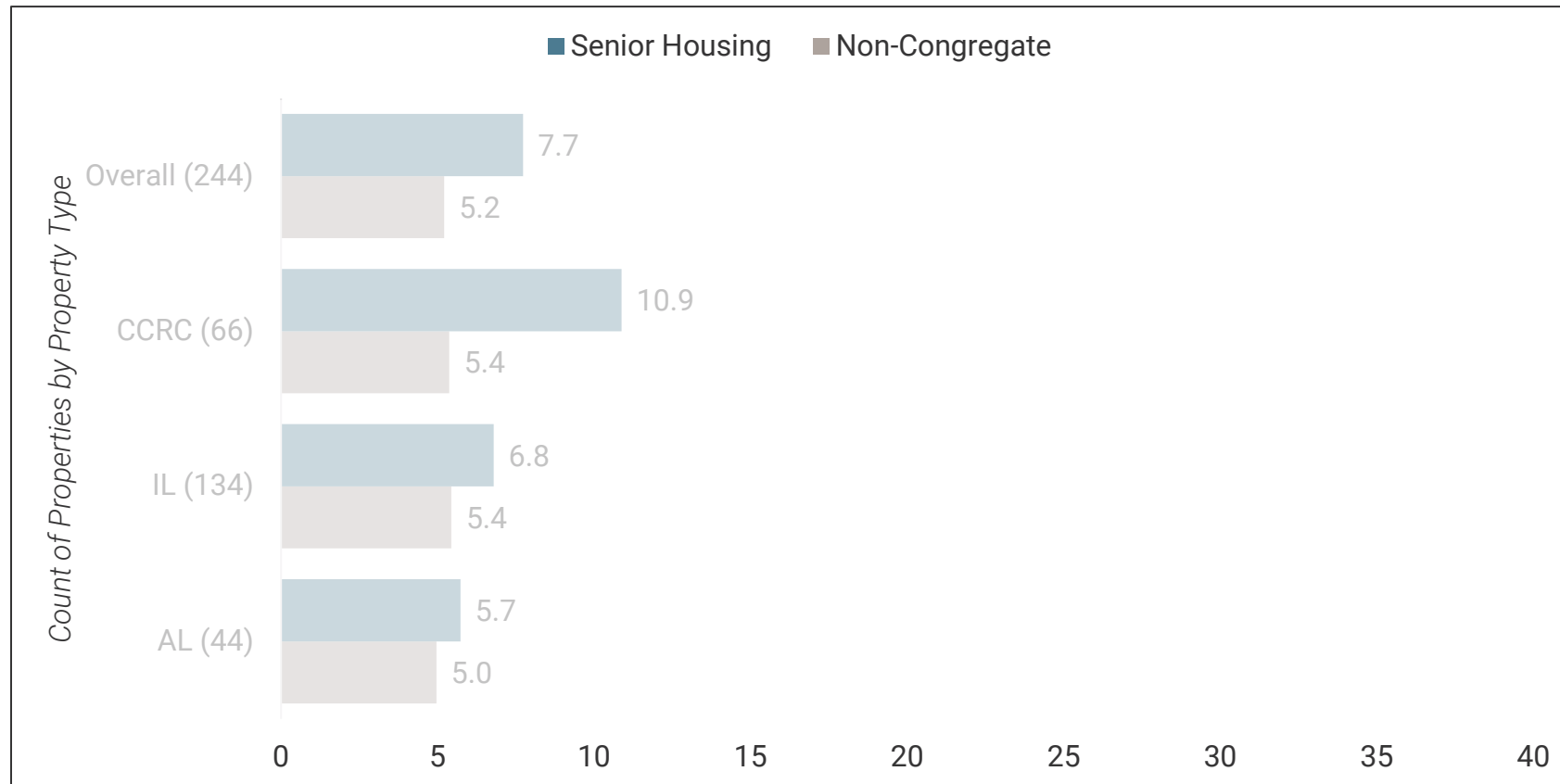


Senior housing residents experienced **20% fewer hospitalizations due to UTIs** compared to their matched counterparts (26.3 claims per 1,000 residents vs. 32.7 per 1,000 matched beneficiaries, respectively).

* The difference in means are statistically significant at $p < 0.05$.

Measure Definition: Inpatient FFS admissions with a principal diagnosis of urinary tract infection. Excludes kidney or urinary tract disorder admissions, other indications of immunocompromised state admissions, and obstetric admissions ; rate per thousand beneficiaries. **NOTE:** Findings relevant among people with a hospitalization for a PQI-qualifying event.

Hospital admissions for hypertension are such rare events—**only 0.38% of senior housing residents were hospitalized for hypertension** during the study period



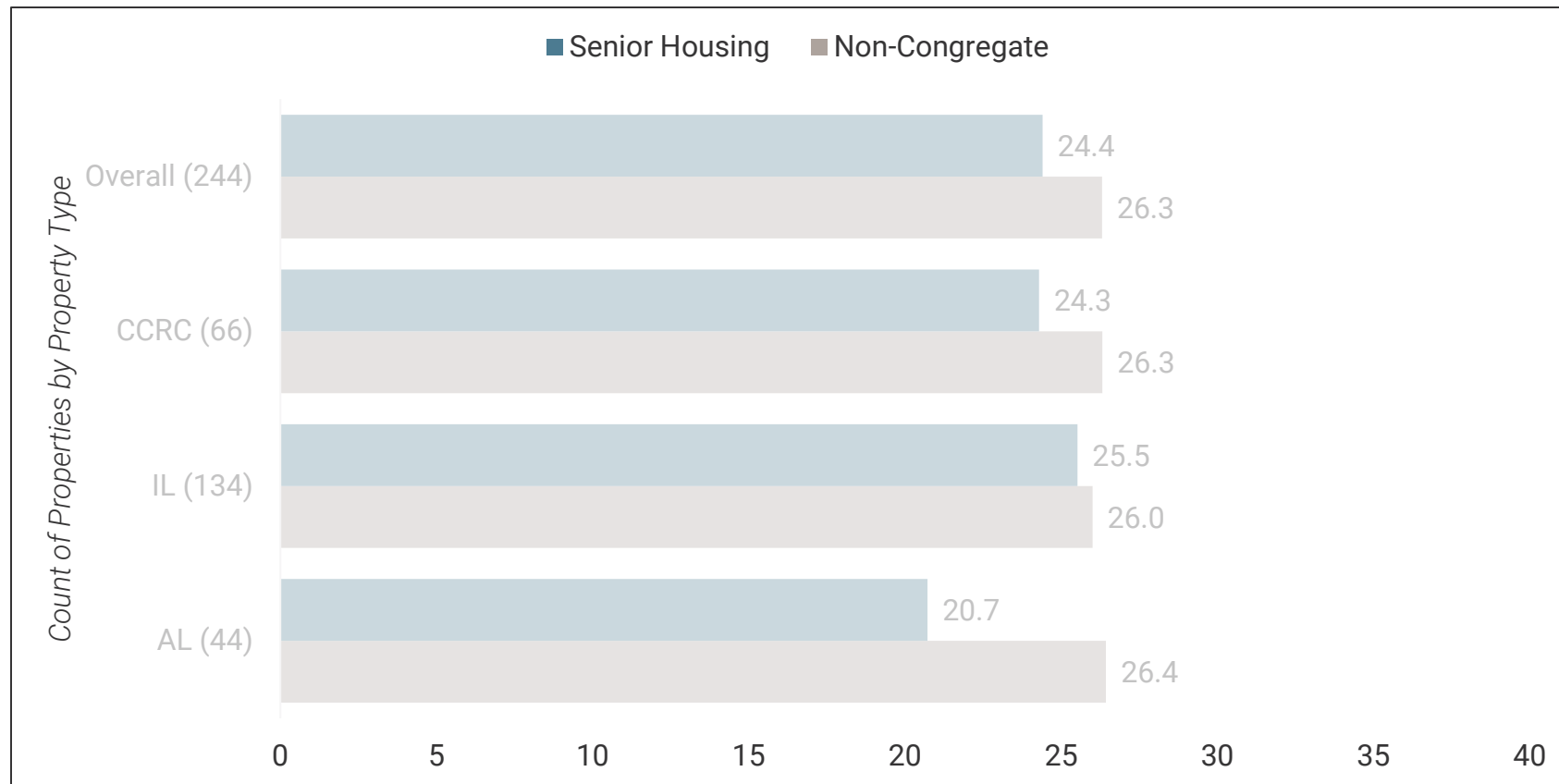
There was **no statistically significant difference** in hospital admissions for hypertension for senior housing residents relative to their matched peers.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Inpatient FFS admissions with a principal diagnosis of hypertension. Excludes kidney disease combined with dialysis access procedure admissions, cardiac procedure admissions, and obstetric admissions; rate per thousand beneficiaries.

NOTE: Findings relevant among people with a hospitalization for a PQI-qualifying event.

Only about 1.5% of senior housing residents were hospitalized for community acquired pneumonia during the study period



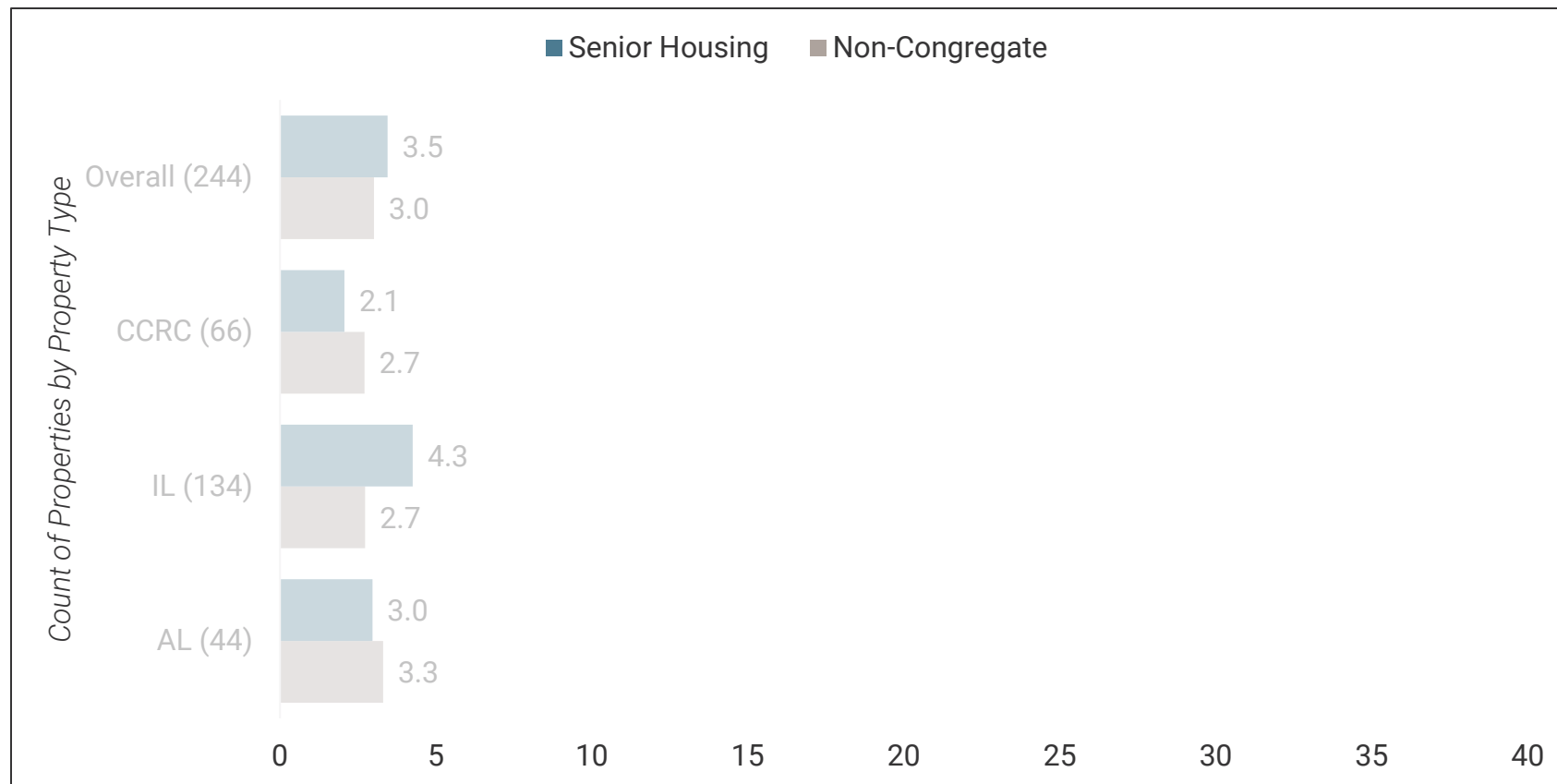
There was **no meaningful difference** in hospital admissions for community acquired pneumonia for senior housing residents relative to their matched peers.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Inpatient FFS admissions with a principal diagnosis of community acquired pneumonia. Excludes sickle cell or hemoglobin-S admissions, other indications of immunocompromised state admissions, and obstetric admissions; rate per thousand beneficiaries.

NOTE: Findings relevant among people with a hospitalization for a PQI-qualifying event.

Less than 1% of CCRC residents were hospitalized for uncontrolled diabetes during the study period



There was **no meaningful difference** in hospital admissions for uncontrolled diabetes for senior housing residents relative to their matched peers.

Findings that are not statistically significant at the $p < 0.05$ value have been greyed out.

Measure Definition: Inpatient Fee-For-Service admissions with a principal diagnosis of diabetes without mention of short-term (ketoacidosis, hyperosmolarity, or coma) or long-term (renal, eye, neurological, circulatory, or other unspecified) complications. Excludes obstetric admissions. Rate per thousand beneficiaries.

NOTE: Findings relevant among people with a hospitalization for a PQI-qualifying event.

In our study, CCRCs were found to have more favorable outcomes than their matched non-congregate peer group, relative to other property types. Additional research into area-level income inequality does not have a significant influence on CCRC health outcomes.


- Published literature suggests that higher levels of income and wealth are associated with improved health outcomes.¹ NORC examined the relationship between high and low levels of income inequality and health outcomes among CCRC residents and a comparable non-congregate population.
- **Overall, we found no systematic pattern of advantage for CCRC residents in areas with either high or low levels of income inequality.**
- We observed some fluctuation in health outcomes among these subgroups compared to the general CCRC rates. For example, areas with lower levels of income inequality were associated with an increase in hospitalizations for certain Prevention Quality Indicators.
- As a limitation of the study design, we note that area-level income distributions do not fully account for variation at the person-level.

¹ Health Affairs | Health Policy Brief: Health, Income, & Poverty: Where We Are & What Could Help

A group of people are gathered around a table, looking at a document that features a pie chart. The scene is dimly lit, with a warm, brownish tint. The people are dressed in business casual attire. One person is pointing at the pie chart with a pen.

Thank you.

Dianne Munevar
VP, Health Care Strategy
Munevar-Dianne@norc.org

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