CareJourney

Home Health Access by Health Equity Measures (CY 2024 Q1-Q4)

Methodology

Data Source

Source: 100% Medicare Fee-for-Service Claims Data, licenced from the CMS Virtual Research Data Center (VRDC).

Tables Leveraged:

- Medicare Beneficiary Summary File (MBSF) - this file contains beneficiary demographic and enrollment information (https://resdac.org/cms-data/files/mbsf-base)
- Inpatient Claims - this file contains institutional claims billed at inpatient facilities, including short-term acute (STAC) inpatient claims (https://resdac.org/cms-data/files/ip-ffs)
- Post-Acute Care Claims (https://resdac.org/cms-data/files/ip-ffs)
    - Home Health Claims - this file contains institutional claims billed by home health agencies (https://resdac.org/cms-data/files/hha-ffs)
    - Skilled Nursing Facility Claims - this file contains institutional claims billed by SNFs (https://resdac.org/cms-data/files/snf-ffs)
    - Hospice - this file contains institutional claims billed by hospice providers (https://resdac.org/cms-data/files/hospice-ffs)
    - Inpatient Claims - this file contains institutional claims billed at inpatient facilities, including inpatient rehab facilities and long-term acute care facilities (https://resdac.org/cms-data/files/ip-ffs)

Supplemental Data:

- Area Deprivation Index (ADI) - this file is from the University of Wisconsin Neighborhood Atlas Area Deprivation Index (ADI). It allows for the rankings of neighborhoods by socioeconomic disadvantage in a region of interest (https://www.neighborhoodatlas.medicine.wisc.edu/)

Analysis Source: This analysis was performed by CareJourney, a third party healthcare analytics product organization.

Medicare Claims Methodology

Identification of Short-Term Acute Inpatient Stays

- Short-term acute (STAC) stays are identified based on the facility CMS Certification Number (CCN). This 6-digit code identifies the operating state in the first two digits, and the facility type in the last four digits. General and specialty STACs are identified as having the 3rd through 6th digits of 0001-0879 (https://resdac.org/cms-data/variables/provider-number).
- Short-term acute episodes were then constructed roughly following Bundled Payments for Care Improvement-Advanced (BPCI-A, https://innovation.cms.gov/innovation-models/bpci-advanced) methodology. Inpatient episodes where the patient passed away, did not have required continuous FFS enrollment, or were being treated for end-stage renal disease (ESRD) were excluded.

Identification of Referred Discharge Location

- Inpatient claims contain a discharge status code (https://resdac.org/cms-data/variables/patient-discharge-status-code-ffs) indicating where the patient was referred post-discharge.
- Referred discharge locations as referenced in these slides are based on the following discharge status codes:
  - Home Health: 06, 86
  - Hospice: 50, 51
  - Home: 01, 81
  - SNF: 03, 83
  - IP Rehab: 62, 90
  - Hospital: 02, 66, 43, 63, 65, 82, 85, 88, 91, 93, 94
  - Other: All other discharge status codes

Identification of Home Health Conversions

- For each episode, all post-acute care claims were reviewed, and the first location where a patient had a claim billed in the 7-day period post-discharge from the STAC was identified as the “next site of care”. Ties were broken by leveraging the discharge status codes from the STAC claims.
- Patients who were referred to home health that had home health as their “next site of care” were considered as home health conversions. Patients who had another type of post-acute care billed first within this 7-day period were considered as “other PAC”. All other patients were considered as having gone home without receiving home health care in the 7-day period.

Beneficiary Cohort Segmentation Methodology

Social Determinants of Health (SDOH) measures were selected to give greater understanding of home health access to underserved and disadvantaged populations based on available data. Included measures are described below.

Dual Status

- Using the dual_stus_cd_[month] in the MBSF file (https://resdac.org/cms-data/variables/monthly-medicare-medicaid-dual-eligibility-code-january) , the following logic is used to classify a patient as either dual or non-dual status:
  - if a patient was coded for 01, 02, 03, 04, 05, 06, or 08 during any month throughout the year, then the beneficiary is considered dual eligible
  - Anyone who does not fit that criteria, is considered non-dual

Race/Ethnicity

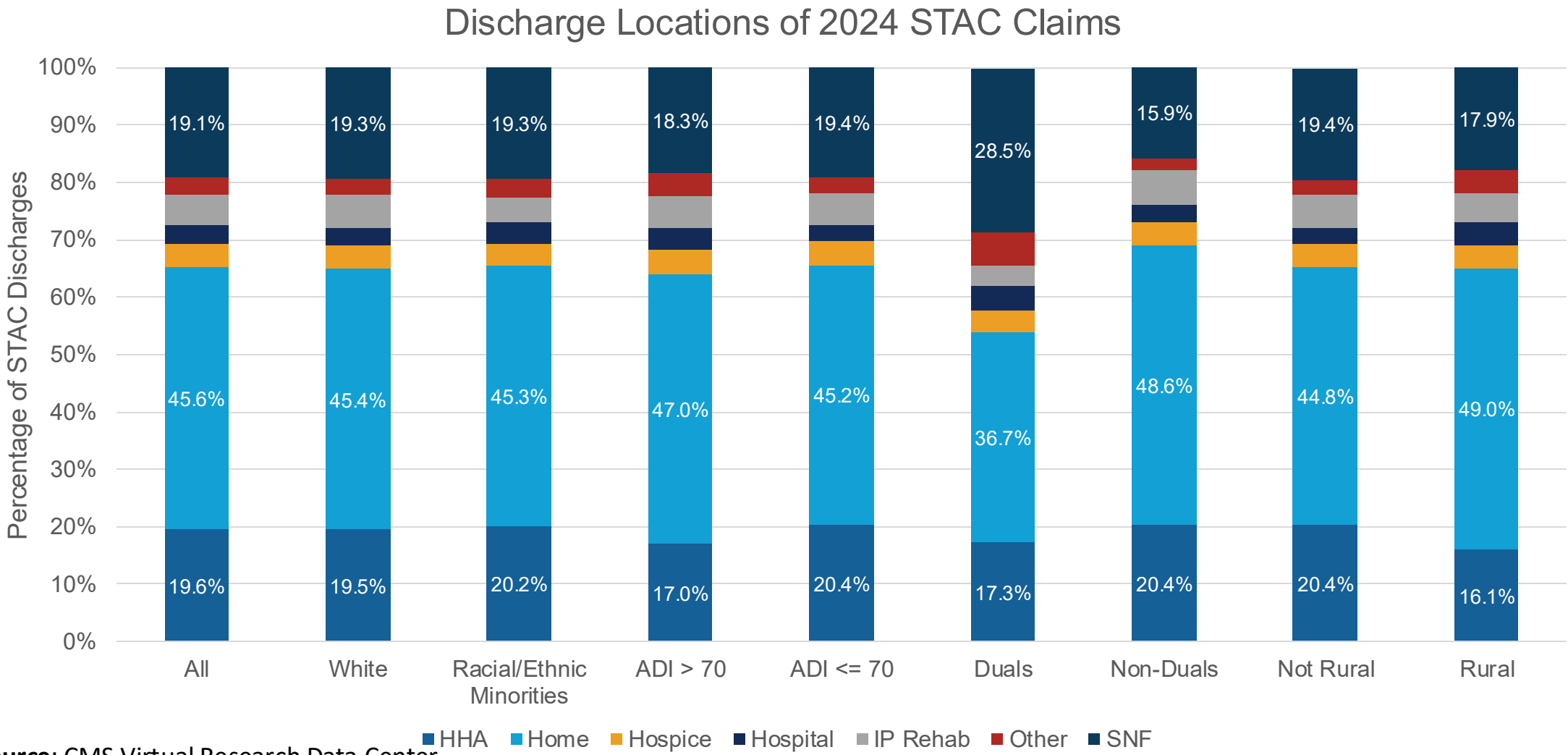
- Using the rti_race_cd in the MBSF file (https://resdac.org/cms-data/variables/research-triangle-institute-rti-race-code) , the following logic is used to classify if a patient is a racial/ethnic minority or white beneficiary:
  - If the beneficiary is coded as 2 (Black/African American), 3 (Other), 4 (Asian/Pacific Islander), 5 (Hispanic), or 6 (American Indian/Alaska Native), then they are considered a racial/ethnic minority
  - If the beneficiary is coded as a 1, then they are considered Non-Hispanic White
  - If the beneficiary is coded as 0, then they are considered unknown and are filtered out

Area Deprivation Index (ADI)

- ADI raw scores are at the zip code level for each beneficiary.
- Beneficiary zip codes are identified based on the MBSF file (https://resdac.org/cms-data/variables/zip-code-beneficiary)
- Using the raw ADI score for each beneficiary, the following logic is used to split beneficiaries into two categorizations:
  - If a beneficiary lives in a zip-code with an ADI score > 70, then it is considered in a distressed area
  - If they live in a zip-code with an ADI score <= 70 then they are not considered to be in a distressed area

Discharge Patterns

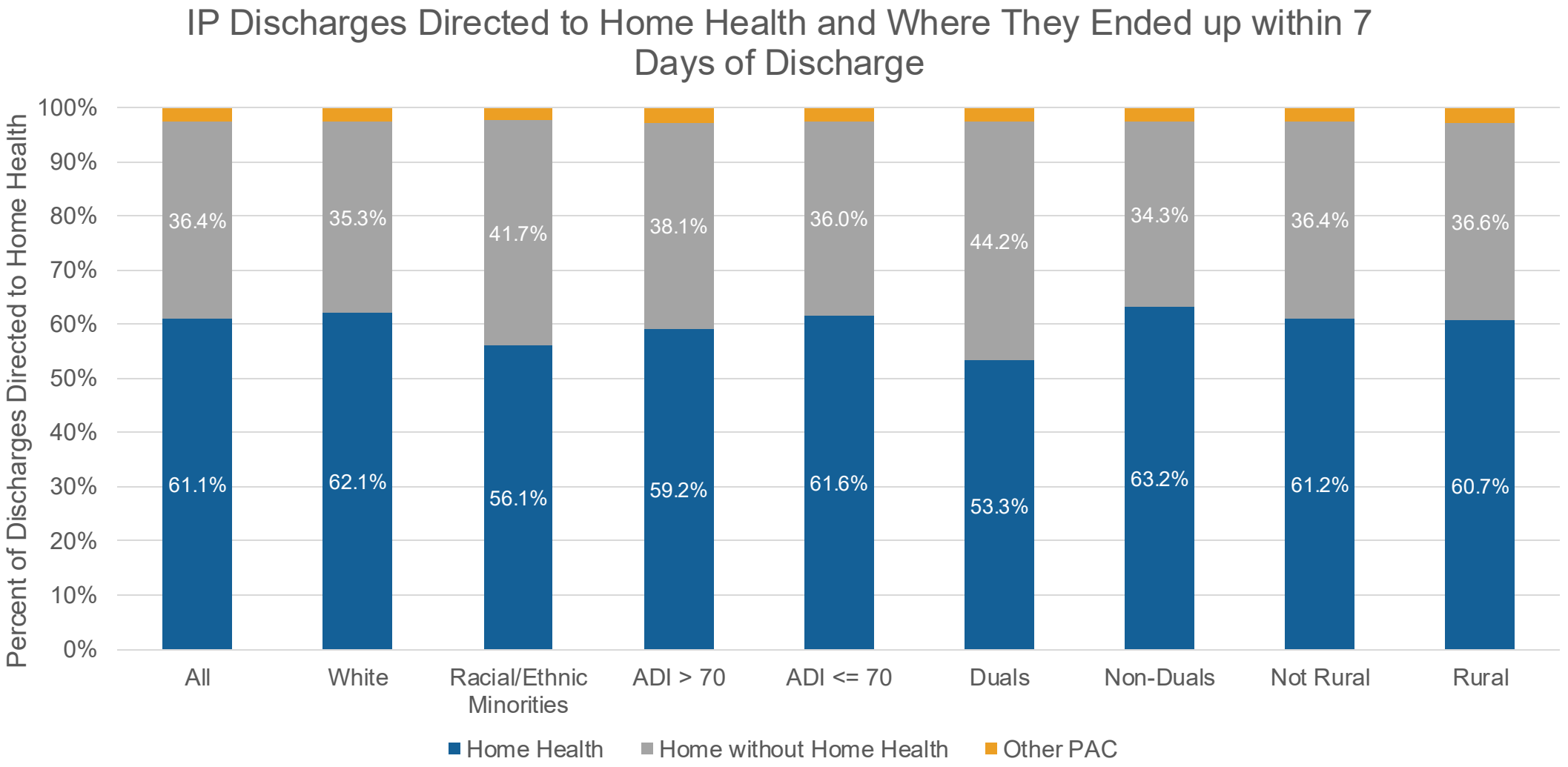
20% of all 2024 STAC claims have home health as the referred discharge location. Duals and Benes in high distress areas are less likely to be directed to home health



Source: CMS Virtual Research Data Center

Data: 2024 Q1-Q3 inpatient STAC claims (see methodology slides for how each discharge location is coded). Percentages are the number of claims with each respective discharge location code divided by the total number of STAC claims

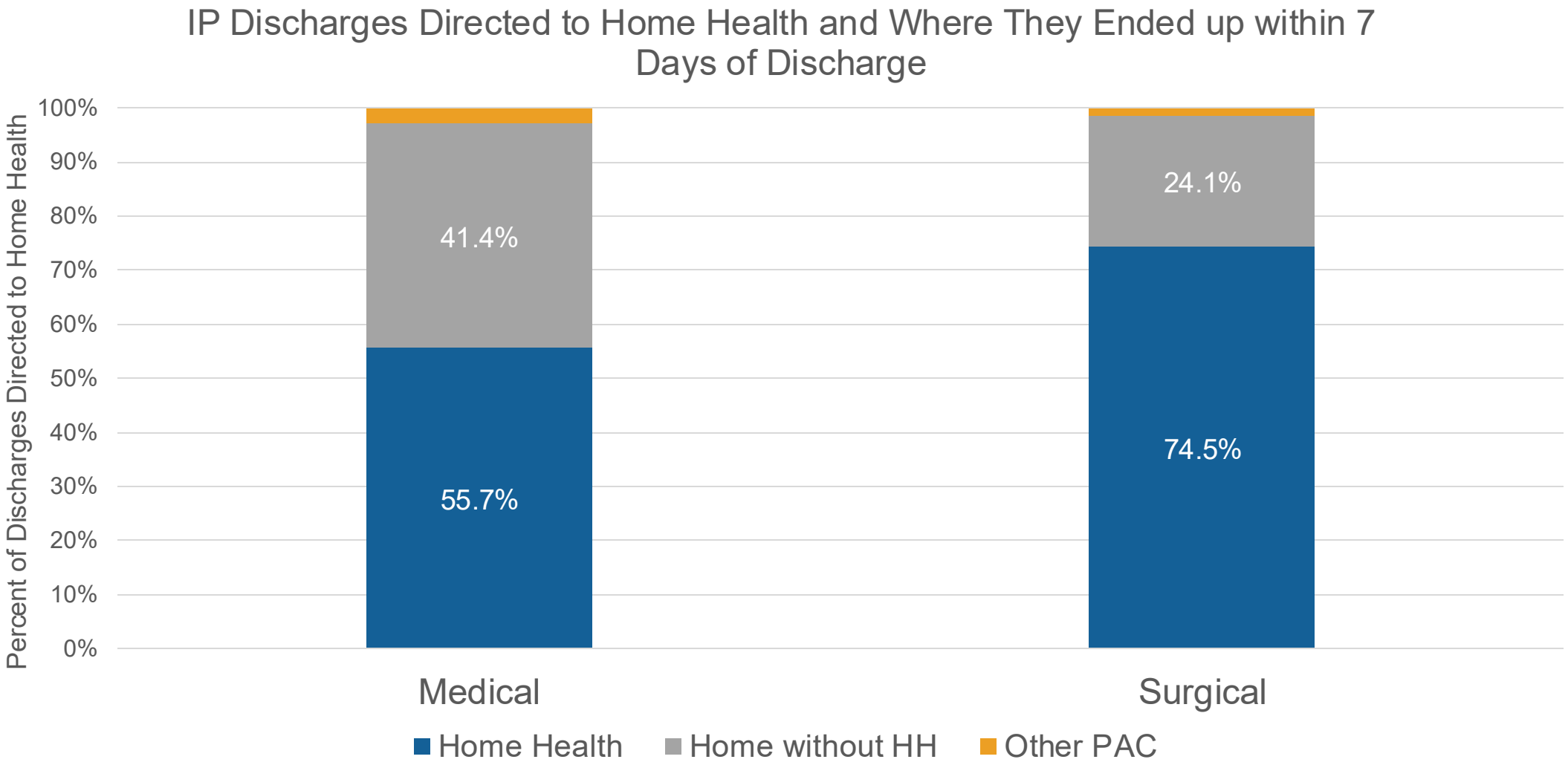
About 61% of beneficiaries directed to HHA are converted to HHA within 7 days of discharge. Racial/Ethnic minorities and Duals are less likely to convert



Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

Among the beneficiaries directed to Home Health, there is a substantial difference in conversion to HH between Medical and Surgical DRG types with surgical DRG converting to HH well above the population average (61.1%) at 74.5%



Source: CMS Virtual Research Data Center

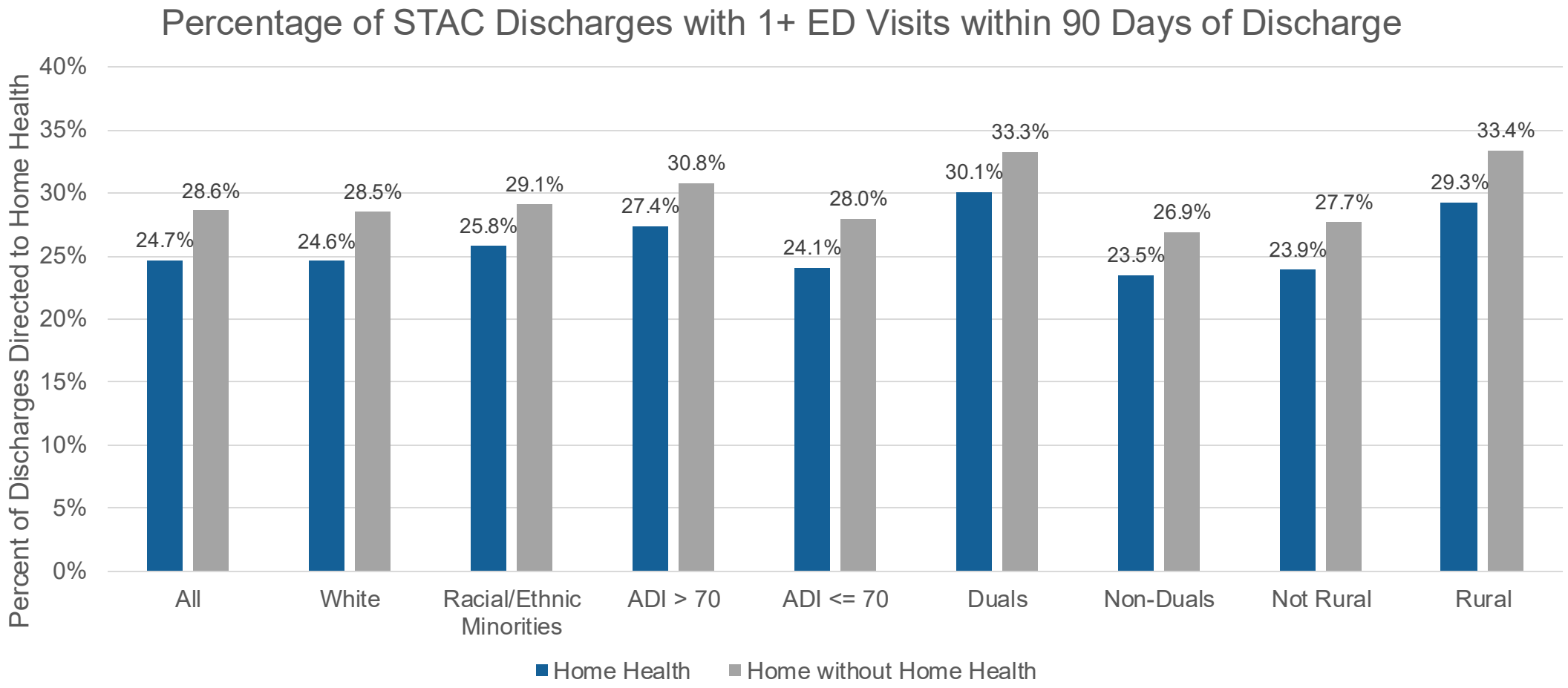
Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

IP Discharges Directed to Home Health and did not receive HH by Major Diagnostic Categories (MDC). MDCs shown are sorted by total volume. Of these top 10 MDCs, MDC 11 is substantially above the population average of not receiving home health after referral to home health of 43.8%

Next site of care	MDC	Number of IP Discharges Referred to HH	Percentage of Patients that Did Not Receive HH within 7 Days (Pop Avg: 35.7%)
Home	MDC 5 – Diseases and Disorders of the Circulatory System	106,796	37.7%
Home	MDC 8 – Diseases and Disorders of the Musculoskeletal System and Connective Tissue	67,969	19.9%
Home	MDC 4 – Diseases and Disorders of the Respiratory System	71,652	38.2%
Home	MDC 18 – Infectious and Parasitic DDs	63,346	35.8%
Home	MDC 6 – Diseases and Disorders of the Digestive System	47,269	39.3%
Home	MDC 11 – Diseases and Disorders of the Kidney and Urinary Tract	47,114	43.8%
Home	MDC 1 – Diseases and Disorders of the Nervous System	37,291	38.6%
Home	MDC 10 – Diseases and Disorders of the Endocrine, Nutritional, and Metabolic System	20,928	42.3%
Home	MDC 9 – Diseases and Disorders of the Skin, Subcutaneous Tissue and Breast	13,258	38.1%
Home	MDC 7 – Diseases and Disorders of the Hepatobiliary System and Pancreas	11,433	39.0%

Patient Outcomes

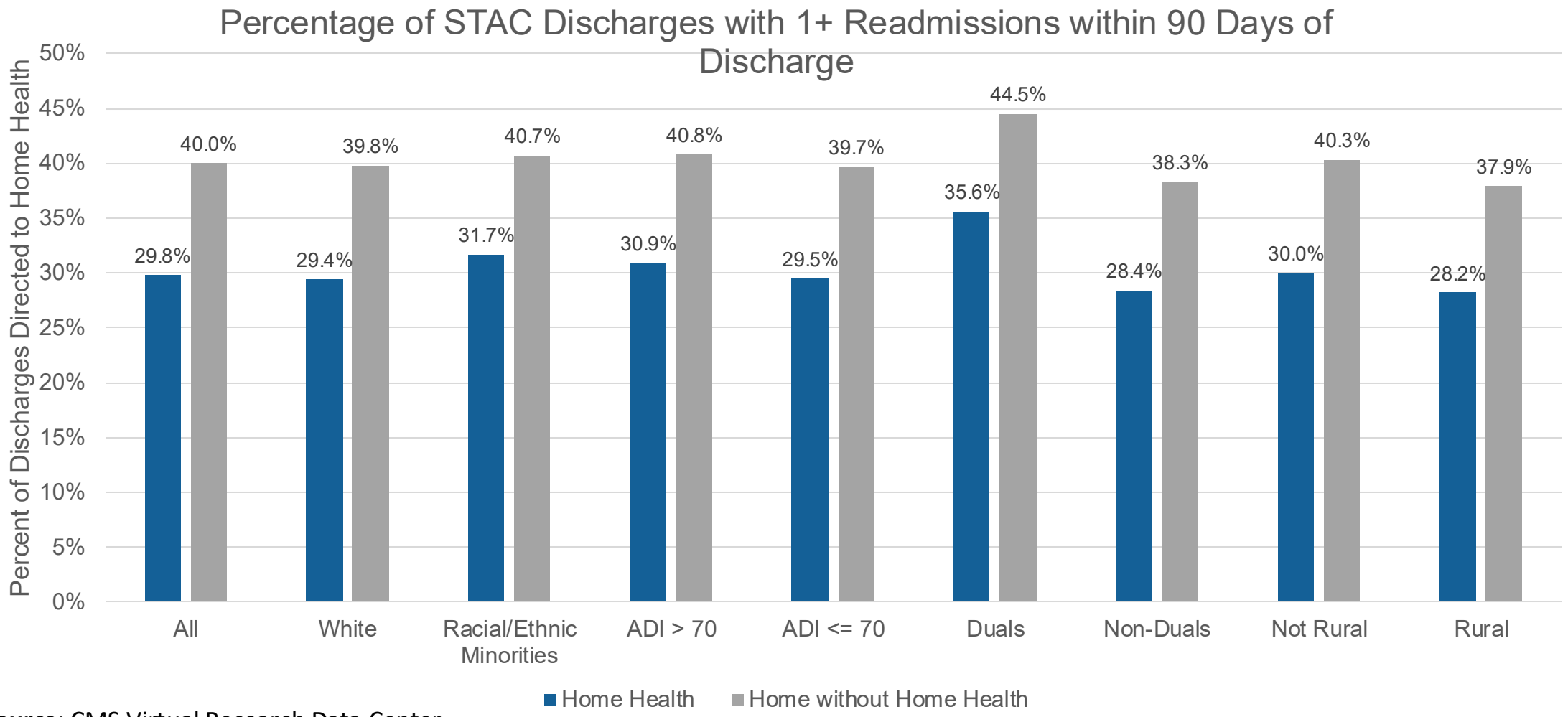
Among beneficiaries directed to HHA, those that received home health services within 7 days of discharge saw substantially lower ED rates in 90 days following discharge compared to those who went home without services



Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

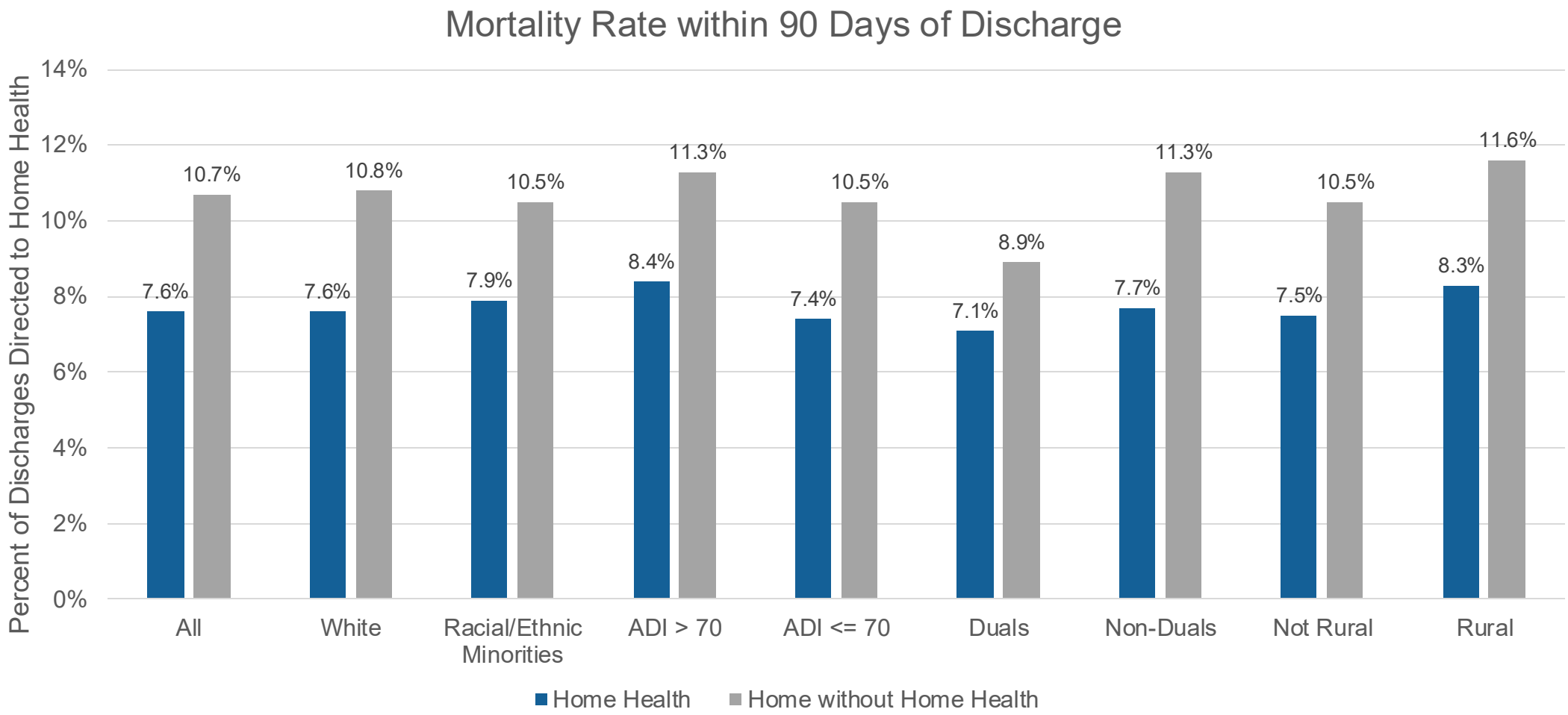
Among beneficiaries directed to HHA, those that received home health services within 7 days of discharge saw substantially lower readmission rates in 90 days following discharge compared to those who went home without services



Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

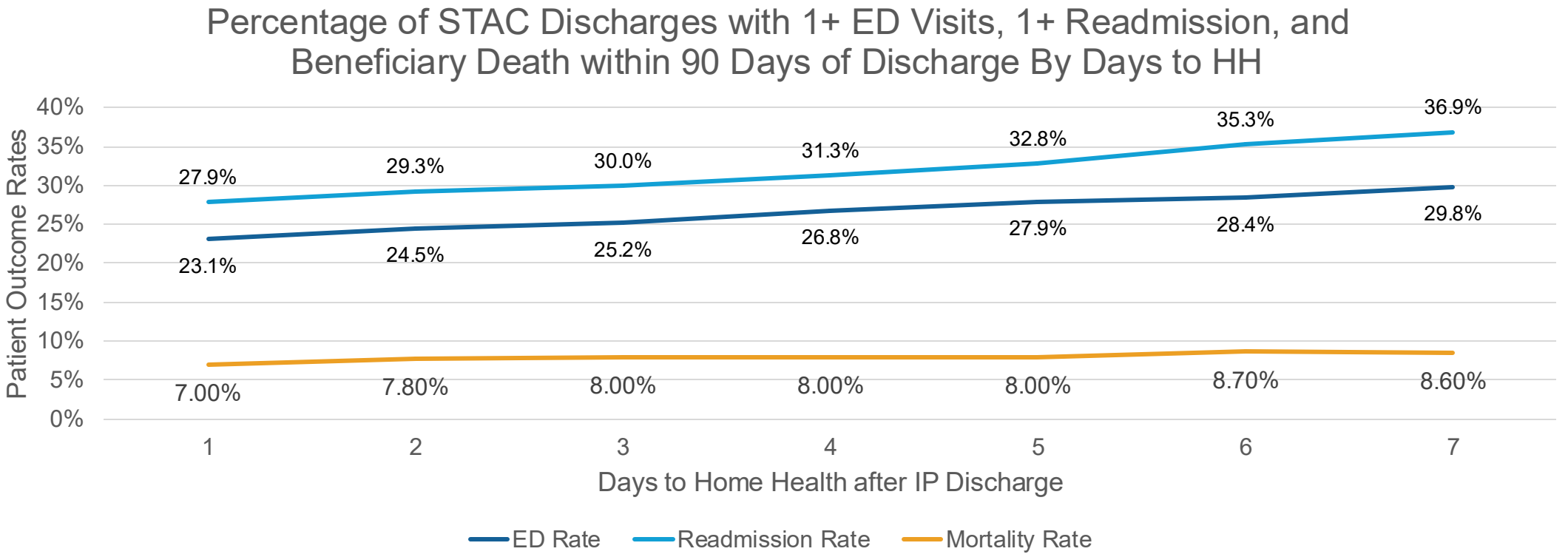
Among beneficiaries directed to HHA, those that received home health services within 7 days of discharge saw substantially lower mortality rates in 90 days following discharge compared to those who went home without services



Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge. Mortality data does not include patients that died in hospital.

Among beneficiaries who went to home health, timely access is crucial to reducing negative outcomes. The percentage of those with at least one readmission rose by 38.9% between receiving home health within 1 day compared to 7

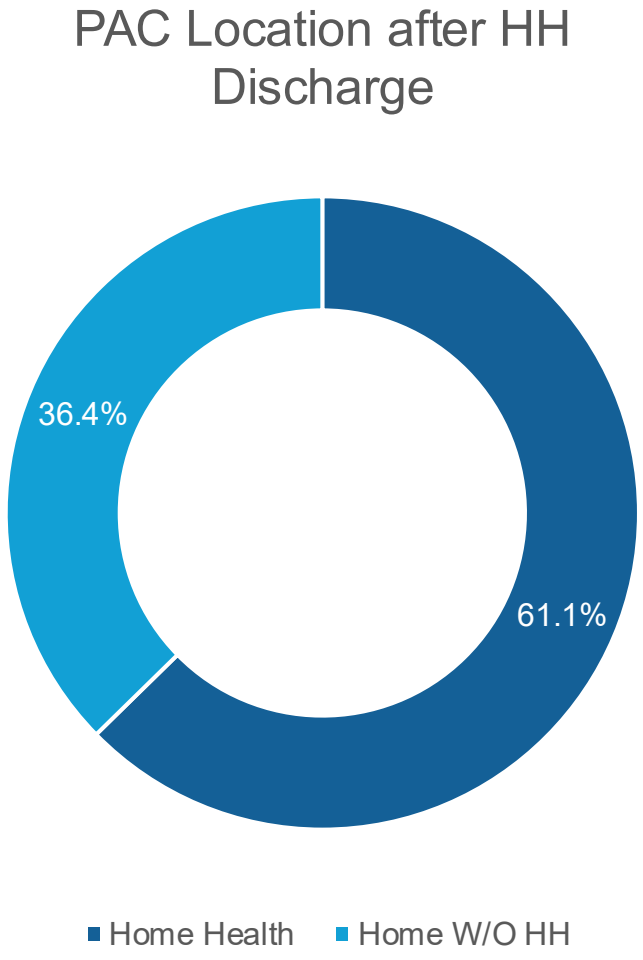


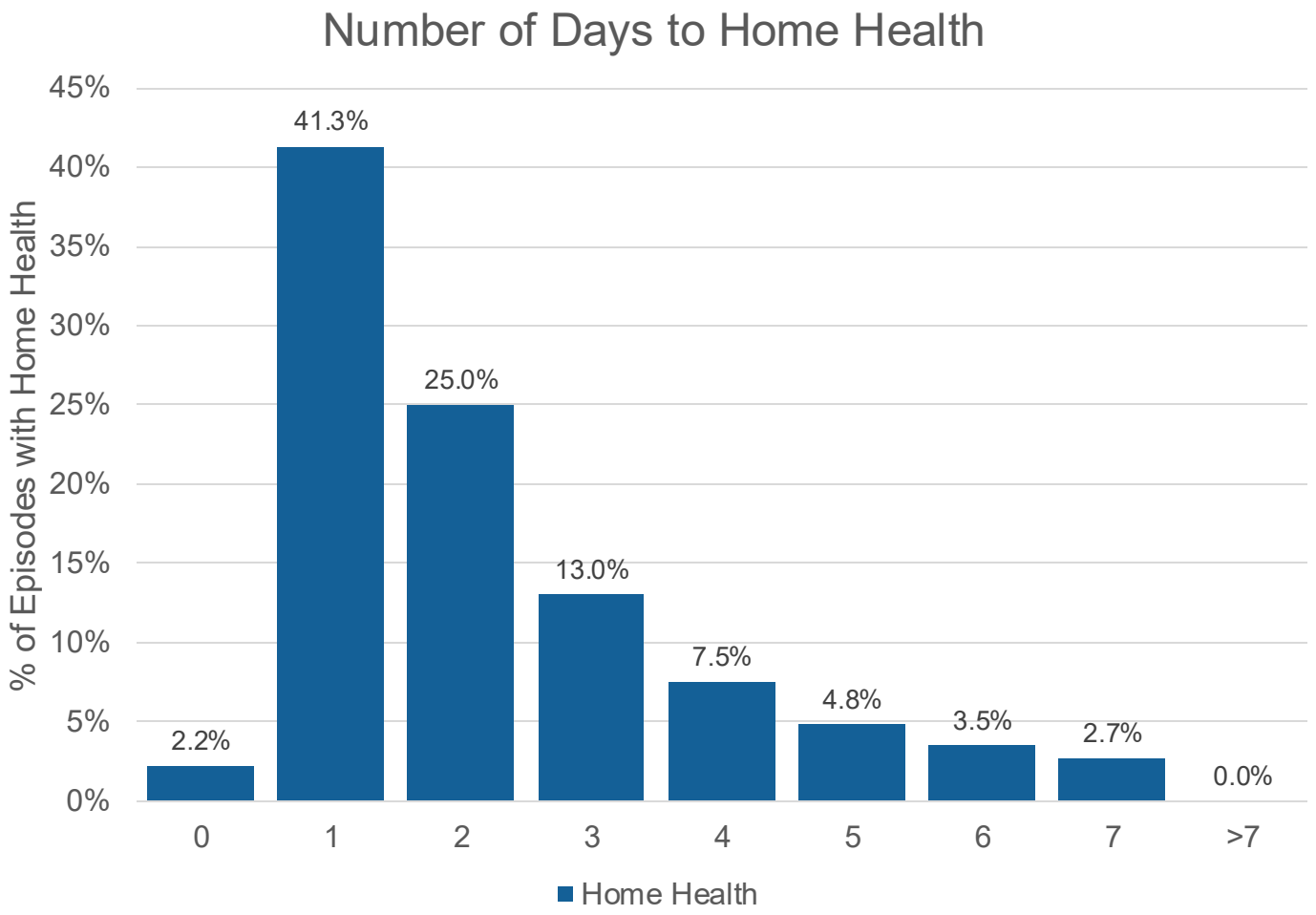
% Of Discharges by Days to HH	0	1	2	3	4	5	6	7
	2.2%	41.3%	25.0%	13.0%	7.5%	4.8%	3.5%	2.7%

Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

Of the 62% of Beneficiaries who receive home health after discharge, 44.2% of them access home health within 1 day post discharge

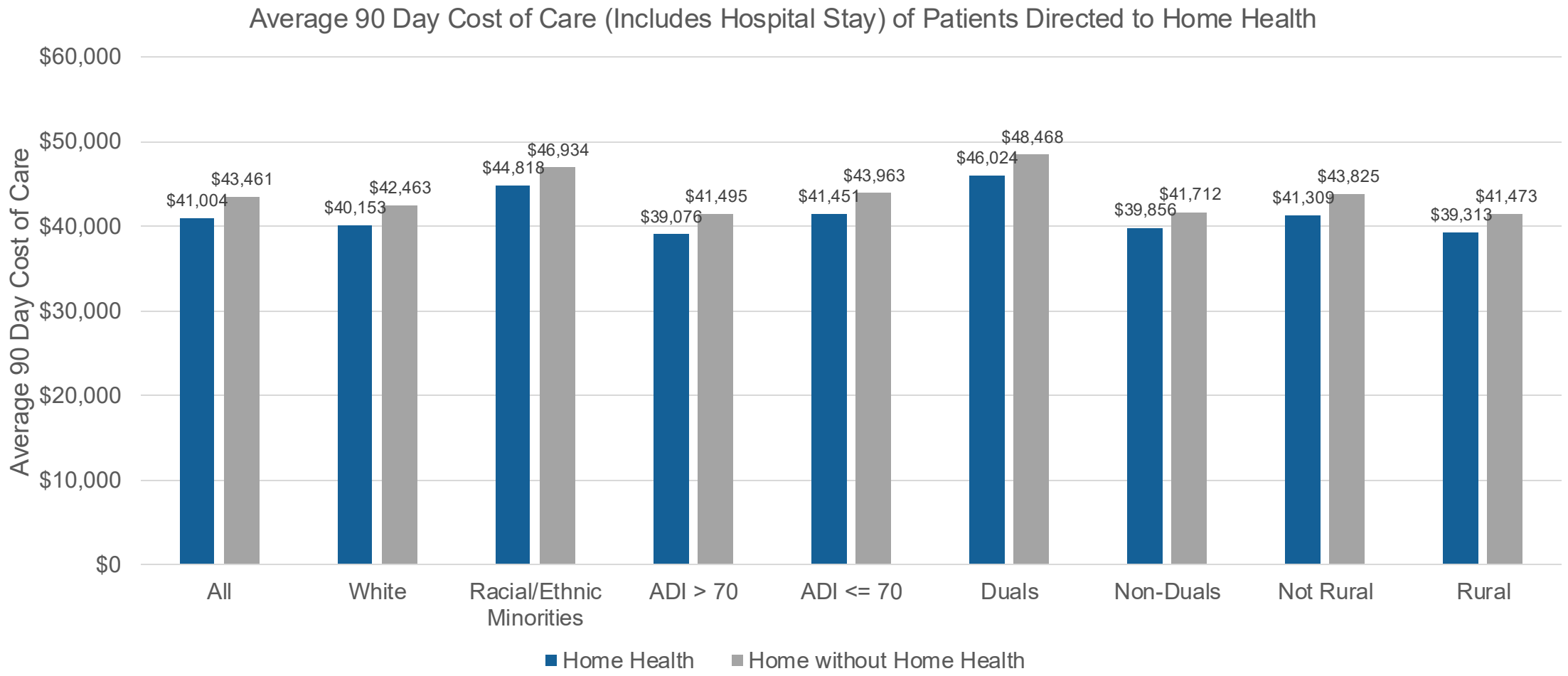




Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

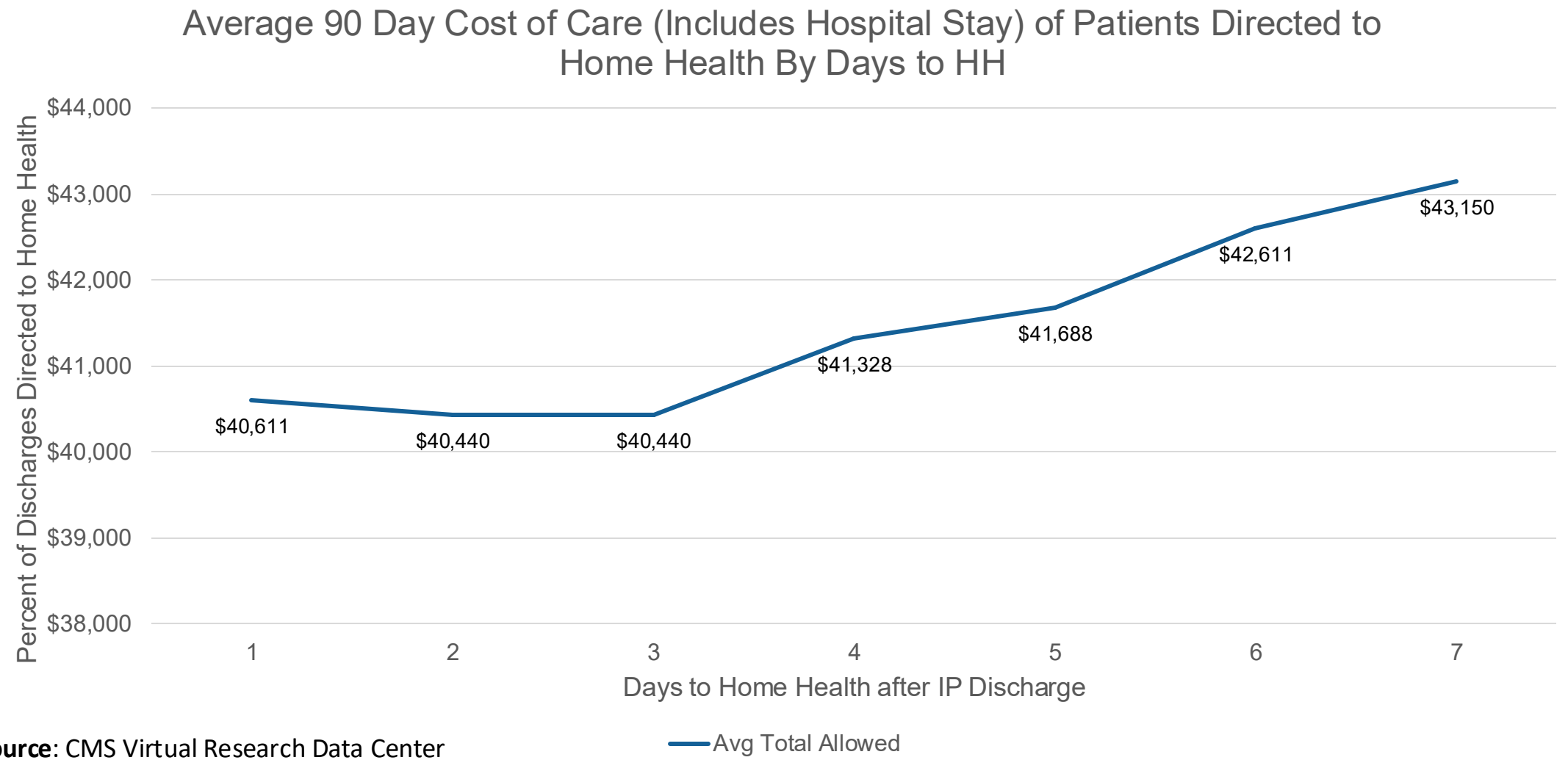
Among beneficiaries directed to HHA, those that received home health services within 7 days of discharge saw lower 90-day total cost of care compared to those who went home without services



Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

Among beneficiaries who went to home health, timely access is also crucial to reducing spend. Total average spend rose by 8.8% between receiving home health between 1 and 7 days after discharge



Source: CMS Virtual Research Data Center

Data: 2024 inpatient claim files filtered for STAC claims (see methodology slides for how each discharge location is coded and how conversions are calculated). Discharge data based on Q1-Q2 2024 to enable visibility into 90 day runout post-discharge.

If all the 2024 STAC patients who were referred to home health actually went to home health, we would've expected to see a 28.9% reduction, or about 5,900 less deaths

Number of Total STAC claims in 2024 Q1-Q2 that were referred to home health			
522,617			
Number of Patients referred to HH that went to Home Health		**Number of Patients referred to HH that went home (no home health)**	
319,355 (61.1% of 522,617)		190,476 (36.4% of 522,617)	
What would have been the expected outcomes if the 190,476 patients that did not receive home health did?			
Metric	**Observed**	**Expected**	**Delta**
Mortality	20,359	14,476	-5,883 (28.9% reduction)
Patients with ED Visits	54,470	47,048	-7,422 (13.6% reduction)
Patients with Readmissions	76,033	56,762	19,271- (25.4% reduction)

Note: Expected values are determined by multiplying the rates of each outcome metric for home health by the number of patients who did not receive home health. This gives an estimated number of each metric had they received home health. For example, expected mortality is 7.6% (home health mortality rate for all patients) * 190,476 = 14,476. Observed rates are taken from slide 17 (all deaths for patients who did not receive HH)

When comparing White and Minority patients per 100K STAC discharges, we see that there are 666 less Minority home health conversions than White patients. If Minority patients had the same referral and conversion rates as White patients, we would expect to see a 1.7% reduction in total deaths, .7% reduction in total ED visits and 1.5% reduction in total readmissions

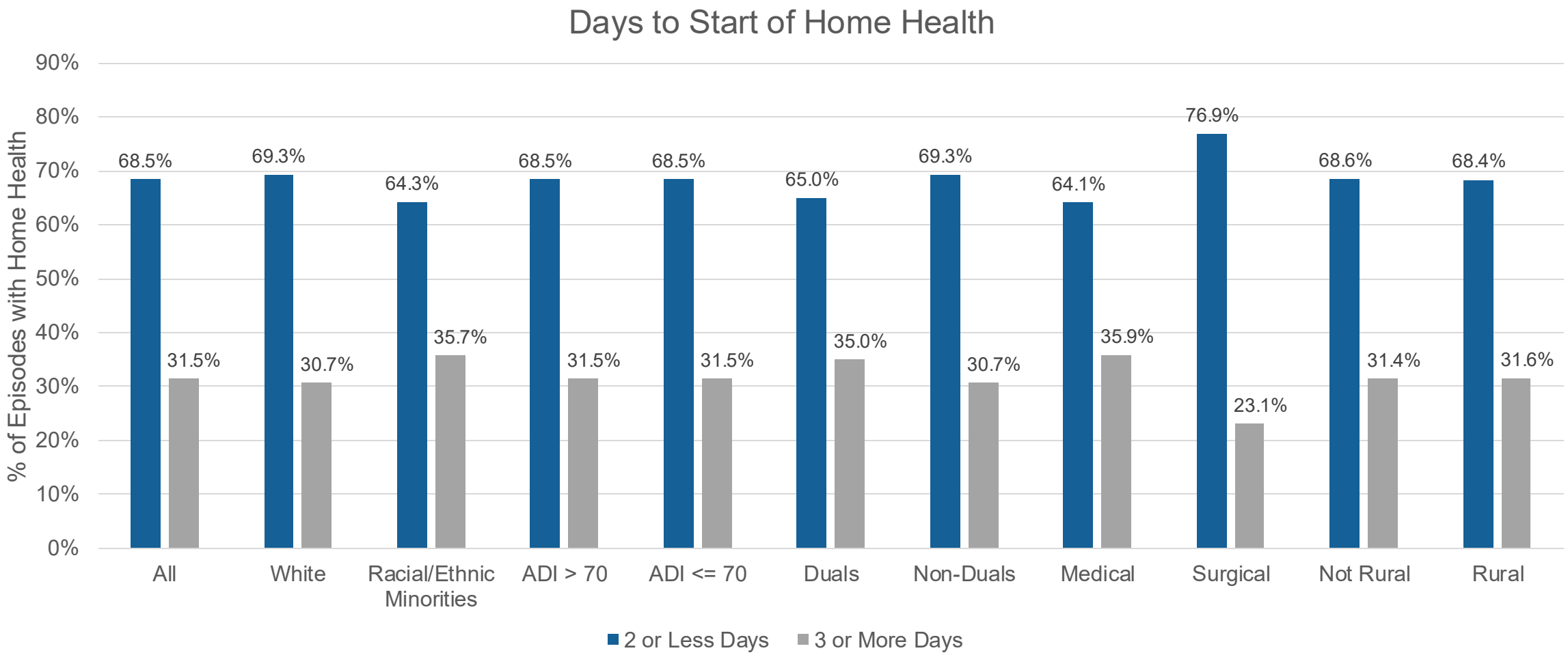
100,000 White STAC Patients	100,000 Minority STAC Patients
Number Referred to Home Health (%)	**Number Referred to Home Health (%)**
19,500 (19.5% of 100,000 referred)	20,400 (20.4% of 100,000 referred)
Number Converted to Home Health (%)	**Number Converted to Home Health (%)**
12,110 (62.1% of 19,500 converted to HH)	11,444 (56.1% of 20,400 converted to HH)

Disparity between White and Minority Patients Receiving Home Health Care
666 less Minority patients receiving home health care than White patients

Comparison of Outcomes if Minority Patients had the same Referrals and Conversions as White Patients (N=12,994)			
Metric	**Observed** (11,444 HH + 666 No HH)	**Expected** (12,110 Home Health)	**Delta**
Mortality	974	957	1.7% reduction
Patients with ED Visits	3,147	3,124	.7% reduction
Patients with Readmissions	3,899	3,839	1.5% reduction

Note: Observed values are determined by applying the non-home health outcome rates for minorities to the 666 patients and the home health rates to the remaining 11,444. Expected values are determined by applying the home health outcome rates for minorities to all 12,110 patients. For example, observed mortality is 11,444*7.9% + 666*10.5% =974, and expected mortality is 7.9% * 12,110 patients = 957 deaths

While timely initiation of care is critical to costs and outcomes, the ability to access home health services quickly post-discharge varies across populations.



- Overall, about 69% of patients receive home health services within 0-2 days.
- This rate is higher among surgical discharges, with 77% of patients receiving care quickly.
- Among medical discharges, however, home health care is initiated within two days only 64% of the time.
- Among patient demographic cohorts, racial/ethnic minorities and dual-eligible beneficiaries were able to access home health services less quickly than their counterparts.

Appendix

Comparing 2024 Q1-Q3 Trends against 2023 Q1-Q3 Trends

2024 Table Counts (Slide 8)

Next site of care	Cohort	Number of PAC Conversions (Numerator)	Number STAC discharges Referred to Home Health Q1-Q2 (Denominator)
HHA	All	319,355	522,617
Home	All	190,476	522,617
HHA	White	261,880	421,430
Home	White	148,922	421,430
HHA	Minority	51,771	92,223
Home	Minority	38,444	92,223
HHA	ADI > 70	60,105	101,580
Home	ADI > 70	38,726	101,580
HHA	ADI <= 70	259,250	421,037
Home	ADI <= 70	151,750	421,037
HHA	Dual	59,446	111,574
Home	Dual	49,311	111,574
HHA	Non Dual	259,909	411,043
Home	Non-Dual	141,165	411,043
HHA	Not Rural	270,473	442,111
Home	Not Rural	161,017	442,111
HHA	Rural	48,882	80,506
Home	Rural	29,459	80,506
HHA	Medical	206,757	370,894
Home	Medical	153,494	370,894
HHA	Surgical	106,323	142,669
Home	Surgical	34,380	142,669

2024 Table Counts (Slides 12-14)

Next site of care	Cohort	Number of STAC Conversions to PAC Site ("Next Site of Care")	Number of Discharges w/ 1+ ED visits	Number of Discharges w/ 1+ Readmissions	Number of Deaths
HHA	All	319,355	78,989	95,026	24,311
Home	All	190,476	54,470	76,033	20,359
HHA	White	261,880	64,433	77,023	19,898
Home	White	148,922	42,459	59,197	16,045
HHA	Minority	51,771	13,352	16,402	4,092
Home	Minority	38,444	11,176	15,657	4,038
HHA	ADI > 70	60,105	16,449	18,573	5,051
Home	ADI > 70	38,726	11,914	15,813	4,393
HHA	ADI <= 70	259,250	62,540	76,453	19,260
Home	ADI <= 70	151,750	42,556	60,220	15,966
HHA	Dual	59,446	17,889	21,143	4,200
Home	Dual	49,311	16,427	21,937	4,389
HHA	Non Dual	259,909	61,100	73,883	20,111
Home	Non-Dual	141,165	38,043	54,096	15,970

2024 Table Counts (Slides 12-14)

Next site of care	Cohort	Number of STAC Conversions to PAC Site ("Next Site of Care")	Number of Discharges w/ 1+ ED visits	Number of Discharges w/ 1+ Readmissions	Number of Deaths
HHA	Not Rural	270,473	64,680	81,233	20,257
Home	Not Rural	161,017	44,625	64,876	16,936
HHA	Rural	48,882	14,309	13,793	4,054
Home	Rural	29,459	9,845	11,157	3,423
HHA	Medical	206,757	55,275	70,229	20,404
Home	Medical	153,494	45,567	64,295	17,985
HHA	Surgical	106,323	22,325	23,296	3,631
Home	Surgical	34,380	8,157	10,874	2,174

2024 Table Counts for Outcomes by Days to Home Health (slide 15)

Cohort	Days to Home Health After IP Discharge	Number of Claims w/ 1+ ED visits	Number of Claims w/ 1+ Readmissions	Number of Deaths	Number of Claims
All	1	30,551	36,844	9,177	131,994
All	2	19,545	23,414	6,249	79,927
All	3	10,443	12,450	3,320	41,440
All	4	6,386	7,467	1,907	23,845
All	5	4,315	5,062	1,243	15,441
All	6	3,154	3,910	962	11,082
All	7	2,568	3,188	741	8,629

2023 Table Counts

Next site of care	Cohort	Number of PAC Conversions (Numerator)	Number STAC discharges Referred to Home Health Q1-Q2 (Denominator)
HHA	All	326,811 (63%)	522,952
Home	All	183,134 (35%)	522,952
HHA	White	267,984 (63%)	422,027
Home	White	143,095 (34%)	422,027
HHA	Minority	53,798 (58%)	93,196
Home	Minority	37,456 (40%)	93,196
HHA	ADI > 70	64,656 (60%)	106,959
Home	ADI > 70	39,391 (37%)	106,959
HHA	ADI <= 70	262,155 (63%)	415,993
Home	ADI <= 70	143,743 (35%)	415,993
HHA	Dual	65,026 (55%)	119,306
Home	Dual	51,195 (43%)	119,306
HHA	Non Dual	261,785 (65%)	403,646
Home	Non-Dual	131,939 (33%)	403,646
HHA	Not Rural	275,025 (63%)	439,467
Home	Not Rural	1153,692 (35%)	439,467
HHA	Rural	51,786 (62%)	83,485
Home	Rural	29,442 (35%)	83,485
HHA	Medical	207,929 (57%)	365,979
Home	Medical	147,264 (40%)	365,979
HHA	Surgical	115,961 (76%)	153,366
Home	Surgical	35,275 (23%)	153,366

2023 Table Counts

Next site of care	Cohort	Number of STAC Conversions to PAC Site ("Next Site of Care")	Number of Discharges w/ 1+ ED visits	Number of Discharges w/ 1+ Readmissions	Number of Deaths
HHA	All	326,811	79,429 (24%)	95,980 (29%)	25,565 (7.8%)
Home	All	183,134	51,964 (28%)	72,385 (40%)	20,247 (11%)
HHA	White	267,984	64,738 (24%)	77,750 (29%)	20,857 (7.8%)
Home	White	143,095	40,476 (28%)	56,048 (40%)	15,902 (11%)
HHA	Minority	53,798	13,687 (25%)	16,967 (32%)	4,387 (8.2%)
Home	Minority	37,456	10,803 (29%)	15,352 (41%)	4,112 (11%)
HHA	ADI > 70	64,656	17,492 (27%)	19,681 (30%)	5,433 (8.4%)
Home	ADI > 70	39,391	12,231 (31%)	16,076 (41%)	4,623 (12%)
HHA	ADI <= 70	262,155	61,937 (24%)	76,299 (29%)	20,132 (7.7%)
Home	ADI <= 70	143,743	39,733 (28%)	56,309 (39%)	15,624 (11%)
HHA	Dual	65,026	19,243 (30%)	22,865 (35%)	4,753 (7.3%)
Home	Dual	51,195	16,948 (33%)	22,611 (44%)	4,702 (9.2%)
HHA	Non Dual	261,785	60,186 (23%)	73,115 (28%)	20,812 (7.9%)
Home	Non-Dual	131,939	35,016 (27%)	49,774 (38%)	15,545 (12%)

2023 Table Counts

Next site of care	Cohort	Number of STAC Conversions to PAC Site ("Next Site of Care")	Number of Discharges w/ 1+ ED visits	Number of Discharges w/ 1+ Readmissions	Number of Deaths
HHA	Not Rural	275,025	64,440 (23%)	81,442 (30%)	21,147 (7.7%)
Home	Not Rural	153,692	42,150 (27%)	61,292 (40%)	16,736 (11%)
HHA	Rural	51,786	14,989 (29%)	14,538 (28%)	4,418 (8.5%)
Home	Rural	29,442	9,814 (33%)	11,093 (38%)	3,511 (12%)
HHA	Medical	207,929	55,232 (27%)	70,711 (34%)	21,483 (10%)
Home	Medical	147,264	43,496 (30%)	61,224 (42%)	17,887 (12%)
HHA	Surgical	115,961	23,710 (20%)	24,792 (21%)	3,968 (3.4%)
Home	Surgical	35,275	8,340 (24%)	11,014 (31%)	2,315 (6.6%)

2023 Table Counts for Outcomes by Days to Home Health

Cohort	Days to Home Health After IP Discharge	Number of Claims w/ 1+ ED visits	Number of Claims w/ 1+ Readmissions	Number of Deaths	Number of Claims
All	1	31,172 (23%)	37,751 (27%)	9,954 (7.2%)	137,728 (42%)
All	2	19,510 (24%)	23,542 (29%)	6,507 (8.0%)	81,011 (25%)
All	3	10,430 (25%)	12,410 (29%)	3,372 (8.0%)	42,115 (13%)
All	4	6,233 (26%)	7,394 (31%)	1,945 (8.2%)	23,865 (7.3%)
All	5	4,315 (28%)	5,094 (33%)	1,308 (8.5%)	15,416 (4.7%)
All	6	3,079 (28%)	3,863 (35%)	1,000 (9.1%)	10,951 (3.4%)
All	7	2,557 (31%)	3,159 (38%)	742 (8.9%)	8,355 (2.6%)