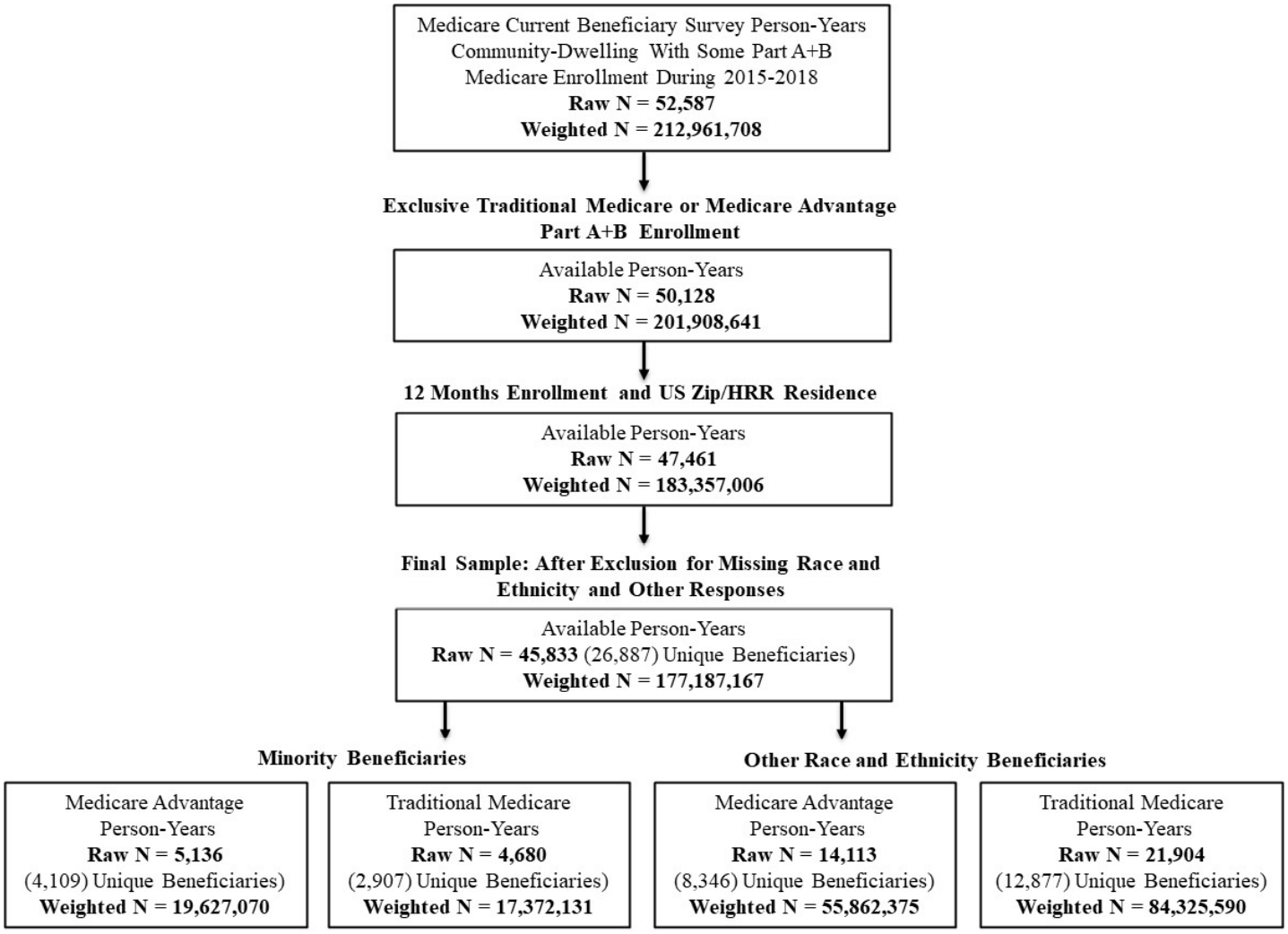
Supplemental Online Content

Johnston KJ, Hammond G, Meyers DJ, Joynt Maddox KE. Association of race and ethnicity and Medicare program type with ambulatory care access and quality measures. *JAMA*. Published August 17, 2021. doi:10.1001/jama.2021.10413

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

eFigure. Study Sample Selection Flowchart



In the bottom boxes, some individuals appear in the data set in multiple years, and some are in traditional Medicare in one year and in Medicare Advantage the next year. Thus, these individuals appear in both Medicare program boxes in the unique beneficiaries count.

eTable 1. Comparing Medicare Beneficiaries Included Versus Excluded From Study Sample, 2015-2018

	Study Sample Beneficiaries[a]		Excluded Beneficiaries[b]	P-Value[c]
Total Number of Patient Years, Unweighted, N	**45,833**		**6,754**	**--**
Total Number of Patient Years, Weighted, N[d]	**177,187,167**		**35,774,542**	**--**
Demographic Characteristics		**N =**		
Age in Years, *MEAN (SD)*	71.3 (11.2)	6,754	68.5 (10.5)	<.001
Sex				
Male	44.6%		47.2%	0.001
Female	55.4%		52.8%	
Race and Ethnicity				
Minority	20.9%	6,394	25.9%	<.001
Other	79.1%		74.1%	
Annual Income, *MEAN (SD)*	52,691 (88,351)	6,754	51,007 (62,252)	0.252
Education				
No High School or College Education	16.6%		19.0%	<.001
High School / Some College Education	57.8%		56.2%	0.060
College / Graduate School Education	25.7%		24.8%	0.311
Lives Alone	29.6%	5,675	25.3%	<.001
Rural	21.2%	6,309	19.4%	0.036
Urban	78.8%		80.6%	
Medicare Advantage Market Penetration Rate	33.1%	6,742	34.7%	<.001
Medicare Program				
Enrolled in Medicare Advantage	42.6%	6,754	59.3%	<.001
Enrolled in Traditional Medicare	57.4%		40.7%	
Months Enrolled, *MEAN*	12.0		9.6	<.001
Current Medicare Entitlement Status				
Aged	85.5%		81.3%	<.001
Disabled	14.4%		18.5%	<.001
End-Stage Renal Disease	0.8%		1.3%	0.001
Medicaid Dual Enrollment	17.8%		23.4%	<.001
Health Status				
Poor Self-Rated Health	22.9%	4,272	28.9%	<.001
ADLS with Difficulty/Can't Do, (0-6), *MEAN (SD)*	0.68 (1.34)		0.78 (1.16)	0.007
IADLs with Difficulty/Can't Do, (0-6), *MEAN (SD)*	0.83 (1.44)		0.85 (1.18)	0.383
Diabetes	33.0%	4,894	34.0%	0.354
Heart Failure	7.3%		7.3%	0.908
Ischemic Heart Disease	16.1%		15.9%	0.823
COPD/Asthma	20.5%		22.0%	0.068

Depression	26.7%		30.0%	0.001
Died During Year	0.3%	6,754	16.2%	<.001
Ambulatory Care Access (Study N=41,757)				
Usual Source of Care	92.0%		87.4%	<.001
Usual Source of Care is PCP	81.7%	3,510	75.9%	<.001
Specialist Visit	54.1%		48.4%	<.001
Ambulatory Care Quality				
Influenza Vaccination (Study N=41,470)	71.7%	4,618	63.2%	<.001
Pneumonia Vaccination (Study N=38,829)	76.7%	4,244	65.9%	<.001
Colon Cancer Screening[e] (Study N=40,962)	64.3%	3,607	64.0%	0.832

Abbreviations: N, number; ADLs, activities of daily living; IADLs, instrumental ADLs; COPD, chronic obstructive pulmonary disease; PCP, primary care clinician; MCBS, Medicare Current Beneficiary Survey.

[a]Medicare beneficiaries living in the community in a U.S. zip code and Hospital Referral Region with at least 1-calendar-year excusive continuous enrollment in Medicare Advantage (MA) or Traditional Medicare (TM) benefits and completed the annual survey round in the MCBS.

[b]Medicare beneficiaries living in the community with at least 1-month enrollment in MA and/or TM benefits.
[c]P-value on the Wald Test of significance, equivalent to the F-statistic for continuous variables and the Chi-squared statistic for categorical variables.

[d]Weighted estimates from the 2015-18 MCBS using cross-sectional weights accounting for the overall annual selection probability of each person sampled and including adjustments for the stratified sampling design, survey nonresponse, and coverage error.

[e]Fecal occult blood test at home or doctor's office or colonoscopy or sigmoidoscopy within past 5 years, excluding patients who self-reported having colon cancer or were under age 45.

eTable 2. Characteristics of Study Sample Beneficiaries by Race and Ethnicity, 2015-2018

	Minority				Other	
	Black	**Hispanic**	**Native American**	**Asian / Pacific Islander**	**White**	**Multiracial**
Total Number of Patient Years, Unweighted, N	**4,568**	**4,049**	**476**	**723**	**34,835**	**1,182**
Total Number of Patient Years, Weighted, N[a]	**17,131,192**	**14,124,098**	**1,735,531**	**4,008,380**	**135,260,656**	**4,927,309**
Demographic Characteristics						
Age in Years, *MEAN (SD)*	68.0 (13.4)	69.6 (12.6)	68.0 (12.0)	71.2 (9.0)	72.0 (10.7)	68.4 (11.4)
Sex						
Male	41.0%	43.6%	49.6%	43.8%	45.0%	47.5%
Female	59.0%	56.4%	50.4%	56.2%	55.0%	52.5%
Annual Income, *MEAN (SD)*	29,355 (34,888)	33,063 (55,053)	27,520 (27,984)	48,470 (56,464)	58,347 (96,706)	47,125 (49,592)
Education						
No High School or College Education	30.5%	46.9%	37.7%	20.2%	11.3%	16.7%
High School / Some College Education	58.1%	41.1%	55.4%	39.6%	59.8%	64.0%
College / Graduate School Education	11.4%	12.0%	6.9%	40.1%	28.9%	19.2%
Lives Alone	34.7%	24.1%	24.0%	14.2%	30.1%	28.1%
Rural	16.1%	6.7%	53.4%	3.1%	23.4%	22.8%
Urban	83.9%	93.3%	46.6%	96.9%	76.6%	77.2%
Medicare Advantage Market Penetration Rate	32.7%	39.9%	26.4%	37.0%	32.4%	32.4%
Medicare Program						
Medicare Advantage	51.1%	60.1%	35.4%	44.0%	39.8%	42.0%
Traditional Medicare	48.9%	39.9%	64.6%	56.0%	60.2%	58.0%
Current Medicare Entitlement Status						
Aged	73.4%	81.0%	78.5%	89.5%	87.8%	78.6%
Disabled	26.5%	18.6%	21.5%	10.3%	12.1%	21.3%
End-Stage Renal Disease	2.5%	1.8%	1.8%	1.2%	0.4%	0.4%
Medicaid Dual Enrollment	38.4%	43.0%	35.8%	31.1%	11.8%	22.4%

Health Status						
Poor Self-Rated Health	33.8%	37.4%	37.0%	23.2%	19.5%	30.4%
ADLS with Difficulty/Can't Do, (0-6), *MEAN (SD)*	0.92 (1.55)	0.93 (1.66)	1.01 (1.60)	0.61 (1.11)	0.62 (1.26)	1.00 (1.55)
IADLs with Difficulty/Can't Do, (0-6), *MEAN (SD)*	1.10 (1.64)	1.16 (1.78)	1.16 (1.69)	0.98 (1.37)	0.74 (1.36)	1.11 (1.63)
Diabetes	43.5%	45.5%	41.9%	43.5%	29.6%	39.8%
Heart Failure	11.2%	6.3%	9.0%	2.5%	6.9%	9.3%
Ischemic Heart Disease	14.2%	16.1%	17.1%	11.4%	16.3%	20.5%
COPD/Asthma	18.8%	18.7%	26.2%	12.3%	20.8%	29.7%
Depression	23.9%	34.0%	33.5%	16.9%	26.2%	33.0%
Access						
Usual Source of Care, %	88.9%	90.1%	90.3%	91.2%	92.7%	89.1%
Usual Source of Care is PCP, %	73.0%	78.7%	78.5%	79.0%	83.5%	76.5%
Specialist Visit, %	38.8%	43.1%	44.9%	39.9%	58.0%	47.1%
Quality						
Influenza Vaccination	59.8%	71.4%	66.1%	75.0%	74.8%	66.6%
Pneumonia Vaccination	64.7%	68.9%	73.8%	68.4%	78.6%	74.6%
Colon Cancer Screening[b]	65.6%	67.2%	62.5%	61.6%	63.9%	65.4%

Abbreviations: N, number; PCP, primary care clinicians; ADLs, activities of daily living; IADLs, instrumental ADLs; COPD, chronic obstructive pulmonary disease; MCBS, Medicare Current Beneficiary Survey; Asian/Pacific Islander includes Hawaiian.

[a]Weighted estimates from the 2015-18 MCBS using cross-sectional weights accounting for the overall annual selection probability of each person sampled and including adjustments for the stratified sampling design, survey nonresponse, and coverage error.

[b]Fecal occult blood test at home or doctor's office or colonoscopy or sigmoidoscopy within past 5 years, excluding patients who self-reported having colon cancer or were under age 45.

eTable 3. Association of Black Versus White Race With Ambulatory Care Access and Quality in Medicare Advantage and Traditional Medicare, 2015-2018

		Unadjusted Results			Adjusted Regression Results[b]
	Sample Size[a] N=	Black	White	Absolute Difference (95% CI)	Marginal Difference of Black vs. White (95% CI)
Access in Medicare Advantage					
Usual Source of Care, %[c]	14,439	90.4	94.2	-3.8 (-6.1, -1.5)	-2.6 (-4.5, -0.6)
Usual Source of Care is PCP, %	14,439	75.7	86.0	-10.3 (-13.9, -6.8)	-5.4 (-7.4, -3.4)
Specialist Visit, %	14,439	39.0	57.9	-18.9 (-22.5, -15.2)	-15.3 (-18.9, -11.6)
Quality in Medicare Advantage					
Influenza Vaccination[c]	14,452	62.0	75.1	-13.1 (-16.8, -9.5)	-8.3 (-12.4, -4.3)
Pneumonia Vaccination[c]	13,579	69.2	80.5	-11.3 (-15.2, -7.5)	-5.9 (-9.9, -1.9)
Colon Cancer Screening[c,d]	14,691	68.3	67.1	1.2 (-2.2, 4.6)	4.6 (1.2, 8.1)
Access in Traditional Medicare					
Usual Source of Care, %	21,523	87.3	91.8	-4.4 (-6.7, -2.2)	-0.7 (-1.8, 0.5)
Usual Source of Care is PCP, %	21,523	70.1	81.8	-11.7 (-15.9, -7.5)	-6.4 (-8.9, -3.9)
Specialist Visit, %	21,523	38.6	58.1	-19.5 (-23.3, -15.7)	-13.4 (-16.8, -10.0)
Quality in Traditional Medicare					
Annual Flu Shot	21,281	56.4	72.7	-16.3 (-20.7, -11.9)	-9.0 (-12.9, -5.1)
Influenza Vaccination	19,982	61.5	78.1	-16.6 (-20.2, -13.0)	-7.4 (-10.8, -4.0)
Colon Cancer Screening[c,d]	20,672	62.6	61.8	0.8 (-2.7, 4.3)	5.3 (2.2, 8.5)

Abbreviations: N, number; CI, confidence interval; PCP, primary care clinician.
[a]Met baseline study inclusion and exclusion criteria in Table 1 and responded to MCBS questions for outcome variables. Reporting unweighted sample sizes.
[b]We estimated multivariable logistic regression models for each outcome that also adjusted for the characteristics listed in Table 1. We added fixed effects for the Dartmouth Hospital Referral Regions that beneficiaries resided in to control for market-level differences in supply of medical services, clinician practice intensity, and coding intensity. We included year fixed effects to control for secular trend and adjusted our p-values for the complex survey design of the MCBS and intra-person correlation over time. We used Stata's Margins command to report marginal differences as the change in the mean probability of the outcome variable associated with Black vs. White race.
[c]We estimated a linear probability model because the logistic regression model would not converge.
[d]Fecal occult blood test at home or doctor's office or colonoscopy or sigmoidoscopy within past 5 years, excluding patients who self-reported having colon cancer or are under age 45.

eTable 4. Association of Medicare Advantage vs. Traditional Medicare With Ambulatory Care Access and Quality by Beneficiary Black and White Race, 2015-2018

		Unadjusted Results			Adjusted Regression Results[b]
	Sample Size[a] N=	Medicare Advantage	Traditional Medicare	Absolute Difference (95% CI)	Marginal Difference of Medicare Advantage vs. Traditional Medicare (95% CI)
Access in Black Beneficiaries					
Usual Source of Care, %	4,172	90.4	87.3	3.1 (0.1, 6.0)	0.4 (-0.5, 1.3)
Usual Source of Care is PCP, %	4,172	75.7	70.1	5.6 (0.9, 10.2)	3.8 (-0.5, 8.0)
Specialist Visit, %	4,172	39.0	38.6	0.4 (-3.9, 4.6)	-0.8 (-5.0, 3.5)
Quality in Black Beneficiaries					
Influenza Vaccination	4,123	62.0	56.4	5.5 (0.7, 10.4)	5.1 (0.5, 9.8)
Pneumonia Vaccination[c]	3,737	69.2	61.5	7.7 (3.2, 12.3)	5.3 (1.2, 9.5)
Colon Cancer Screening[c,d]	3,620	68.3	62.6	5.7 (1.8, 9.5)	3.9 (-0.3, 8.0)
Access in White Beneficiaries					
Usual Source of Care, %	31,790	94.2	91.8	2.4 (1.4, 3.5)	1.4 (0.8, 2.0)
Usual Source of Care is PCP, %	31,790	86.0	81.8	4.2 (2.3, 6.1)	1.4 (0.8, 2.0)
Specialist Visit, %	31,790	57.9	58.1	-0.3 (-2.4, 1.9)	-0.5 (-2.2, 1.3)
Quality in White Beneficiaries					
Influenza Vaccination	31,610	75.1	72.7	2.4 (0.8, 4.0)	2.1 (0.8, 3.5)
Pneumonia Vaccination	29,824	80.5	78.1	2.4 (0.9, 4.0)	1.6 (0.1, 3.0)
Colon Cancer Screening[c,d]	31,743	67.1	61.8	5.3 (3.6, 7.0)	4.4 (3.1, 5.8)

Abbreviations: N, number; CI, confidence interval; PCP, primary care clinician.

[a]Met baseline study inclusion and exclusion criteria in Table 1 and responded to MCBS questions for outcome variables. Reporting unweighted sample sizes.[b]We estimated multivariable logistic regression models for each outcome that also adjusted for the characteristics listed in Table 1. We added fixed effects for the Dartmouth Hospital Referral Regions that beneficiaries resided in to control for market-level differences in supply of medical services, clinician practice intensity, and coding intensity. We included year fixed effects to control for secular trend and adjusted our p-values for the complex survey design of the MCBS and intra-person correlation over time. We used Stata's Margins command to report marginal differences as the change in the mean probability of the outcome variable associated with Medicare Advantage vs. Traditional Medicare enrollment.

[c]We estimated a linear probability model because the logistic regression model would not converge.

[d]Fecal occult blood test at home or doctor's office or colonoscopy or sigmoidoscopy within past 5 years, excluding patients who self-reported having colon cancer or are under age 45.

eTable 5. Association of Medicare Advantage vs. Traditional Medicare With Differences in Access and Quality for Black vs. White Race Beneficiaries, 2015-2018

			Adjusted Regression Results for Interaction
	Sample Size[a] N=	Outcome Variable Mean	Marginal Difference of Medicare Advantage AND Black[b] (95% CI)
Association with Access Differences			
Usual Source of Care, %	35,962	92.3	-0.7 (-2.5, 1.1)
Usual Source of Care is PCP, %	35,962	82.3	-0.3 (-3.9, 3.4)
Specialist Visit, %	35,962	55.8	-1.2 (-6.0, 3.6)
Association with Quality Differences			
Influenza Vaccination	35,733	72.1	1.0 (-3.2, 5.2)
Pneumonia Vaccination	33,561	77.6	1.3 (-2.2, 4.9)
Colon Cancer Screening[d]	35,363	64.1	0.1 (-4.0, 4.1)

Abbreviations: N, number; CI, confidence interval; PCP, primary care clinician.

[a]Met baseline study inclusion and exclusion criteria in Table 1 and responded to MCBS questions for outcome variables. Reporting unweighted sample sizes.

[b]We estimated multivariable logistic regression models for each outcome that also adjusted for the characteristics listed in Table 1. We added fixed effects for the Dartmouth Hospital Referral Regions that beneficiaries resided in to control for market-level differences in supply of medical services, clinician practice intensity, and coding intensity. We included year fixed effects to control for secular trend and adjusted our p-values for the complex survey design of the MCBS and intra-person correlation over time. We used Stata's Margins command to report marginal differences as the change in the mean probability of the outcome variable associated with the interaction of Medicare Advantage and Black vs. Traditional Medicare and White race. We estimated the percentage difference as the marginal difference divided by the outcome variable sample mean.

[c]Fecal occult blood test at home or doctor's office or colonoscopy or sigmoidoscopy within past 5 years, excluding patients who self-reported having colon cancer or are under age 45. We estimated a linear probability model for colon cancer screening because the logistic regression model would not converge.