# Supplementary Online Content

This supplementary material has been provided by the authors to give readers additional information about their work.

**eMethods 1.** Data Accrual

The American Community Survey (ACS) captures numerous sociodemographic, economic, employment and geographic characteristics of adults in the United States through a multi-phase sampling technique. For community-dwelling adults, the ACS is administered through in-person interviews, telephones, mail and the internet. For group-dwelling adults, the ACS is administered through in-person interviews, telephone, or mail (although an online guide is available). For individuals in group quarters, the sampling frame is multifaceted as it includes sampling on the facility level and then within each facility as outlined in the ACS and PRCS Design and Methodology (Version 3.0) – Chapter 8: Data Collection and Capture for Group Quarters. To summarize, facilities are sampled to be representative at the state and federal level through interviews with facility representative(s). Upon agreeing to participation, individuals within facilities are identified and recruited for survey completion. In recent years (2021-2023), the ACS has selected approximately 3.5 million household address and completed final interviews with approximately 2 million households. Among group quarters, approximately 153,000 were selected in the initial sample in 2023 and approximately 129,000 completed final interviews. Please see eTable 1 for sample sizes during the available study period.

**eTable 1.** Number of Surveys Collected Per Year

| Year | Initial Addresses Selected | Final Interviews | Initial Sample Selected | Final Actual Interviews | Final Synthetic Interviews* |
|------|------|------|------|------|------|
| **2023** | 3,544,357 | 1,978,704 | 152,993 | 129,481 | 144,762 |
| **2022** | 3,538,392 | 1,980,550 | 150,169 | 124,846 | 150,186 |
| **2021** | 3,538,442 | 1,950,832 | 140,036 | 119,144 | 122,876 |
| **2020** | 2,872,402 | 1,406,935 | 96,955 | 80,030 | 147,632 |
| **2019** | 3,544,301 | 2,059,945 | 167,187 | 150,305 | 128,498 |
| **2018** | 3,544,000 | 2,143,000 | 166,000 | 150,000 | 133,000 |
| **2017** | 3,526,808 | 2,145,639 | 168,590 | 157,721 | 133,564 |
| **2016** | 3,527,047 | 2,229,872 | 206,415 | 160,572 | 131,915 |
| **2015** | 3,540,307 | 2,305,707 | 206,630 | 161,865 | 134,224 |
| **2014** | 3,540,532 | 2,322,722 | 207,403 | 165,116 | 129,913 |
| **2013** | 3,551,227 | 2,208,513 | 207,410 | 163,663 | 135,758 |
| **2012** | 3,539,552 | 2,375,715 | 208,551 | 154,182 | 137,086 |
| **2011** | 3,272,520 | 2,128,104 | 204,553 | 148,486 | 150,052 |
| **2010** | 2,899,676 | 1,917,799 | 197,045 | 144,948 | N/A |
| **2009** | 2,897,256 | 1,917,748 | 198,808 | 146,716 | N/A |
| **2008** | 2,894,711 | 1,931,955 | 186,862 | 145,974 | N/A |

*Please note the synthetic interview numbers include imputation to address sub-state geography estimates and this change in methodology is not expected to impact state-level estimates.

While the ACS has a high response rate, over time response rates have decreased (see eTable 2). Among community-dwelling adults, the response rate is >85% except during 2020 when it was 71%. Among adults in group-quarters, the response rate is >75% except in 2020 when it was 47%. The lower response rates in 2020 are why the survey weights are considered experimental. We exclude 2020 in our analysis due to lack of confidence in the representativeness of the data collected that year.

**eTable 2.** American Community Survey Response Rates (2008-2022)

| Year | Response Rate for Households | Response Rate for Group Quarters |
|------|-----------------------------|----------------------------------|
| 2022 | 84.4 | 81.2 |
| 2021 | 85.3 | 74.8 |
| 2020 | 71.2 | 47.2 |
| 2019 | 86 | 90.9 |
| 2018 | 92 | 91.4 |
| 2017 | 93.7 | 94.7 |
| 2016 | 94.7 | 95.7 |
| 2015 | 95.8 | 95.3 |
| 2014 | 96.7 | 95.9 |
| 2013 | 89.9 | 95.2 |
| 2012 | 97.3 | 95.1 |
| 2011 | 97.6 | 96.9 |
| 2010 | 97.5 | 97.6 |
| 2009 | 98 | 98 |
| 2008 | 97.9 | 98 |

Please see survey question language below capturing disability for ACS respondents.

**[Cognitive Difficulty]** *18 a) Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions?*

*[ ] Yes*

*[ ] No*

**[Ambulatory Difficulty]** *18 b) Does this person have serious difficulty walking or climbing stairs?*

*[ ] Yes*

*[ ] No*

**[Self-Care Difficulties]** *18 c. Do you have difficulty dressing or bathing?*

*[ ] Yes*

*[ ] No*

*Answer question 19 if you are 15 years old or over. Otherwise, SKIP to on page 7 for further instructions; do not answer any more questions.*

**[Independent Living Difficulties]** *19. Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?*

*[ ] Yes*

*[ ] No*

**eMethods 2.** Estimation and Characterization of Nursing Home Population

While relatively little is known about the socio-demographic characteristics and health status of the population in prison, the nursing home population is well characterized. We thus comparatively examine the estimated number of nursing home residents and their demographic characteristics to other estimates of the nursing home population to validate our approach.
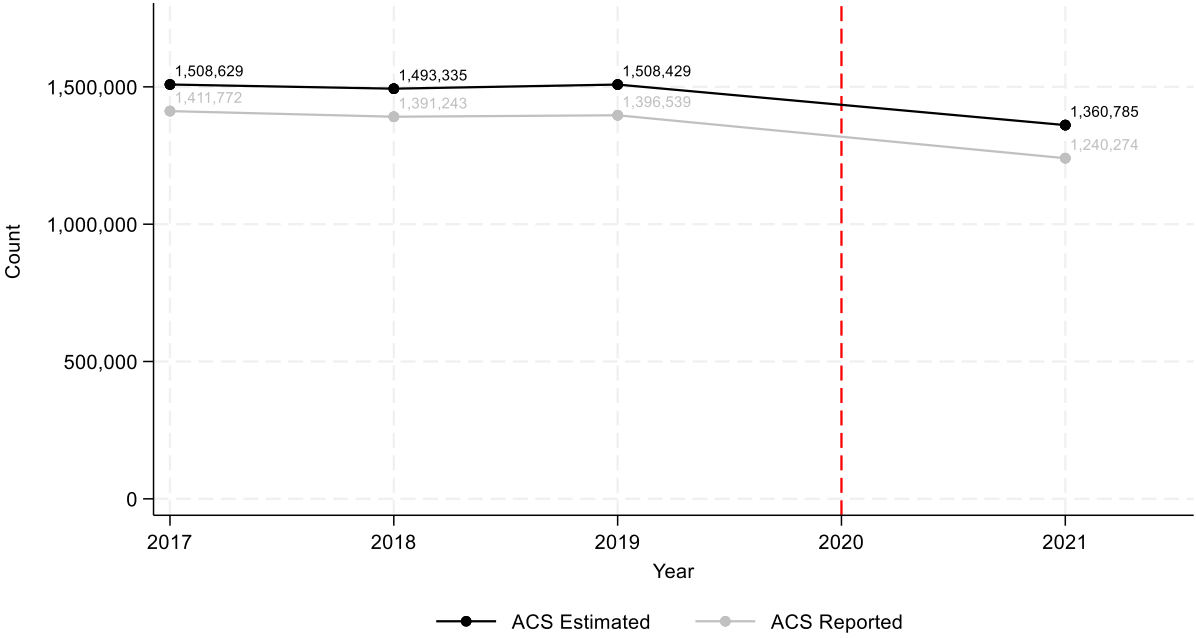
We first estimate the number of likely nursing home residents and compare our American Community Survey (ACS) estimates to the national estimates provided by the American Community Survey, see the eFigure. For context, in 2019, the number of nursing facility/skilled nursing facility respondents aged 55 and older was reported to be 1,396,539 in ACS tables released by the Census Bureau(4). Using our approach, we estimate approximately 1,508,429. Thus, our classification approach overcounts likely nursing home residents and thus *undercounts* individuals in prison.

Second, we examine demographic and functional characteristics of the likely nursing home residents to determine if the sample characteristics are aligned with existing evidence about the nursing home population. See eTable 3. As aligned with existing evidence, in 2019, we observe the likely nursing home resident population is approximately 60% female, 78% white, and the majority of residents have difficulty with independent living, self-care or ambulation, as aligned with expectations and existing literature (5).

Finally, we also examine the prevalences of adults in prison per capita at the state level to determine if the states with the highest prevalences of adults aged 55+ in prison per capita are like states with the highest prevalences of imprisonment (of any age) per capita. We observe 7 of the 10 states with the highest prevalences of imprisonment per capita in 2019, as reported by the Bureau of Justice Statistics, also have some of the highest prevalences of imprisonment among adults 55+ per capita (see eTable 4).

Based on these descriptive statistics, we conclude that our algorithm is distinguishing between individuals aged 55+ who reside in a nursing home versus those residing in prisons, but likely undercounts the population in prison.

**eFigure.** Estimated Number of Nursing Home Residents 55 Years and Older



SOURCES: American Community Survey (ACS).

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**eTable 3.** Demographic Statistics of the Likely Nursing Home Resident Cohort 55 Years and Older, 2019

| | **Likely Nursing Home Residents aged 55+** |
|---|---|
| | N=1,508,429[1] |
| Age, mean (SD) | 77.85 (11.85) |
| **Sex** | |
| Male | 41.01% |
| Female | 58.99% |
| **Race** | |
| White | 77.93% |
| Black/African American | 16.51% |
| American Indian or Alaska Native, Chinese, Japanese, Other Asian or Pacific Islander, Two or more race or Other race | 5.56% |
| **Highest Level of Education** | |
| Less than high school | 70.06% |
| High School/GED or more | 29.94% |
| **Census Region** | |
| Northeast | 22.65% |
| Midwest | 28.18% |
| South | 34.29% |
| West | 14.87% |
| Any cognitive difficulty | 56.82% |
| Any ambulatory difficulty | 80.13% |
| Any Independent living difficulty | 82.55% |

| Any Self-care Difficulty | 72.30% |

**eTable 4.** States with Highest Prevalences of Imprisonment per 100 000 People, 2019

| State | Prevalence of imprisonment for age 55+ | Order of Prevalence of imprisonment for age 55+ | Prevalence of imprisonment for ages 18+ | Order of Prevalence of imprisonment for ages 18+ |
|---|---|---|---|---|
| Texas | 547.7 | 1 | 709 | 6 |
| Oklahoma | 538.9 | 2 | 840 | 2 |
| Arkansas | 509.0 | 3 | 762 | 4 |
| Georgia | 489.1 | 4 | 663 | 8 |
| Alaska | 485.2 | 5 | 323 | 37 |
| Mississippi | 451.9 | 6 | 830 | 3 |
| Florida | 425.3 | 7 | 552 | 14 |
| Alabama | 415.7 | 8 | 539 | 17 |
| Louisiana | 403.3 | 9 | 887 | 1 |
| Arizona | 347.3 | 10 | 719 | 5 |

Source: Prevalence of Imprisonment for ages 55 and older are author tabulation based on

American Community Survey. Prevalence of imprisonment for all ages are from the Bureau of

Justice Statistics (https://bjs.ojp.gov/content/pub/pdf/p19.pdf).

**eTable 5.** Demographics Over Time of Population 55 Years and Older in Prison

| | 2010-2011<br>N=3,468[1] | 2018-2019<br>N=5,587[1] | 2021-2022<br>N=7,166[1] |
|---|---|---|---|
| Age, mean (SD) | 62.1 (8.2) | 62.4 (7.9) | 63.2 (8.1) |
| | | | |
| Sex | 3,091 (90.09%) | 5,041 (91.73%) | 6,389 (90.52%) |
| Male | 377 (9.91%) | 546 (8.27%) | 777 (9.48%) |
| Female | | | |
| | 2,048 (58.24%) | 3,177 (56.71%) | 3,558 (49.43%) |
| Race | 1,122 (32.59%) | 1,878 (33.87%) | 2,267 (31.77%) |
| White | 298 (9.18%) | 532 (9.43%) | 1,341 (18.80%) |
| Black/African American | | | |
| American Indian or Alaska Native, Chinese, Japanese, Other Asian or Pacific Islander, Two or more race or Other race | 2,414 (69.31%) | 3,958 (71.54%) | 5,359 (75.09%) |
| | 1,054 (30.69%) | 1,629 (28.46%) | 1,807 (24.91%) |
| Highest Level of Education | | | |
| Less than high school | 476 (14.61%) | 551 (10.63%) | 560 (9.53%) |
| High School/GED or more | 579 (17.76%) | 825 (14.62%) | 936 (14.42%) |
| | 1,687 (48.79%) | 3,178 (55.83%) | 4,359 (58.03%) |
| Census Region | 726 (18.85%) | 1,033 (18.93%) | 1,311 (18.01%) |
| Northeast | 62.1 (8.2) | 62.4 (7.9) | 63.2 (8.1) |
| Midwest | | | |
| South | 3,091 (90.09%) | 5,041 (91.73%) | 6,389 (90.52%) |
| West | 377 (9.91%) | 546 (8.27%) | 777 (9.48%) |

[1]Mean (SD); n (unweighted) (%)

**eTable 6.** Predicted Probability Disability

| | Predicted Probability (Standard Error) | | | |
|---|---|---|---|---|
| | Any Cognitive Difficulty | Ambulatory Difficulty | Independent Living Difficulty | Self-Care Difficulty |
| **More Expansive Comparison Group** Community-Dwelling and Nursing Home Residents | 0.083*** | 0.186*** | 0.121*** | 0.072*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| In prison | 0.150*** | 0.256*** | 0.149*** | 0.093*** |
| | (0.002) | (0.003) | (0.002) | (0.002) |

*p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

All model output includes controlling for age, sex, race, highest level of education, marital status, and Census region.

**eTable 7.** Differential Effects of Prison Status Across Sensitivity Analyses

| | Any Cognitive Difficulty | Ambulatory Difficulty | Independent Living Difficulty | Self-Care Difficulty |
|---|---|---|---|---|
| **Under Age 65** | | | | |
| Community-Dwelling | -ref- | -ref- | -ref- | -ref- |
| In prison | 0.035*** | 0.021*** | -0.011*** | -0.009*** |
| | (0.002) | (0.002) | (0.001) | (0.001) |
| N | 6142241 | 6142241 | 6142241 | 6142241 |
| **Age 65+ Only** | | | | |
| Community-Dwelling | -ref- | -ref- | -ref- | -ref- |
| In prison | 0.147*** | 0.199*** | 0.166*** | 0.142*** |
| | (0.004) | (0.007) | (0.005) | (0.005) |
| N | 7768047 | 7768047 | 7768047 | 7768047 |
| **Age 75+ Only** | | | | |
| Community-Dwelling | -ref- | -ref- | -ref- | -ref- |
| In prison | 0.240*** | 0.278*** | 0.311*** | 0.290*** |
| | (0.009) | (0.013) | (0.012) | (0.012) |
| N | 3242052 | 3242052 | 3242052 | 3242052 |
| **More Restricted Definition of Adult in Prison (live in same place as last year)** | | | | |
| Community-Dwelling | -ref- | -ref- | -ref- | -ref- |
| In prison | 0.035*** | 0.021*** | -0.011*** | -0.009*** |
| | (0.002) | (0.002) | (0.001) | (0.001) |
| N | 6,142,241 | 6,142,241 | 6,142,241 | 6,142,241 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

All model output includes controlling for age, sex, race, highest level of education, marital status, and Census region.

**eReferences**

1. U.S. Census Bureau. *American Community Survey: Design and Methodology Report*. 2022. Available at: https://www2.census.gov/programs-surveys/acs/methodology/design_and_methodology/2022/acs_design_methodology_report_2022.pdf.

2. U.S. Census Bureau. *American Community Survey (ACS) Response Rates*. Available at: https://www.census.gov/acs/www/methodology/sample-size-and-data-quality/response-rates/. Accessed October 27, 2024.

3. U.S. Census Bureau. *American Community Survey (ACS) Sample Size*. Available at: https://www.census.gov/acs/www/methodology/sample-size-and-data-quality/sample-size/index.php. Accessed October 28, 2024.

4. US Census Bureau. Group Quarters Type (3 Types) by Sex by Age. US Census Bureau; 2019.

5. National Academies of Sciences, Engineering, and Medicine. Medicine. The National Imperative to Improve Nursing Home Quality: Honoring Our Commitment to Residents, Families, and Staff. The National Academies Press; 2022.