NB23-17: Tracking Racial Health Disparities in the SSI Population Before and During the COVID-19 Pandemic

Jessica Van Parys & Jevay Grooms

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1 Pilot aims

The project has 3 aims:

1. Estimate unadjusted disparities in health outcomes (e.g., mortality rates, morbidity rates, emergency health care utilization) by race/ethnicity, 2016-2020.

2. Estimate adjusted racial disparities in health outcomes. Adjusters include SSI recipient age and geographic location.

3. Estimate racial disparities in COVID-19 outcomes (e.g., documented COVID-19 cases and excess mortality in 2020 compared to 2019).

We used the Transformed Medicaid Statistical Information System Analytic Files (TAF) for all states from 2016-2020 to measure racial health disparities in the SSI population. We identified SSI recipients in Medicaid by using the (i) SSI indicator, (ii) SSI status, and (iii) Medicaid eligibility codes for all months. Our sample included all Medicaid enrollees with a positive value for any of these three codes. Our sample size included about 3.5 million SSI recipients ages 18-64 nationwide each year. Racial groups in the TAF data include White, Black, Hispanic, Asian, American Indian and Alaskan Native (AIAN), Native Hawaiian and Other Pacific Islander (NHOPI), and Multiracial. Table 1 shows the counts of SSI recipients by racial/ethnic group, identified in the TAF data, pooling years 2016-2020.

Table 1: Race and Ethnicity of SSI Recipients, 2016-2020

	White	Black	Hispanic	Asian	NHOPI	AIAN	Multiracial
Share of SSI Recipients	.467	.306	.137	.023	.003	.012	.002
# of SSI Recipients	6832529	4481643	2009152	329439	57003	212926	30722

This table depicts the share of SSI recipients belonging to each race/ethnicity category. Data are from TAF 2016-2020. The sample is restricted to recipients aged 18-64 years.

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2 Aim #1: Unadjusted Racial/Ethnic Health Disparities

Our first aim was to measure disparities in health outcomes and health care utilization by race/ethnicity from 2016-2020. We focused on the following outcomes, which could be measured using TAF data:

- Mortality rates
- Share of SSI population with at least 1 chronic condition and share with 4+ chronic conditions
- Rates of hypertension, diabetes, heart failure, chronic obstructive pulmonary disease (COPD), kidney disease, depression, and cancers
- ED visit rates, including types (e.g., primary care treatable, preventive)
- Hospitalization rates, including ambulatory care sensitive hospitalizations
- 30-day readmission rates conditional on an initial hospitalization
- Non-mortality related exits from Medicaid

For each outcome, we created a bar chart that pooled the years 2016-2020 by race/ethnicity. The bar charts show which groups have the highest rates of each outcome. Then we created line graphs to show how the rates of each outcome have changed over time by racial/ethnic group.

Results: We find that AIAN and White SSI recipients may be in the worst health, but that emergency health care utilization is highest among Black SSI recipients. Mortality rates are highest among AIAN and White SSI recipients (2.3-2.4% per year) and lowest among Asian and Hispanic recipients (1.3-1.6% per year) (Figure 1). The trends in mortality rates across racial/ethnic groups remained relatively stable from 2016-2020, though all groups experienced a large increase in mortality in 2020 during the COVID-19 pandemic (Figure 2). Mortality rates increased by 10-40% from 2019 to 2020 in the SSI population.

We do not find large differences across racial/ethnic groups in the prevalence of having any chronic condition or 4+ chronic conditions (Figure 3). The prevalence of any chronic condition is relatively stable for most groups from 2016-2019 (though rising for NHOPI), but decreases markedly in 2020 (Figure 4). The decrease in the share of the SSI population with any chronic condition in 2020 is consistent with prior research showing that health care utilization was delayed or deferred in 2020 due to the pandemic (Gertz et al., 2022).

However, we find striking differences in the types of chronic conditions present across racial/ethnic groups in the SSI population. Figure 5 shows that diabetes rates are highest among NHOPI and Asian populations, hypertension rates are highest among Black and NHOPI populations, kidney disease rates are highest among NHOPI and AIAN populations, heart failure rates are highest among Black and NHOPI populations, COPD rates are highest among White and Multiracial populations, and depression rates are highest among Multiracial and White populations. Figure 6 further breaks down cancer rates by racial/ethnic group. We find breast cancer incidence is highest among Asian SSI recipients, prostate cancer is highest among Black SSI recipients, lung cancer is highest among White SSI recipients, and endometrial and colon cancer rates are similar across groups. Figure 7 shows that the rates of most chronic conditions are stable from 2016-2020, except rates of heart failure are increasing in all

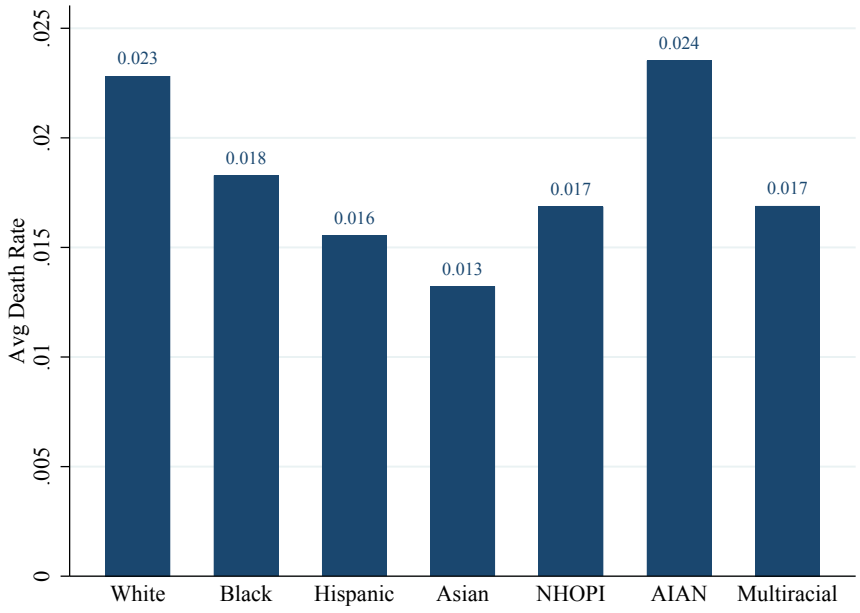
groups.

Turning to our results for emergency healthcare utilization, we consider the share of each population with an ED visit as well as the average number of ED visits per year (Figure 8). We find that Black SSI recipients are the most likely to have any ED visit (48%) in a given year and their average number of ED visits is highest (1.77 per year). Asian SSI recipients have the lowest rates of ED usage (27% have any ED visit and the average number of visits per year is 0.73). Figure 9 shows that the ED visit rates are stable from 2016-2019, but decrease significantly in 2020 during the pandemic. Figure 10 further subdivides ED visits into types: primary care treatable (PCT), primary care avoidable (PCA), non-emergenct, and non-primary care avoidable (Non-PCA) according to an algorithm first developed at NYU and later updated (Johnston et al., 2017). Generally we find that the results in Figure 8 are similar to the results in Figure 10; Black SSI recipients are more likely to have every type of ED visit compared to SSI recipients of other racial/ethnic groups.

Next we consider the share of each population with a hospitalization, as well as the average number of hospitalizations per group per year (Figure 11). AIAN SSI recipients are the most likely to experience a hospitalization (18%) and have the most hospitalizations per year (0.33) compared to other groups, though Black SSI recipients are not far behind (16% and 0.32, respectively). Asian SSI recipients continue to exhibit the lowest rates of emergency health care utilization; only 9% have any hospitalization and the average number of hospitalizations per year is 0.25. Figure 12 shows the incidence of hospitalization is stable from 2016-2019, but declines sharply for all groups in 2020 during the pandemic. Figure 13 breaks down hospitalization prevalence into ambulatory care sensitive (ACS) (e.g., avoidable) vs. non-ACS groupings. We continue to find the highest rates of both ACS and non-ACS hospitalizations among AIAN and Black SSI recipients. Figures 14 and 15 show readmission rates, conditional on an initial hospitalization, by race/ethnicity. We find that Black SSI recipients have the highest rates of readmissions, especially from 2016-2018; however, their readmission rates decline in 2019, at which point AIAN SSI recipients have higher rates of readmission. We are unsure what is driving the change to readmission rates among Black SSI recipients over this time period, so the result warrants further scrutiny.

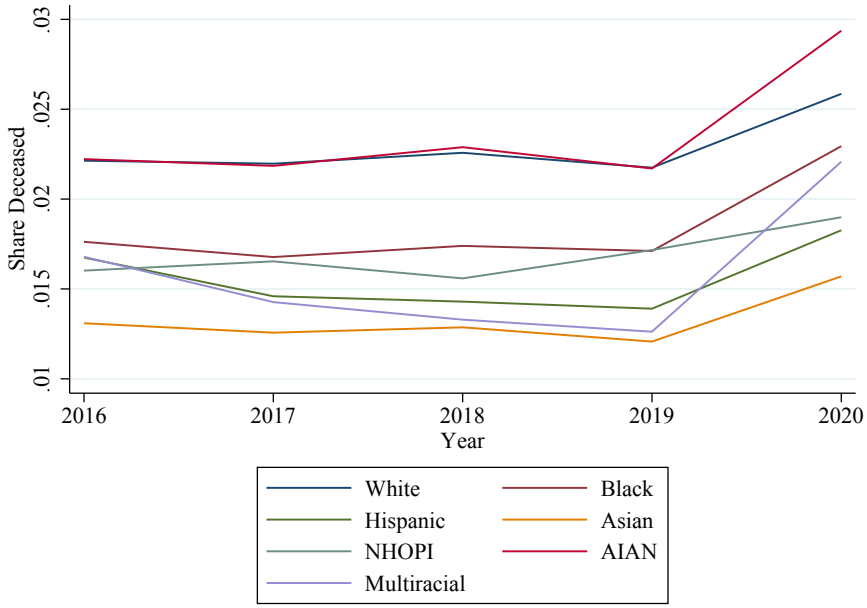
Finally, we consider differences in "churn" out of Medicaid by racial/ethnic group in Figures 16 and 17. Here we categorize a SSI recipient as having "exited Medicaid" if they appear in the Medicaid claims in one year, but not the next. We exclude SSI recipients who die in either year from the calculation. The average churn rate is quite low – around 4% of the SSI population per year. We find the highest rates of Medicaid exit among AIAN and Black SSI recipients, the same groups that had relatively high rates of emergency health care utilization (i.e., ED visits and hospitalizations). It is unclear what is causing higher Medicaid exit rates among AIAN and Black SSI recipients, and the finding deserves further research. Figure 17 shows that exit rates increased dramatically in 2020 during the pandemic. We believe this result may be a data error because the Center for Medicare and Medicaid (CMS) changed its approach to generating Medicaid beneficiary IDs in 2020. We will continue to dig into this anomaly, and update this report as necessary.

Figure 1: Mortality Rates among SSI Recipients by Race/Ethnicity



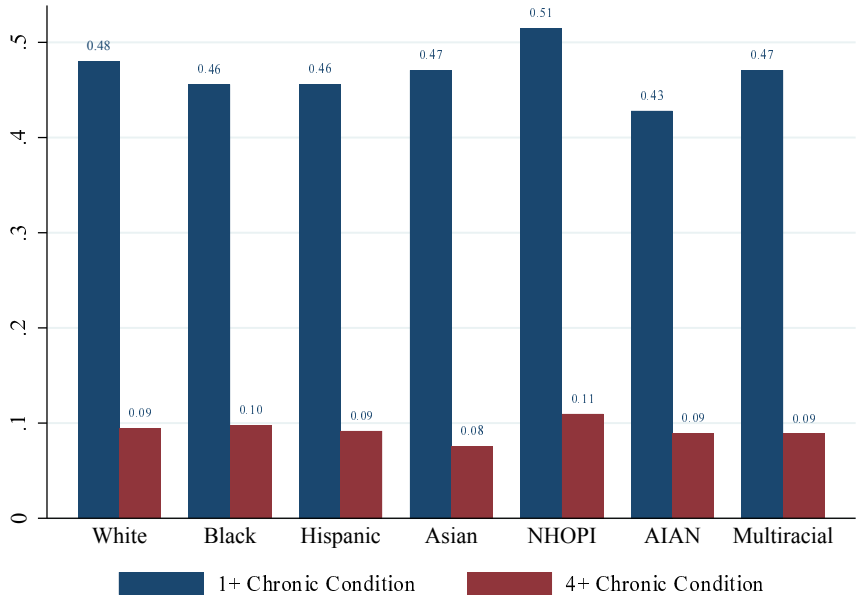
This figure depicts the average mortality rate by race/ethnicity for SSI recipients aged 18-64 years. Data are from TAF 2016-2020.

Figure 2: Mortality Rates among SSI Recipients by Race/Ethnicity, 2016-2020



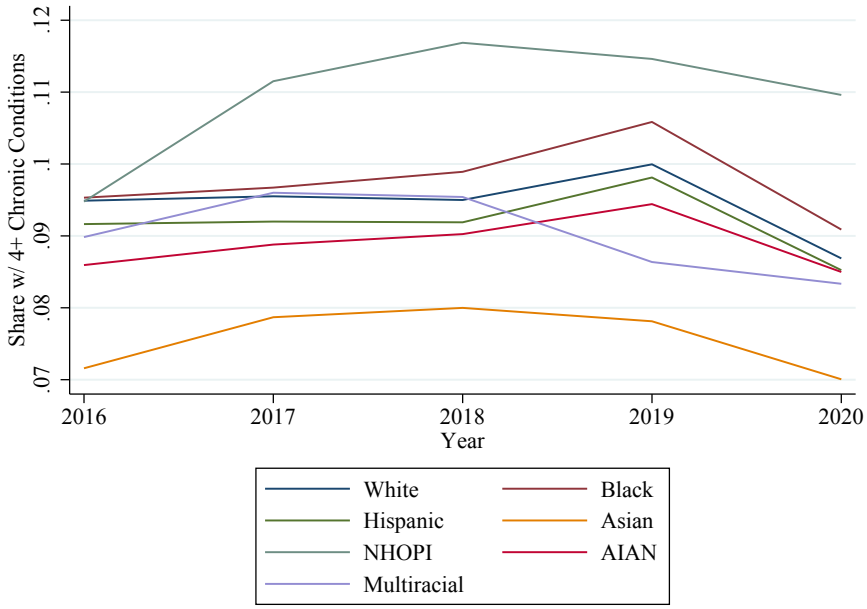
This figure depicts the change in mortality rates by race/ethnicity among SSI recipients from 2016-2020. Data are from TAf 2016-2020. The sample is restricted to SSI recipients aged 18-64 years.

Figure 3: Chronic Condition Prevalence among SSI Recipients by Race/Ethnicity



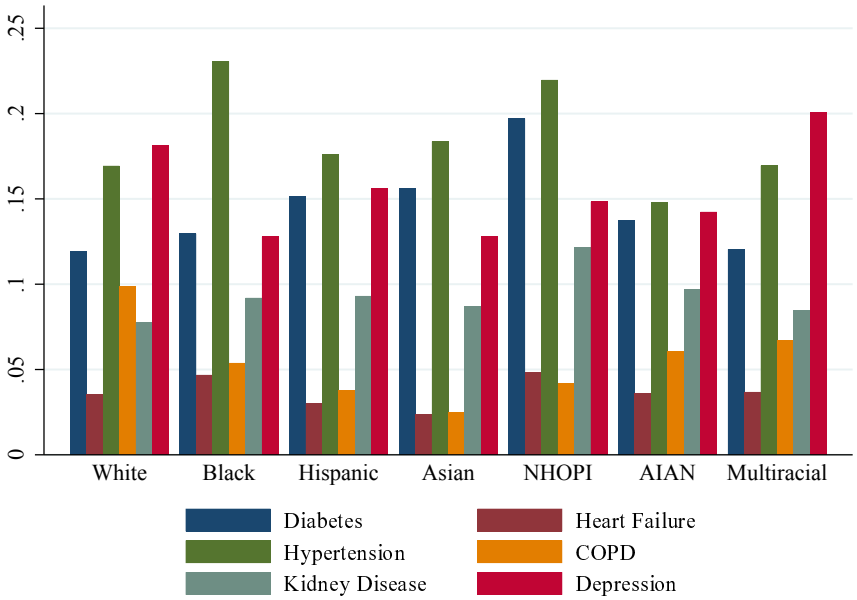
This figure depicts the share of SSI recipients with at least 1 chronic condition or 4 or more chronic conditions respectively by race/ethnicity. The sample is restricted to SSI recipients aged 18-64 years. Data are from TAF 2016-2020. Chronic Conditions are identified using the 30 Chronic Conditions Warehouse.

Figure 4: Chronic Condition Prevalence among SSI Recipients by Race/Ethnicity, 2016-2020



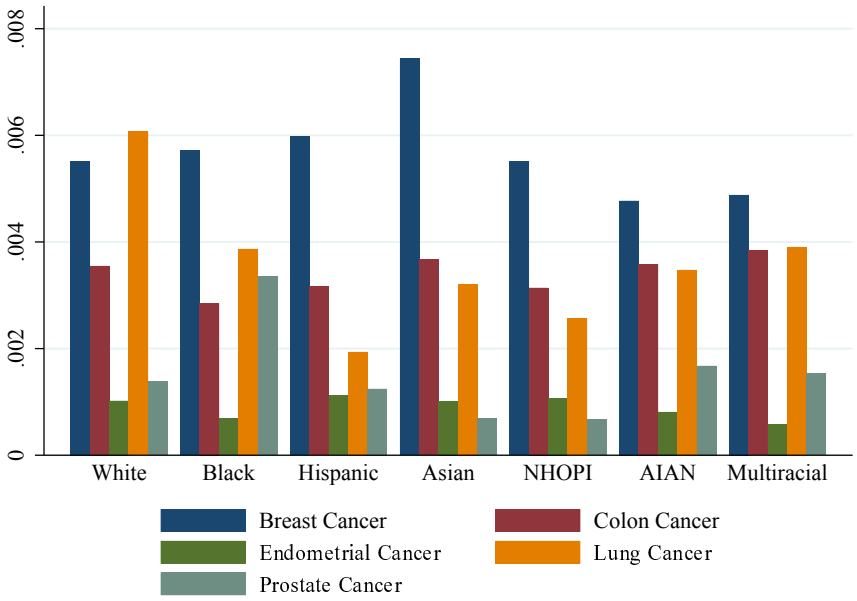
This figure depicts changes in the share of SSI recipients with 4 or more chronic conditions by race/ethnicity from 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. Chronic conditions are identified using the 30 Chronic Condition Warehouse. Data are from TAF 2016-2020.

Figure 5: Prevalence of Specific Chronic Conditions among SSI Recipients by Race/Ethnicity



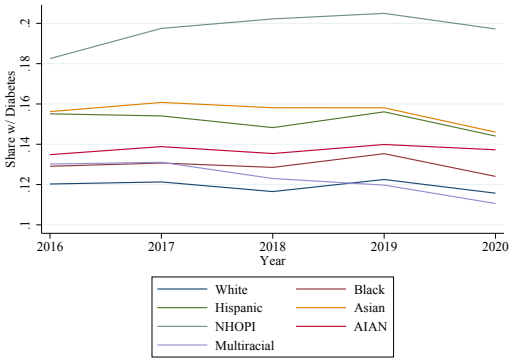
This figure depicts the share of SSI recipients with diabetes, hypertension, chronic kidney disease, heart failure, COPD, or depression by race/ethnicity. The sample is restricted to SSI recipients aged 18-64 years. Chronic conditions are identified using the 30 CCW. Data are from TAF 2016-2020.

Figure 6: Prevalence of Specific Cancers among SSI Recipients by Race/Ethnicity

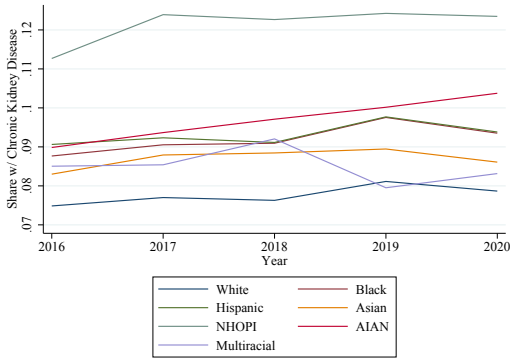


This figure depicts the share of SSI recipients with different types of cancers by race/ethnicity. The sample is restricted to SSI recipients aged 18-64 years. Cancer diagnoses are identified using the 30 CCW. Data are from TAF 2016-2020.

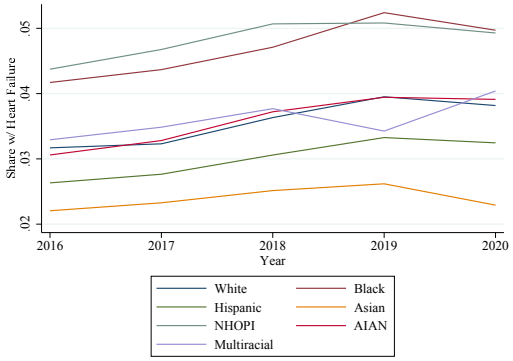
Figure 7: Prevalence of Specific Chronic Conditions among SSI Recipients by Race/Ethnicity, 2016-2020



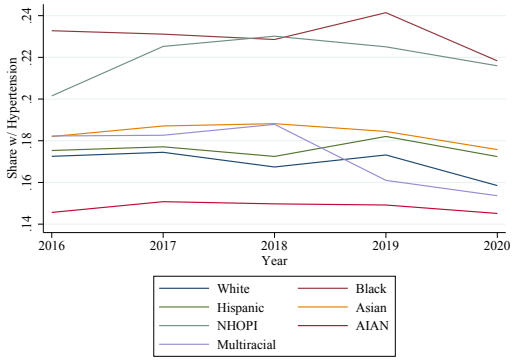
(a) Diabetes



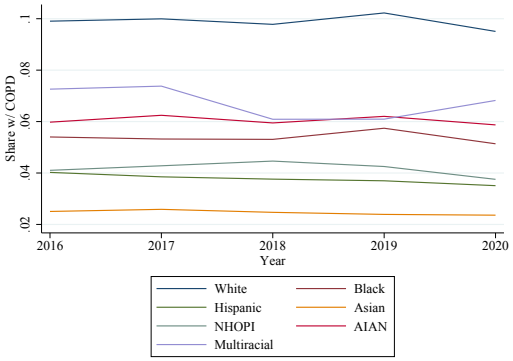
(b) Chronic Kidney Disease



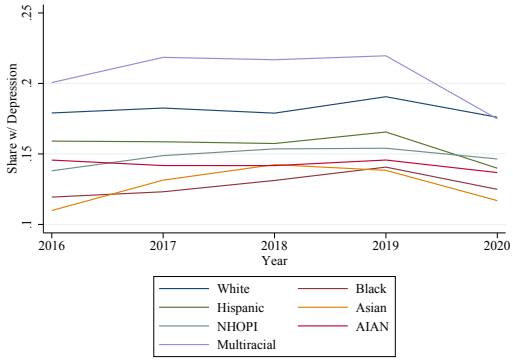
(c) Heart Failure



(d) Hypertension



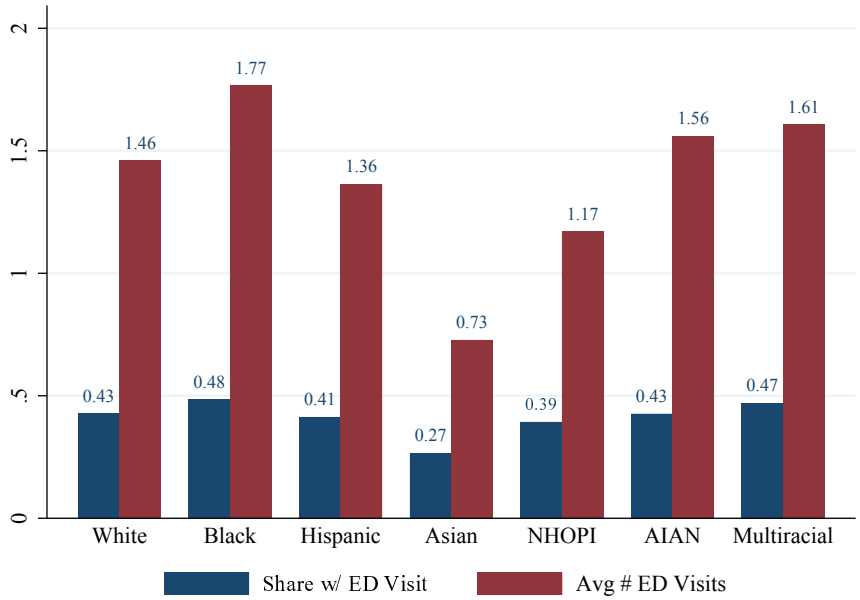
(e) COPD



(f) Depression

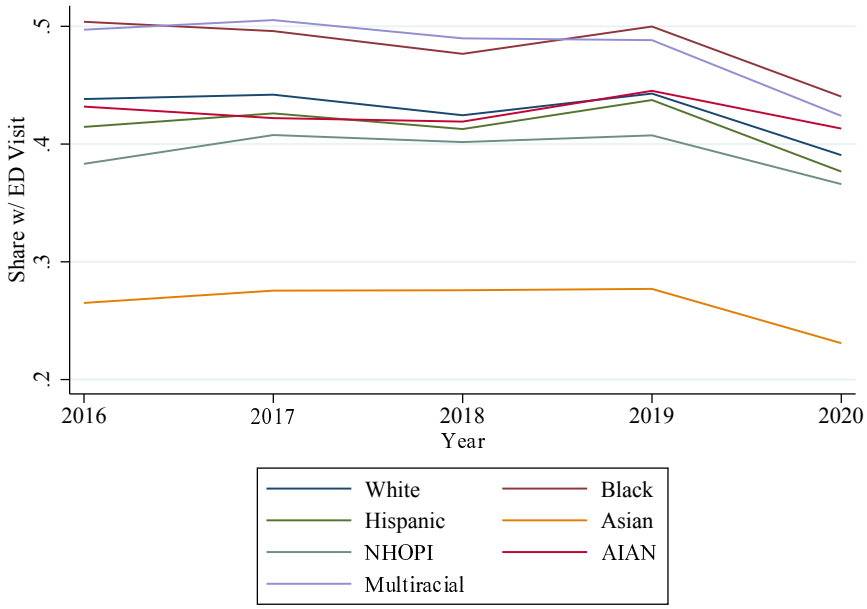
This figure depicts changes in the prevalence of diabetes, chronic kidney disease, heart failure, hypertension, COPD, and depression among SSI recipients by race/ethnicity for 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. Chronic conditions are identified using the 30 CCW. Data are from TAF 2016-2020.

Figure 8: ED Visits among SSI recipients by Race/Ethnicity



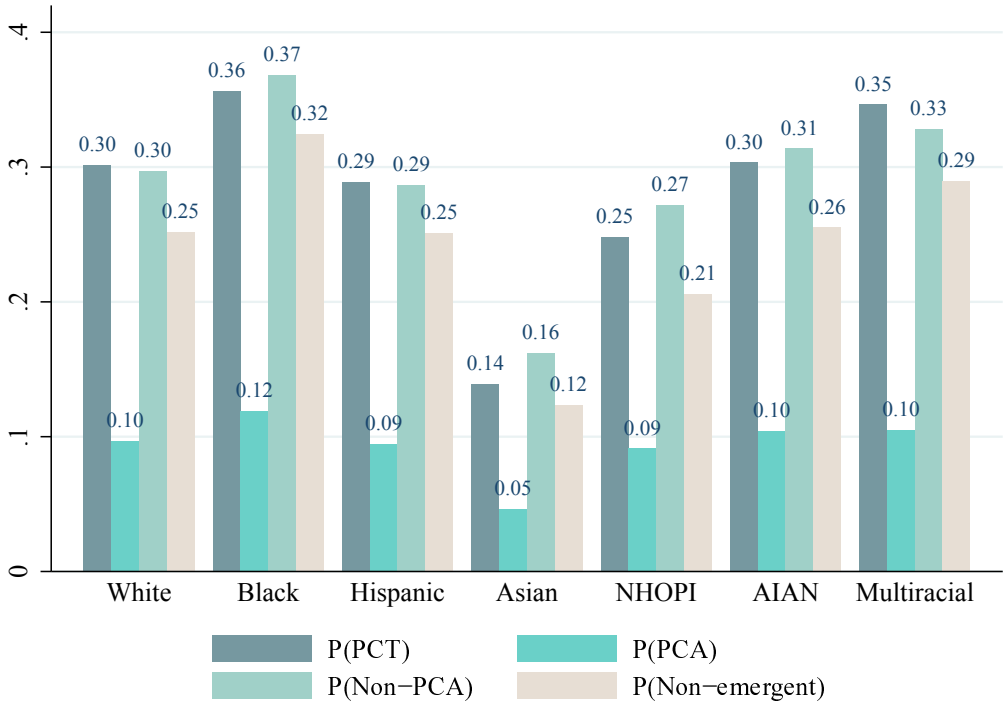
This figure depicts ED usage by race/ethnicity among SSI recipients aged 18-64 years. The blue bars depict the share of recipients with at least one ED visit, while the red bars depict the average number of ED visits per recipient-year. Recipients with no ED claims are imputed as having 0 ED visits. Recipients with ED visit counts in the 99th percentile are dropped from the sample. Data are from TAF 2016-2020.

Figure 9: ED Visits among SSI Recipients by Race/Ethnicity, 2016-2020



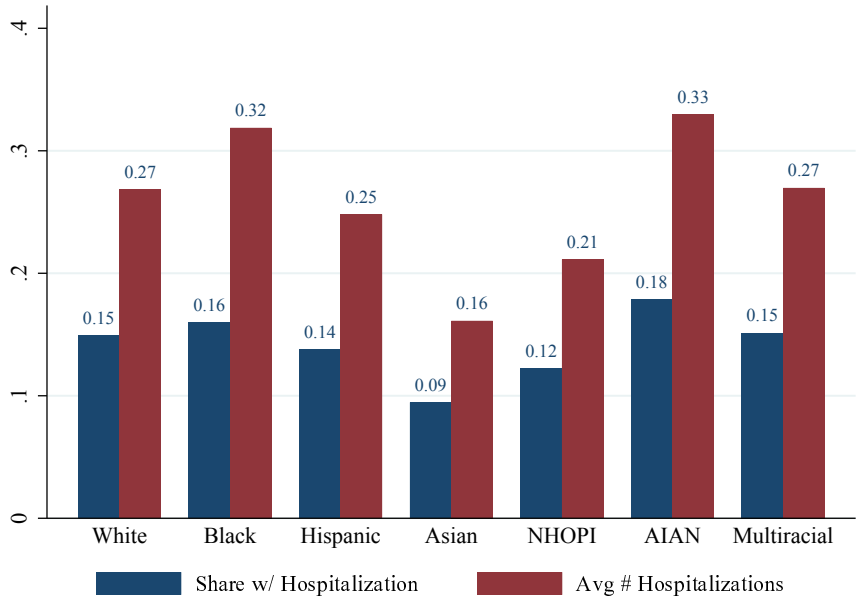
This figure depicts changes in share of SSI recipients with at least 1 ED visit by race/ethnicity from 2016-2020. The sample is restricted to recipients aged 18-64 years. Recipients with ED visit counts in the 99th percentile are dropped from the sample. Data are from TAF 2016-2020.

Figure 10: Types of ED Visits among SSI Recipients by Race/Ethnicity



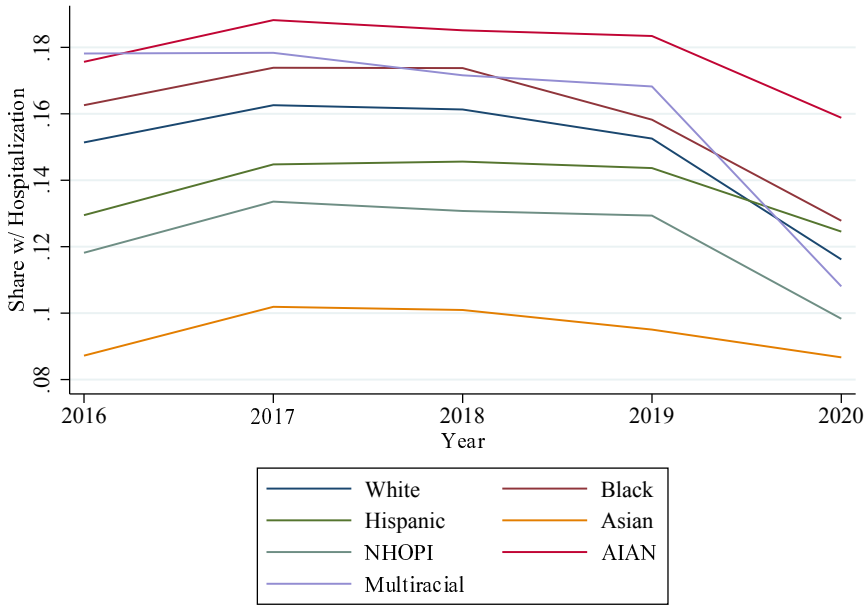
This figure depicts the types of ED visits by race/ethnicity among SSI recipients aged 18-64 years. Respective probabilities of having a primary care treatable (PCT), primary care avoidable (PCA), non-primary care avoidable (Non-PCA), and nonemergent ED visit are assigned following Johnston et al. (2017). Recipients with no ED visit claims are assigned a probability of 0 for all respective ED categories. Recipients with ED visit counts in the 99th percentile are dropped from the sample. Data are from TAF 2016-2020.

Figure 11: Hospitalizations among SSI Recipients by Race/Ethnicity



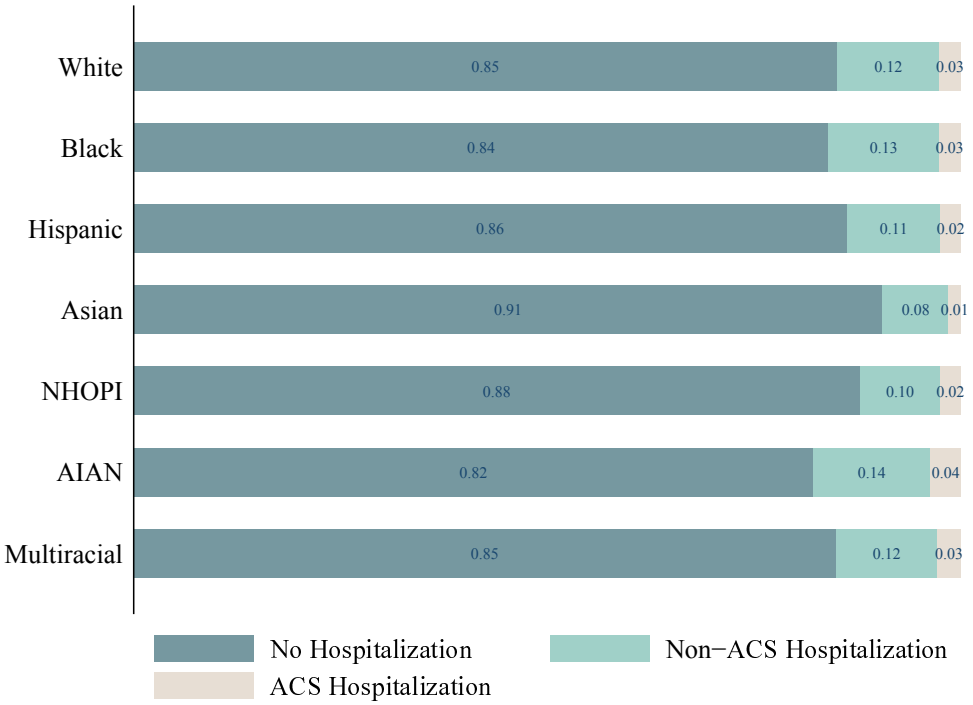
This figure depicts hospitalizations by race/ethnicity among SSI recipients aged 18-64 years. The blue bars depict the share of recipients with at least 1 hospitalization, while the red bars depict the average number of hospitalizations per recipient-year. Recipients with no inpatient claims are imputed as having 0 hospitalizations. Data are from TAF 2016-2020.

Figure 12: Hospitalizations among SSI Recipients by Race/Ethnicity, 2016-2020



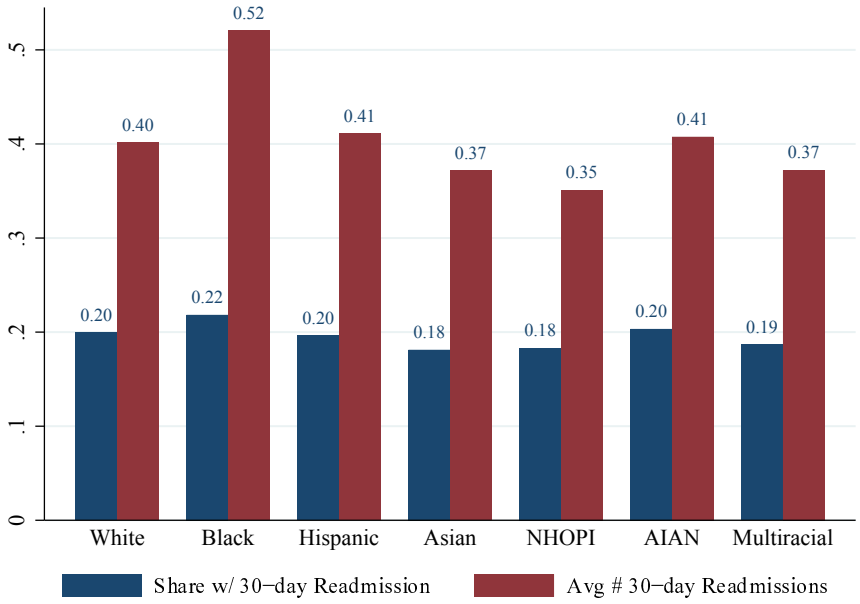
This figure depicts changes in the share of SSI recipients with at least 1 hospitalization by race/ethnicity from 2016-2019. The sample is restricted to recipients aged 18-64 years. Data are from TAF 2016-2020.

Figure 13: Types of Hospitalizations among SSI Recipients by Race/Ethnicity



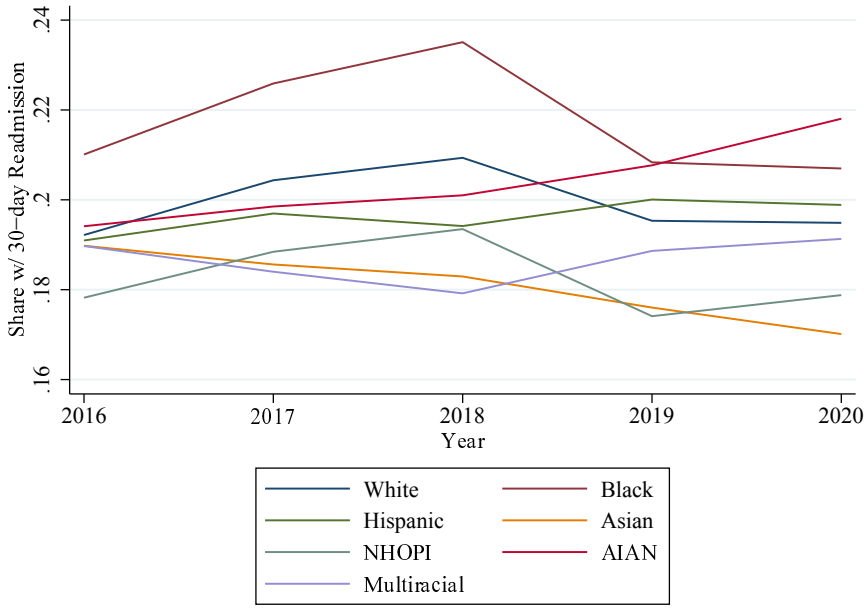
This figure depicts the types of hospitalizations by race/ethnicity for SSI recipients aged 18-64 years. Ambulatory Care Sensitive (ACS) hospitalizations are identified using the Billings algorithm(Billings et al., 1993). Data are from TAF 2016-2020.

Figure 14: 30-Day Readmissions among Hospitalized SSI Recipients by Race/Ethnicity



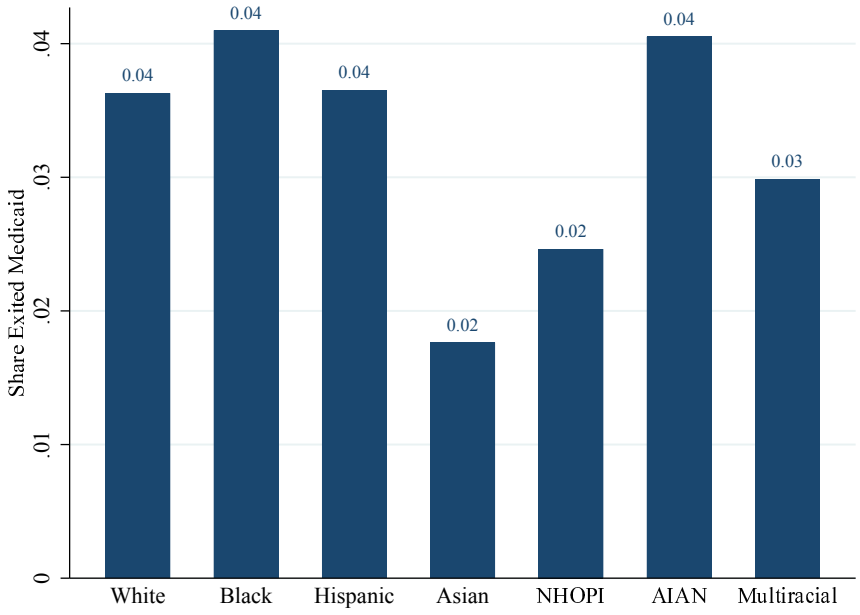
This figure depicts the rate of 30-day readmissions by race/ethnicity among SSI recipients aged 18-64 years. The blue bars represent the share of recipients with at least 1 30-day readmission, while the red bars depict the average number of 30-day readmissions per recipient-year. Depicted results are conditional on a recipient having an initial reported hospitalization. Data are from TAF 2016-2020.

Figure 15: 30-Day Readmissions among Hospitalized SSI Recipients by Race/Ethnicity, 2016-2020



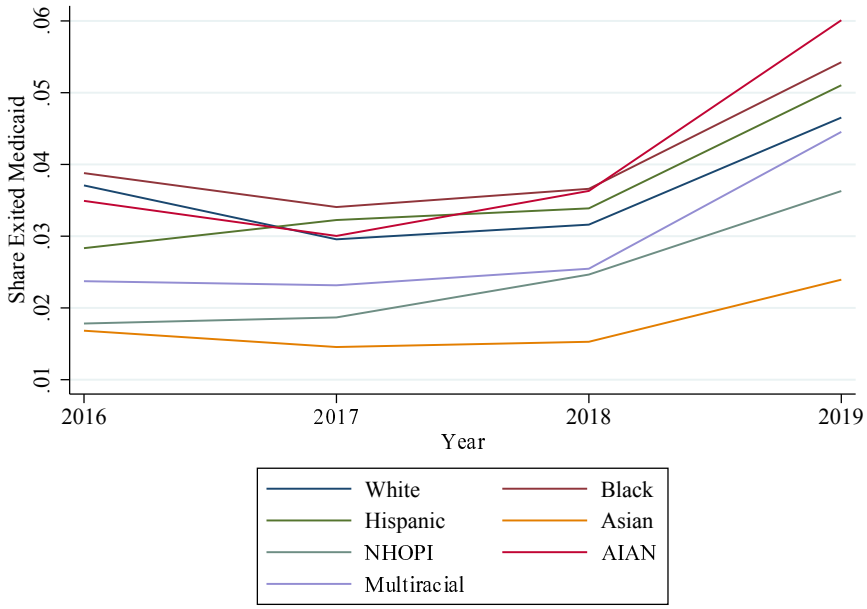
This figure depicts changes in the rate of 30-day readmissions by race/ethnicity among SSI recipients from 2016-2020. The sample is restricted to SSI recipients aged 18-64 years with a reported hospitalization. Data are from TAF 2016-2020.

Figure 16: Medicaid Exit Rates among SSI Recipients by Race/Ethnicity



This figure depicts differences in the rates of Medicaid exit among SSI recipients by race/ethnicity. The sample is restricted to SSI recipients aged 18-64 years. Data is from TAF 2016-2020. Recipients are defined as having exited if they are not present in the demographic and enrollment file of the subsequent year.

Figure 17: Medicaid Exit Rates among SSI Recipients by Race/Ethnicity, 2016-2020



This figure depicts trends in Medicaid exit rates among SSI recipients by race/ethnicity 2016-2020. The sample is restricted to recipients aged 18-64 years. Data is from TAF 2016-2020. Recipients are defined as having exited if they are not present in the demographic and enrollment file of the subsequent year.

3 Aim #2: Adjusted Racial/Ethnic Health Disparities, 2016-2020

Our second aim was to adjust the measured disparities in Aim #1 by SSI recipient age, sex, an indicator for metro county residence, hospital referral region (HRR) of residence, and year effects. The purpose of the adjustment is to determine whether racial/ethnic health disparities persist after controlling for other demographic characteristics and where different racial/ethnic groups live in the United States (e.g., urban vs. rural counties, geographic regions). To complete the adjustment, we estimated ordinary least squares (OLS) models where we regressed each health outcome on the racial/ethnic indicators as well as the adjustment factors listed above. We report the coefficient estimates on the racial/ethnic indicators in table format in this section (where White SSI recipients are the omitted/baseline group). Our sample pools SSI recipients from all states and years, 2016-2020.

Results: We find that our adjusted results are very similar to our unadjusted results. Table 2 shows that AIAN and White SSI recipients continue to exhibit the highest mortality rates. The probability of having 4+ chronic conditions is highest among Hispanic SSI recipients followed by Black and NHOPI recipients. We continue to find the highest rates of diabetes and kidney disease among NHOPI SSI recipients, the highest rates of hypertension and heart failure among Black SSI recipients, the highest rates of COPD among White SSI recipients, and the highest rates of depression among Multiracial and White SSI recipients (Table 3).

Turning to our adjusted results for emergency health care utilization (Tables 4 and 5), we continue to find the highest rates of emergency department (ED) visits among Black and Multiracial SSI recipients, and the highest rates of hospitalizations and readmissions among AIAN and Black SSI recipients. Finally, Table 6 shows that Medicaid churn is still highest among Black and AIAN SSI recipients.

Overall, it is interesting that our adjusted racial/ethnic health disparities are so similar to our unadjusted estimates. The results from Aim #2 suggest that differences in health outcomes and health care utilization across racial ethnic groups in SSI are not the result of differences in the average ages of these recipients or where they live (broadly speaking) in the country.

Table 2: Mortality Rates and Chronic Condition Incidence among SSI Recipients by Race/Ethnicity, 2016-2020

	(1) Mortality Rate	(2) 4+ Chronic Conditions
Black	-0.00459***	0.00555***
	(0.0000960)	(0.000195)
Hispanic	-0.00431***	0.0101***
	(0.000122)	(0.000255)
Asian	-0.00867***	-0.0164***
	(0.000221)	(0.000489)
Native Hawaiian or Pacific Islander	-0.00707***	0.00495***
	(0.000553)	(0.00134)
American Indian or Alaska Native	0.00222***	0.00249***
	(0.000349)	(0.000653)
Multiracial, non-Hispanic	-0.00346***	0.00229
	(0.000742)	(0.00158)
Observations	14245963	14245963
HRR FE	Yes	Yes
Year FE	Yes	Yes
Avg	0.02	0.08

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table depicts adjusted racial/ethnic disparities in mortality rates and 4+ chronic condition incidence among SSI recipients. Data are from TAF 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. Chronic conditions are identified using the Chronic Chronic Conditions Warehouse. Controls for age, age-squared, USDA county classification, gender, and hospital referral region (HRR) and year fixed effects are included. Robust standard errors are included.

Table 3: Specific Chronic Condition Incidence among SSI Recipients by Race/Ethnicity, 2016-2020

	(1) Diabetes	(2) Heart Failure	(3) COPD	(4) Chronic Kidney Disease	(5) Hypertension	(6) Depression
Black	0.0208***	0.0114***	-0.0335***	0.0178***	0.0576***	-0.0461***
	(0.000218)	(0.000135)	(0.000167)	(0.000188)	(0.000259)	(0.000237)
Hispanic	0.0509***	-0.0000653	-0.0355***	0.0235***	0.0267***	-0.00931***
	(0.000307)	(0.000164)	(0.000197)	(0.000257)	(0.000331)	(0.000328)
Asian	0.0427***	-0.0136***	-0.0590***	0.00781***	0.0213***	-0.0452***
	(0.000647)	(0.000294)	(0.000325)	(0.000519)	(0.000683)	(0.000616)
NHOPI	0.0759***	0.00502***	-0.0562***	0.0364***	0.0410***	-0.0494***
	(0.00169)	(0.000897)	(0.000889)	(0.00140)	(0.00173)	(0.00156)
AIAN	0.0231***	0.00178***	-0.0285***	0.0195***	-0.00170*	-0.0422***
	(0.000782)	(0.000430)	(0.000562)	(0.000675)	(0.000812)	(0.000825)
Multiracial, non-Hispanic	0.0158***	0.000507	-0.0213***	0.00842***	0.0151***	0.00702**
	(0.00182)	(0.00107)	(0.00140)	(0.00158)	(0.00204)	(0.00227)
Observations	14245963	14245963	14245963	14245963	14245963	14245963
HRR FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Avg	0.11	0.03	0.06	0.08	0.17	0.13

Standard errors in parentheses

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

This table depicts adjusted racial/ethnic disparities in 6 specific chronic conditions among SSI recipients. Data are from TAF 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. Chronic conditions are identified using the Chronic Chronic Conditions Warehouse. Controls for age, age-squared, USDA county classification, gender, and hospital referral region (HRR) and year fixed effects are included. Robust standard errors are included.

Table 4: ED Visits among SSI Recipients by Race/Ethnicity, 2016-2020

	(1) ED Visit	(2) P(PCT)	(3) P(PCA)	(4) P(Non-PCA)	(5) P(Nonemergent)
Black	0.0546***	0.0593***	0.0226***	0.0711***	0.0709***
	(0.000332)	(0.000691)	(0.000350)	(0.000877)	(0.000630)
Hispanic	0.0222***	0.00751***	0.00192***	0.0109***	0.0154***
	(0.000451)	(0.000850)	(0.000441)	(0.00108)	(0.000788)
Asian	-0.150***	-0.176***	-0.0618***	-0.162***	-0.149***
	(0.000835)	(0.00118)	(0.000642)	(0.00147)	(0.00117)
Native Hawaiian or Pacific Islander	-0.0696***	-0.0992***	-0.0315***	-0.0790***	-0.0860***
	(0.00213)	(0.00333)	(0.00182)	(0.00391)	(0.00323)
American Indian or Alaska Native	0.0264***	0.0310***	0.0164***	0.0484***	0.0369***
	(0.00113)	(0.00207)	(0.00108)	(0.00255)	(0.00189)
Multiracial, non-Hispanic	0.0533***	0.0485***	0.0173***	0.0416***	0.0545***
	(0.00282)	(0.00497)	(0.00257)	(0.00554)	(0.00437)
Observations	14245963	14245962	14245962	14245962	14245962
HRR FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Avg	0.44	0.31	0.10	0.31	0.27

Standard errors in parentheses

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

This table depicts adjusted racial/ethnic disparities in the likelihood of an ED visit, and probabilities of primary care treatable (PCT), primary care avoidable (PCA), non-primary care avoidable (non-PCA), and nonemergent ED visits among SSI recipients. Data are from TAF 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. Probabilities of each ED visit classification are assigned following Johnston et al. (2017). Controls for age, age-squared, USDA county classification, gender, and hospital referral region (HRR) and year fixed effects are included. Robust standard errors are included.

Table 5: Hospitalizations and 30-Day Readmissions among SSI Recipients by Race/Ethnicity, 2016-2020

	(1) Hospitalization	(2) ACS Hospitalization	(3) 30-Day Readmission
Black	0.00182***	0.00154***	0.00455***
	(0.000245)	(0.000109)	(0.000700)
Hispanic	-0.00772***	-0.00295***	-0.0113***
	(0.000322)	(0.000146)	(0.000991)
Asian	-0.0570***	-0.0170***	-0.0344***
	(0.000563)	(0.000239)	(0.00230)
Native Hawaiian or Pacific Islander	-0.0289***	-0.00596***	-0.0178***
	(0.00143)	(0.000659)	(0.00493)
American Indian or Alaska Native	0.0324***	0.00870***	0.0151***
	(0.000875)	(0.000426)	(0.00225)
Multiracial, non-Hispanic	0.0148***	0.00191*	-0.00399
	(0.00204)	(0.000945)	(0.00579)
Observations	14245962	14245962	2129669
HRRFE	Yes	Yes	Yes
YearFE	Yes	Yes	Yes
Avg	0.15	0.03	0.21

Standard errors in parentheses

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

This table depicts adjusted racial/ethnic disparities in hospitalizations, ambulatory care sensitive (ACS) hospitalizations, and 30-day readmissions among SSI recipients. Data are from TAF 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. ACS hospitalizations are identified following Billings et al. (1993). 30-day readmissions are conditional on a recipient having a reported hospitalization. Controls for age, age-squared, USDA county classification, gender, and hospital referral region (HRR) and year fixed effects are included. Robust standard errors are included.

Table 6: Medicaid Exit among SSI Recipients by Race/Ethnicity, 2016-2020

	(1) Avg Medicaid Exit
Black	0.000386**
	(0.000150)
Hispanic	0.000155
	(0.000195)
Asian	-0.00394***
	(0.000284)
Native Hawaiian or Pacific Islander	-0.00140
	(0.000764)
American Indian or Alaska Native	0.00193***
	(0.000512)
Multiracial, non-Hispanic	0.000467
	(0.00121)
Observations	10683423
HRR FE	Yes
Year FE	Yes
Avg	.040

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This table depicts adjusted racial/ethnic disparities in Medicaid exits among SSI recipients. Data are from TAF 2016-2020. The sample is restricted to SSI recipients aged 18-64 years. Recipients who are not present in the subsequent year's demographic and enrollment file are considered to have exited Medicaid. Controls for age, age-squared, USDA county classification, gender, and hospital referral region (HRR) and year fixed effects are included. Robust standard errors are included.

4 Aim #3: COVID-19 cases, COVID-19 mortality, and Excess Mortality Estimates by Race/Ethnicity

Our third aim was to examine racial/ethnic disparities in COVID-19-related health outcomes in the SSI population. We focused on three outcomes: COVID-19 cases, COVID-19-related mortality, and excess mortality rates by race/ethnicity. To measure (documented) COVID-19 cases, we flagged outpatient, inpatient, and long-term care claims that included the ICD-10 codes B97.29 (Other coronavirus, 01/01/20 - 04/01/20) and U07.1 (2019 Novel Coronavirus, 04/01/20 - Present). A SSI recipient was coded as having COVID-19 if they had a health care claim with at least one of these codes. To compute COVID-19-related deaths, we classified a death as "COVID-related" if the decedent had a COVID-19 diagnosis within 30-days of the date-of-death. To compute the "excess death" rate, we subtracted the total number of SSI recipient deaths in 2019 from the total number of SSI recipient deaths in 2020, and divided by the number of deaths in 2019.

Results: Using outpatient, inpatient, and long-term care records, Figure 18 shows that Hispanic SSI recipients were the most likely to receive a COVID-19 diagnosis in either an outpatient, inpatient, or long-term care setting in 2020. 5.4% of Hispanic SSI recipients received a COVID-19 diagnosis in 2020,

while 5% of NHOPI SSI recipients received a COVID-19 diagnosis and 4.7% of AIAN SSI recipients received a COVID-19 diagnosis. The lowest rates of COVID-19 diagnoses were observed among White (2.8%), Black (3.6%), and Asian (3.6%) SSI recipients.[1]

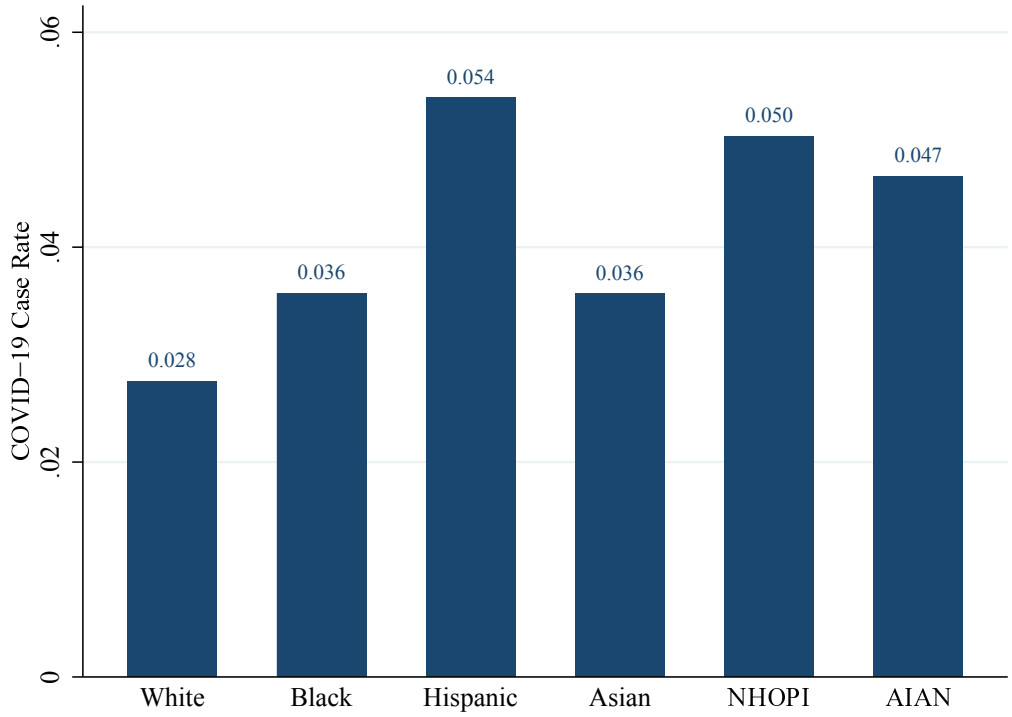
Next we impute deaths in the SSI population that were likely related to COVID by using the date-of-death on the SSI recipient's Medicaid record in conjunction with recent COVID-19 diagnoses in outpatient, inpatient, or long-term care settings. We define a "COVID-19 related death" as one that occurred within 30 days of receiving a COVID-19 diagnosis on any health care claim. Our results for these imputed deaths appear in Figure 19. We find imputed COVID-19 deaths are highest among White and AIAN SSI recipients (2.4% and 2.2%, respectively). The result for White SSI recipients is particularly interesting because they were the least likely to be diagnosed with COVID-19, but they are the most likely to die within 30-days of a diagnosis. Asian SSI recipients were the least likely to die following a COVID-19 diagnosis (1.5%).

Finally, we calculate excess mortality rates by race/ethnicity by subtracting the number of deaths per racial/ethnic group in 2019 from the number of deaths in that group in 2020, and dividing by the total number of SSI recipients in that group in 2019. Not surprisingly, we find excess mortality rates are positive for all groups, indicating that there were more deaths due to any cause in 2020 compared to 2019 (Figure 20). We observe the largest excess mortality rate among Hispanic SSI recipients (43.4%) followed by AIAN SSI recipients (35.6%). We observe the lowest excess mortality rates among White (17.6%) and NHOPI (7.8%) SSI recipients.

Taken together, the results in this section suggest that Hispanic SSI recipients were the most likely to be diagnosed with COVID-19, White SSI recipients were the most likely to die following a COVID-19 diagnosis, but Hispanic SSI recipients had the highest excess mortality. One interpretation is that COVID-19 case rates may have been under-diagnosed for Hispanic SSI recipients. Another interpretation is that, although COVID-19-related deaths were very high among White SSI recipients, White SSI recipients had higher baseline mortality in 2019 than Hispanic SSI recipients, so their excess mortality rate in 2020 was lower. Besides Hispanic and White SSI recipients, AIAN SSI recipients also faced very high COVID-19 burdens as measured by case rates, death rates, and excess death rates.

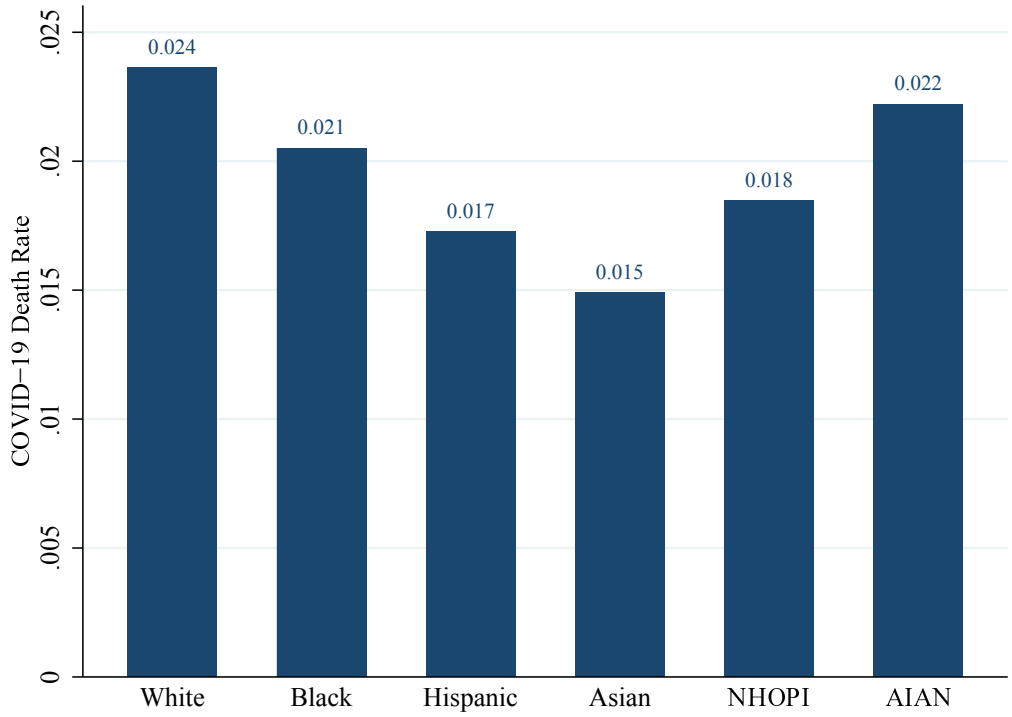
[1]In this section, we combined Multiracial SSI recipients with Black SSI recipients because we discovered that the number of Multiracial SSI recipients increased considerably in 2020 compared to 2019.

Figure 18: Total COVID-19 Cases among SSI Recipients, 2020



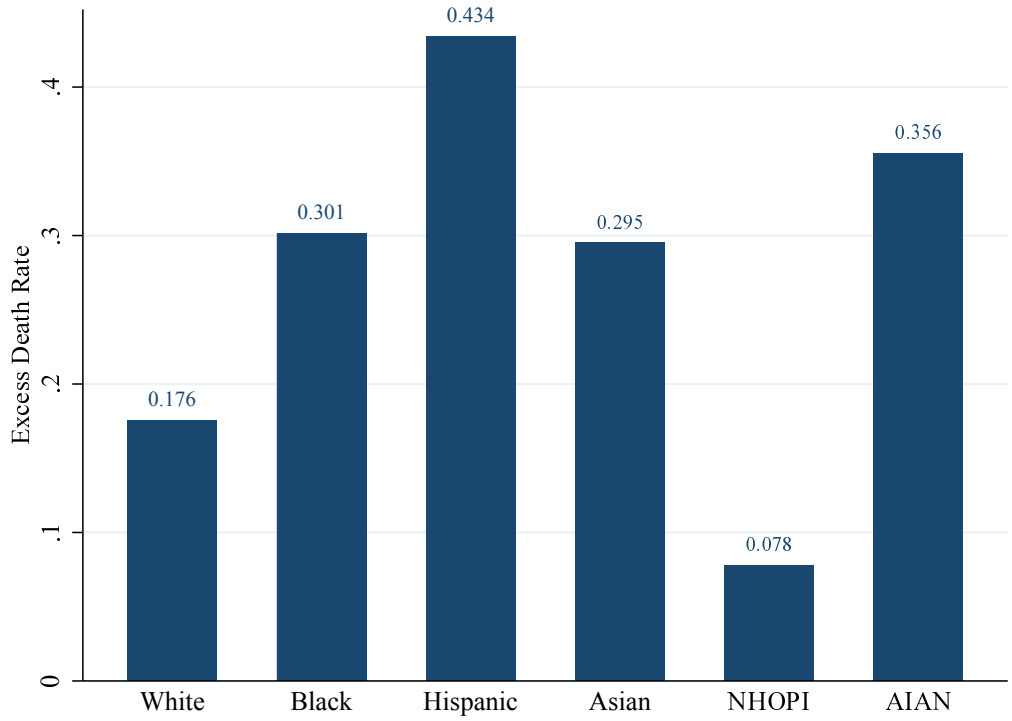
This figure depicts the share of SSI recipients of each race with a identified COVID-19 diagnosis in either inpatient (IP), long-term care (LTC), or other (OT) claims respectively. Data are from TAF 2020. The sample is restricted to SSI recipients aged 18-64 years. Recipients are considered to have a COVID-19 case if they report a COVID-19 ICD-10 code (B97.29 before 04/01/20, U07.1 after 04/01/20) for any diagnosis code.

Figure 19: Total Imputed COVID-19 Deaths among SSI Recipients, 2020



This figure depicts the COVID-19 deaths among SSI recipients of each race. Data are from TAF 2020. The sample is restricted to SSI recipients aged 18-64 years. Recipients are considered to have a COVID-19 case if they report a COVID-19 ICD-10 code (B97.29 before 04/01/20, U07.1 after 04/01/20) for any diagnosis code. Recipients are considered to have died from COVID-19 if they report one of these COVID-19 ICD-10 diagnosis code in 2020 OT, IP, or LT claims within 30 days of their death date.

Figure 20: Excess Deaths among SSI Recipients w/ Restricted Date, 2019 vs 2020



This figure depicts the number of excess deaths in 2020 relative to 2019 by race/ethnicity among SSI recipients. Data are from TAF 2019-2020. The sample is restricted to SSI recipients aged 18-64 years. Excess deaths are calculated by subtracting the number of deaths in 2019 from the number of 2020 deaths. Only deaths after 04/01 are counted for each year.

5 Discussion

Many of our results in this report square with the literature on racial/ethnic health disparities in the US population more generally. For example, we find higher rates of hypertension and heart failure among Black SSI recipients compared to other racial/ethnic groups (Boustan and Margo, 2014; Hicken et al., 2014; Morenoff et al., 2007). We also find the highest rates of diabetes and chronic kidney disease among NHOPI and Hispanic groups (Davis et al., 2017; Uchima et al., 2019). White SSI recipients are the most likely to be diagnosed with depression (McGuire and Miranda, 2008; Zuvekas and Fleishman, 2008). In our COVID-19 analysis, we find the highest COVID-19 case rates and excess death rates among Hispanic and AIAN SSI recipients, consistent with a literature that has found high COVID-19 death rates among Hispanic and AIAN individuals (Alsan et al., 2021; Song et al., 2021; Polyakova et al., 2021; Benitez et al., 2020; Rubin-Miller et al., 2020; Slutske et al., 2023; Hill and Artiga, 2022).

One significant advantage of our study compared to the existing literature is that all SSI recipients enroll in Medicaid, and therefore, they have minimal out-of-pocket expenditures when they seek health care. Thus, the rates of chronic conditions observed in our sample may better reflect the true underlying health of these racial/ethnic groups. In contrast, in the general population of adults ages 18-64, the measured incidence of chronic conditions tends to conflate the actual presence of the chronic condition with the financial barriers that people face when trying to access care and receive a diagnosis.

Therefore, it is striking that many of our results for chronic conditions are largely consistent with the existing literature.

However, our results for mortality rates in the SSI population diverge somewhat from the existing literature on adults in the U.S. more broadly. We find the highest mortality rates among AIAN (consistent with the literature) and White (inconsistent with the literature) SSI recipients. One hypothesis that we hope to explore in future work is whether White SSI recipients exhibit higher rates of substance abuse disorders (SUDs) and mental illness compared to other racial/ethnic groups in SSI. This is a plausible hypothesis given that we find White SSI recipients have the highest rates of depression, COPD, and lung cancer. In future research, it would be useful to subtract deaths related to SUDs from overall deaths and re-calculate the mortality rates across racial/ethnic groups within SSI. Those results might better reflect the existing literature, which shows that AIAN and Black individuals are in worse health and have lower life expectancies than White individuals (Dwyer-Lindgren et al., 2022; Cullen et al., 2012; Gorzig et al., 2022). Such a result would also be consistent with our finding that emergency health care utilization (ED visits, hospitalizations, readmissions) is highest among AIAN and Black SSI recipients, which suggests that AIAN and Black individuals are in the poorest health and require emergency care.

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