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Physicians' Participation In ACOs Is Lower In Places With Vulnerable Populations Than In More Affluent Communities

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ABSTRACT Early evidence suggested that accountable care organizations (ACOs) could improve health care quality while constraining costs, and ACOs are expanding throughout the United States. However, if disadvantaged patients have unequal access to physicians who participate in ACOs, that expansion may exacerbate health care disparities. We examined the relationship between physicians' participation in both Medicare and commercial ACOs across the country and the sociodemographic characteristics of their likely patient populations. Physicians' participation in ACOs varied widely across hospital referral regions, from nearly 0 percent to over 85 percent. After we adjusted for individual physician and practice characteristics, we found that physicians who practiced in ZIP Code Tabulation Areas where a higher percentage of the population was black, living in poverty, uninsured, or disabled or had less than a high school education—compared to other areas—had significantly lower rates of ACO participation than other physicians. Our findings suggest that vulnerable populations' access to physicians participating in ACOs may not be as great as access for other groups, which could exacerbate existing disparities in health care quality.

An accountable care organization (ACO) is a network of doctors—often including one or more hospitals as well—whose members share financial and medical responsibility for providing coordinated care to patients, with the goals of improving care quality and limiting unnecessary spending. ACOs are becoming increasingly common in the United States: At least 744 of them have been formed since 2011.¹ Between Medicare and the commercial (or private) sector, an estimated 23.5 million Americans are now being served by an ACO.¹ Early evidence from both Medicare and commercial ACO initiatives shows that ACOs have succeeded in improving the quality of care and patient experience and, in some cases, constraining costs.^{2–7}

While enthusiasm for ACOs is growing, some stakeholders warn of possible unintended consequences. In particular, there are concerns that ACOs may worsen existing disparities in health care quality.^{8–10} Historically, the care of vulnerable patients—those at increased risk of ill health because of sociodemographic factors—has been concentrated among relatively few providers, who tend to have fewer financial and health care resources and perform worse on most traditional quality metrics, compared to providers serving more affluent populations.^{8–14} If ACO participation is linked to improved care quality, and vulnerable patients have less access than other patients to physicians participating in ACOs, existing disparities may increase. Indeed, early evidence suggests that ACOs tend to be located in areas of the country with lower poverty rates

than areas without ACOs¹⁵ and that patients covered under early Medicare ACO contracts had higher incomes and were less likely to be black, covered under Medicaid, or disabled, compared to patients not covered under these early contracts.¹⁶

These early findings are only part of the story. Previous work has focused on the earliest ACOs (those established by 2012) and, in some cases, only Medicare ACOs.^{15,16} Early participants in ACOs and Medicare ACOs may vary systematically from later participants and those in commercial ACOs, so it is unknown how generalizable these early findings are. More important, it is unknown whether—within a region where ACOs have begun to form—physicians serving populations with a larger proportion of vulnerable patients are less likely than those serving populations with a smaller proportion of such patients to participate in an ACO. If this were the case, it might suggest that such physicians are being systematically excluded from ACOs.

Evidence is needed to better understand how differences in physician ACO participation may affect health care disparities. We used a national data set of US physicians to examine whether physicians' ACO participation is related to the sociodemographic characteristics of the population in their practices' region, and whether a similar relationship exists within even smaller geographic areas.

Study Data And Methods

DATA The unit of analysis in our study was the physician. We used a telephone-verified database of US office-based physicians that included information about their participation in an ACO (public or commercial). The database is continuously updated by SK&A, a private marketing company. We used data collected during 2013.

These data have been shown to be a nearly complete sample frame of all US office-based physicians.¹⁷ However, we investigated their completeness by using National Provider Identifiers and last names to match them to data in the Physician and Other Supplier Public Use File of the Centers for Medicare and Medicaid Services (CMS).

We found that 81.6 percent of physicians in the Medicare file were also in the SK&A data. Compared to physicians in both data sets, those who were only in the Medicare file treated fewer unique beneficiaries annually (359 versus 500), received less in annual Medicare payments (\$57,467.39 versus \$137,895.40), and submitted fewer claims annually (1,074 versus 3,631). Physicians who were only in the Medicare file were evenly distributed geographically; in no

state did the SK&A data match less than 70 percent of Medicare physicians. Of the physicians in the SK&A data, 83.4 percent were also in the Medicare file. Previous comparisons of SK&A data with those in the American Medical Association's Physician Masterfile and in the American Community Survey found similar total numbers of physicians by specialty across the three data sets.¹⁸

We identified each physician's ZIP Code Tabulation Area and used summary statistics for that area from the American Community Survey for the period 2009–13 as a proxy for the sociodemographic characteristics of the population that the physician was likely to care for. These areas overlap substantially with ZIP codes and are identical in the case of many residents. For physicians with multiple practice locations, we used the location with the highest patient volume reported by SK&A.

VARIABLES Our main dependent variable in all analyses was whether or not a physician participated in an ACO. Our main independent variables were the following sociodemographic characteristics at the level of the ZIP Code Tabulation Area: the percentages of the population that had less than a high school education and that were black, Hispanic, living in poverty, uninsured, or disabled.

We included the following physician-level variables: sex, number of physicians in the practice, whether or not the practice was multispecialty, rurality of the practice location, and medical specialty (medical specialties, primary care, surgery, or hospital specialties).¹⁹ We calculated the number of physicians in the practice by using the largest organizational level present in the data, whether that was integrated health system, physician group, or physician office.¹⁷ We defined rurality of the practice location using Rural-Urban Commuting Area codes, classified into four categories.²⁰ We summarized the characteristics of the physicians overall and by whether or not they participated in an ACO.

We estimated physicians' ACO participation at the level of the hospital referral region (HRR) because these 306 regions reflect markets for tertiary hospital care and are representative of all health care markets.²¹ In addition, preliminary analyses at the level of the ZIP Code Tabulation Area revealed that variations in ACO penetration largely followed HRR boundaries. Each HRR is a collection of unique ZIP Code Tabulation Areas. Each physician was assigned to an HRR based on the area in which he or she practiced. We then determined the percentages of physicians within each HRR who participated in an ACO.

We included HRR-level health system variables

to describe health resources in HRRs with varying physician ACO participation rates. These variables included the supplies of primary care and medical specialist physicians and of acute care hospital beds; Medicare beneficiaries' primary care visit rates; and the percentage of beneficiaries with diabetes who received a hemoglobin A1c test in 2013.^{22–24}

We sorted HRRs into quartiles based on physicians' ACO participation and weighted by population, so that each quartile represented roughly one-quarter of the US population. We then described the population and health system characteristics across quartiles.

REGRESSION ANALYSES We performed multivariate linear regressions to examine the association between population-level sociodemographic characteristics of physicians' practice locations and rates of physician ACO participation, after adjusting for physician and practice characteristics. Our dependent variable was ACO participation. We used sociodemographic characteristics of physicians' ZIP Code Tabulation Areas as our main independent variables, to test for the association of physicians' ACO participation with those characteristics. To represent these variables, we grouped the areas into quartiles for each sociodemographic characteristic. Each independent sociodemographic variable was an indicator of the quartile of the physician's ZIP Code Tabulation Area for that sociodemographic measure. The mean and distribution of the area characteristics within each quartile are available in the online Appendix.²⁵

Each set of sociodemographic indicators was examined in a separate regression. In all regressions, we included the physician- and practice-level covariates described above to address potential confounding of the relationship between local population characteristics and ACO participation.

Each regression was run first without and then with HRR fixed effects (that is, a dummy variable for each HRR). Regressions without HRR fixed effects estimated the probability of physician participation in ACOs nationally. In this regression, if all physicians within each HRR are equally likely to participate in an ACO, any associations between local population characteristics and ACO participation would be due to the fact that ACOs are more likely to be in high-income HRRs—whose constituent ZIP Code Tabulation Areas are more wealthy on average—than in low-income ones.

Adding HRR fixed effects controlled for regional characteristics, such as HRR-level income or population demographic characteristics, and regressions with those fixed effects estimated the probability of physician participation condi-

Our results suggest that vulnerable patients have less access to physicians who participate in ACOs compared to other patients.

tional on those characteristics. In this approach, we would see no association between ZIP Code Tabulation Area population characteristics and ACO participation if all physicians within an HRR were equally likely to participate in an ACO. We also performed the regressions after limiting the sample to primary care physicians, as this group of physicians is most central to the ACO model.²⁶

To summarize the associations between various population characteristics in a physician's practice location and his or her likelihood of participation, we used multivariate models to predict the percentage of physicians participating in an ACO in each quartile of ZIP Code Tabulation Area population sociodemographic characteristics.

LIMITATIONS Our study had several limitations. First, the physician data that we used included the vast majority of practicing physicians, but not all of them. However, based on analyses of Medicare physicians who were and were not successfully matched with physicians in our primary data source, we found that the physicians in our study were geographically representative and more clinically active than those for whom we did not have information about ACO participation.

Second, we used general population characteristics of the ZIP Code Tabulation Area where each physician's practice was located as a proxy for the patient population he or she was likely to care for. We were unable to study populations specifically attributed to ACOs or to the physicians in our sample. For some subspecialties, patients travel substantial distances to receive care; as a result, these characteristics are a noisy representation of physicians' likely patient panels. However, sensitivity analyses among the subset of physicians for whom we had Medicare data supported the validity of our measures.

Finally, our physician data were self-reported. Moreover, the data identified only one ACO for each physician and did not specify whether the ACO was commercial or sponsored by Medicare or Medicaid.

Study Results

Our study included 521,543 US physicians. Of those physicians, **25.9 percent participated in an ACO** (Exhibit 1). ACO participation was more common among **female** physicians than among males; **physicians in large and multispecialty practices**, compared to those in other practices; and primary care physicians, compared to those in other specialties. Rates of ACO participation were **highest in the Northeast, mid-Atlantic, upper Midwest, and West** (Exhibit 2).

Compared to HRRs with higher physician participation in ACOs, residents in HRRs with lower participation were more likely to have less than a high school education and to be living in poverty, black, or disabled (Exhibit 3). The largest percentages of Hispanics were found in HRRs with neither the lowest nor the highest physician ACO participation.

HRRs with higher physician participation also tended to have a greater supply of all types of physicians but a lower supply of acute care hospital beds, compared to HRRs with lower participation. In addition, among Medicare beneficiaries, visits to primary care physicians and rates of hemoglobin A1c testing were slightly higher in HRRs with greater physician ACO participation. Full results on the characteristics of HRRs by ACO participation rate are available in the Appendix.²⁵

Nationally, we found that physicians' ACO participation was **inversely related to the percentage of the population that was black, living in poverty, uninsured, or disabled or that had less than a high school education** (Exhibit 4). There was **no consistent pattern of participation across Hispanic population levels**. The largest differences in participation were across quartiles of the proportion of population that was black, with 30.8 percent of all physicians (35.7 percent of primary care physicians) participating in an ACO in ZIP Code Tabulation Areas with the lowest quartile of black population, compared to 22.9 percent of all physicians (26.4 percent of primary care physicians) in the highest quartile.

EXHIBIT 1

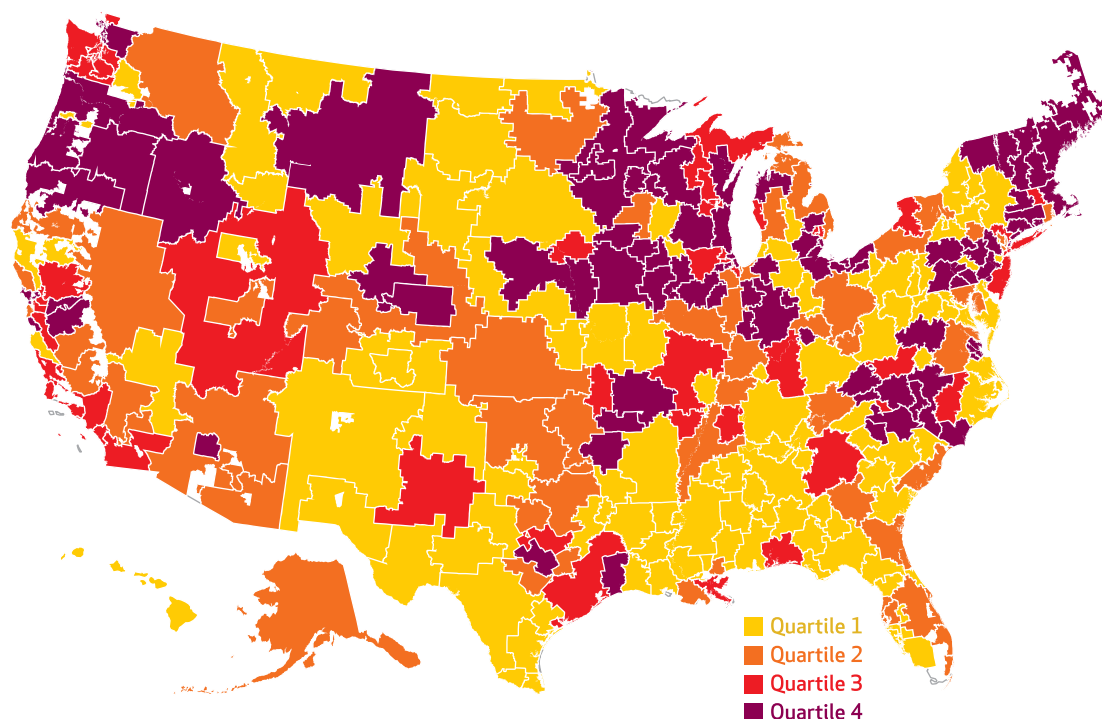
Characteristics of US office-based physicians in 2013

	Participating in an ACO		Not participating in an ACO		All	
	Number	Percent	Number	Percent	Number	Percent
All physicians	135,026	25.9	386,517	74.1	521,543	100
SEX						
Male	92,116	68.2	283,480	73.3	375,596	72.0
Female	42,910	31.8	103,037	26.7	145,947	28.0
NUMBER OF PHYSICIANS IN PRACTICE^a						
Fewer than 10	20,811	15.4	199,896	51.7	220,707	42.3
10-100	19,590	14.5	89,137	23.1	108,727	20.8
More than 100	94,625	70.1	97,484	25.2	192,109	36.8
MULTISPECIALTY PRACTICE						
No	88,816	65.8	298,050	77.1	386,866	74.2
Yes	46,210	34.2	88,467	22.9	134,677	25.8
PRIMARY PRACTICE RURALITY^b						
Urban	127,548	94.5	356,829	92.3	484,377	92.9
Large rural city or town	4,807	3.6	19,740	5.1	24,547	4.7
Small rural town	1,986	1.5	7,750	2.0	9,736	1.9
Isolated small rural town	685	0.5	2,198	0.6	2,883	0.6
MEDICAL SPECIALTY^c						
Medical specialties	35,837	26.5	110,145	28.5	145,982	28.0
Primary care	52,876	39.2	114,877	29.7	167,753	32.2
Surgery	26,627	19.7	93,722	24.3	120,349	23.1
Hospital specialties	19,686	14.6	67,773	17.5	87,459	16.8

SOURCE Authors' analysis of SK&A physician data for 2013. **NOTE** ACO is accountable care organization. ^aTotal number of physicians in the largest unique medical practice to which the physician could be assigned. ^bBased on the Rural Urban Commuting Area (RUCA) of the ZIP code of the physician's primary practice. RUCA scores were grouped into four categories that captured the predominant commuting patterns of each ZIP code's residents. ^cFor details about the specialties, see Note 19 in text.

EXHIBIT 2

Percentages of physicians participating in an accountable care organization in 2013, by hospital referral region



SOURCE Authors' analysis of SK&A physician data for 2013. **NOTES** Hospital referral regions were divided into roughly equal population-weighted quartiles of physician participation in ACOs. Quartile 1 (lowest) is 0.4–12.7 percent. Quartile 2 is 12.8–22.1 percent. Quartile 3 is 22.2–31.2 percent. Quartile 4 (highest) is 31.3–87.1 percent.

For both groups of physicians, the difference between those two quartiles was significant ($p < 0.001$). Full regression results are available in the Appendix.²⁵

When we adjusted for HRR fixed effects, we found persistent differences in ACO participation rates, which suggest within-HRR variation across quartiles of population sociodemographic characteristics (Exhibit 4). In this analysis, the percentages of physicians participating in ACOs were still significantly different across quartiles of ZIP Code Tabulation Areas within HRRs, but the magnitude of the differences was smaller than was the case with the national estimates.

Discussion

We found that physicians' participation in ACOs varied significantly with local sociodemographic characteristics of the population. Physicians practicing in ZIP Code Tabulation Areas with more blacks, higher poverty, more uninsured or disabled residents, or more people with less than a high school education were less likely to participate in ACOs than their counterparts practicing in areas whose populations of such vulner-

able groups were smaller.

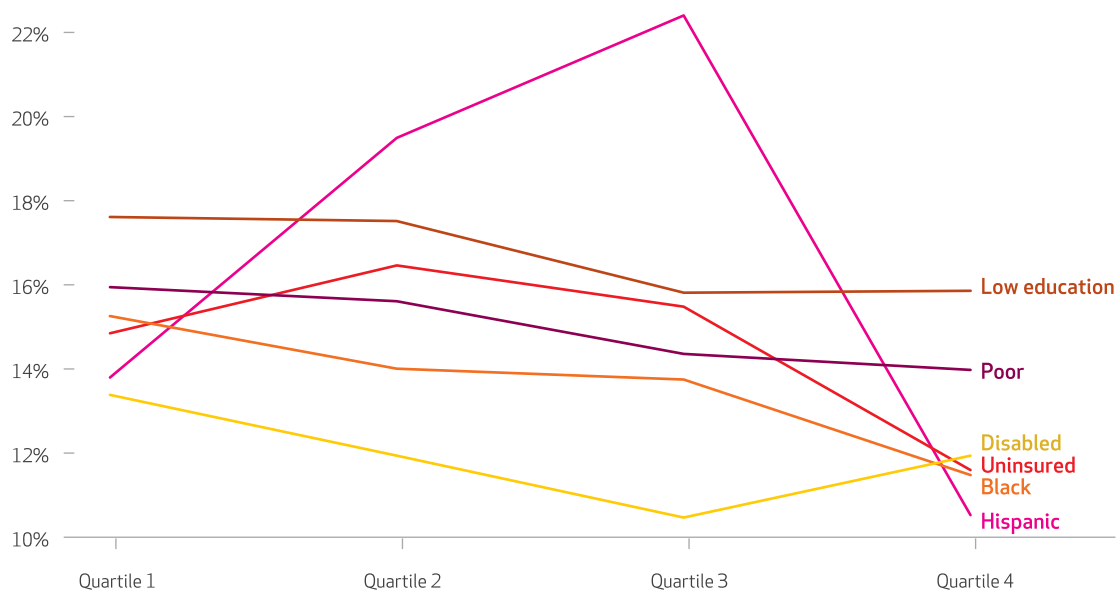
Physicians serving populations with relatively high rates of disadvantaged people could be excluded from emerging ACOs in two ways. First, ACOs may be more likely to form in regions where the overall patient population is more affluent, compared to regions with less affluent populations. Second, emerging ACOs may be more likely to contract with local physicians who serve more affluent patients than with physicians whose patient populations are less affluent, thus excluding disadvantaged patients.

Our study confirmed that ACOs are more likely to be formed in regions of the country whose populations have higher socioeconomic status and a smaller percentage of blacks, compared to regions whose populations have lower socioeconomic status and a larger percentage of blacks.¹⁵ However, we also found that within the regions where an ACO is located, physicians are more likely to participate if their practices are located in ZIP Code Tabulation Areas with higher socioeconomic status and smaller percentages of blacks (since limiting our analyses to within-HRR differences diminished these associations but did not eliminate them).

Our results suggest that vulnerable patients

EXHIBIT 3

Percentages of hospital referral region populations with selected sociodemographic characteristics, by geographic access to physicians participating in an accountable care organization in 2013



SOURCE Authors' analysis of SK&A physician data for 2013 and American Community Survey data for 2009–13. **NOTES** As rates of physician participation in an accountable care organization (ACO) increase, the unadjusted percentages of the hospital referral region (HRR) population with less than a high school education and living in poverty, uninsured, or disabled decreases. Rates of ACO participation are the proportions of physicians in each HRR who reported participating in any ACO. HRRs were divided into quartiles of physician participation in ACOs, weighted by the total resident population. Quartile 1 (lowest) is 0.4–12.7 percent. Quartile 2 is 12.8–22.1 percent. Quartile 3 is 22.2–31.2 percent. Quartile 4 (highest) is 31.3–87.1 percent.

have less access to physicians who participate in ACOs and thus less access to the potential benefits of ACOs, compared to other patients. These findings are consistent with early analyses of regions where ACOs began operating and with analyses of Medicare patients who were and were not attributed to some of the first public ACO contracts.^{15,16} These findings raise concerns that ACOs may increase existing disparities between the quality of health care received by vulnerable populations and the quality of care received by other groups.

As discussed above, studies have shown that ACOs increase the quality of care.^{2–7} However, ACOs also aim to contain costs, and it is possible that ACO participation may encourage providers to stint on necessary care. If that is the case, vulnerable populations would be somewhat sheltered from exposure to such physicians.

While previous studies have examined areas where ACO contracts have been initiated,¹⁵ physician rates of participation may be a more important indicator than the simple presence of an ACO in a region, since patients can be attributed to an ACO only through their physicians. Additionally, given the leadership role that physicians have played in early ACOs,^{27,28} it is important to examine possible factors that may prevent

some physicians from embracing the ACO model.

There are several possible mechanisms for lower rates of ACO participation among physicians serving vulnerable populations, compared to other physicians. Given that it may be hard to meet some benchmarks for quality of care among hard-to-treat, vulnerable populations,^{29–31} ACOs may be less likely to locate in regions with these populations than elsewhere. At the same time, even within areas with ACOs, the organizations may exclude physicians likely to care for vulnerable patients in an effort to ensure that the organizations care for populations that will make it possible to achieve high scores on specific quality measures.

Rates of ACO participation may also be lower among physicians serving vulnerable populations, compared to other physicians, because of physician choice. Individual physicians or physician groups may choose to hold off on joining an ACO if they deem it would be too difficult to achieve specific quality and spending goals with their patient populations. Finally, physician leaders of early ACOs reported that limited capital was a major hurdle to entering an ACO contract.²⁸ Groups serving vulnerable populations may find such hurdles insurmountable.

EXHIBIT 4

Predicted percentages of all physicians and primary care physicians participating in an accountable care organization in 2013, by quartiles of demographic characteristics of the ZIP Code Tabulation Area in which they practice

Percent of population that:	Unadjusted				Adjusted for HRR fixed effects			
	Quartile				Quartile			
	1 (lowest)	2	3	4 (highest)	1 (lowest)	2	3	4 (highest)
IS BLACK								
All physicians	30.8%	26.7%***	24.7%***	22.9%***	27.5%	25.9%****	25.1%****	25.5%**
Primary care physicians	35.7	32.7***	31.3***	26.4***	33.1	31.8****	31.5	29.7****
IS HISPANIC								
All physicians	24.1	27.8****	26.5****	24.2****	25.6	27.3****	25.8****	24.6****
Primary care physicians	29.0	32.5****	32.6	31.9**	32.0	33.2****	31.1****	29.1****
IS LIVING IN POVERTY								
All physicians	28.9	26.2****	25.5****	23.2****	27.1	26.2****	25.7***	24.7****
Primary care physicians	35.5	31.6****	30.7**	28.0****	34.0	31.7****	30.9***	29.3****
IS UNINSURED								
All physicians	27.4	27.7	24.9****	22.1****	25.1	27.0****	26.6***	24.7****
Primary care physicians	33.3	31.7****	30.4****	29.8****	32.1	31.8	31.4	30.3***
HAS LESS THAN A HIGH SCHOOL EDUCATION								
All physicians	26.4	26.8**	24.5****	25.2***	26.1	26.3	24.9****	26.0****
Primary care physicians	31.6	32.9****	31.1****	29.9****	31.7	32.3**	31.1****	30.7
IS DISABLED								
All physicians	28.5	26.7****	24.4****	23.2****	27.6	26.0****	24.9****	24.7
Primary care physicians	35.4	33.3****	29.6****	27.5****	33.3	32.7**	30.4****	29.5***

SOURCE Authors' analysis of SK&A physician data for 2013 and American Community Survey data for 2009–13. **NOTES** Significance refers to the difference between each estimate and that of the next-lowest quartile. Estimates were derived from a multiple regression model that predicted physicians' participation in any accountable care organization, adjusted for sex, medical specialty, number of physicians in the practice, and rurality of the practice location. Demographic estimates were derived from American Community Survey data, with ZIP Code Tabulation Areas divided into population-weighted quartiles. The quartiles were treated as a categorical variable; indicators were used to estimate the change in participation associated with each quartile, with the lowest quartile as the reference group. HRR is hospital referral region. ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

Our findings suggest several potential policy interventions to prevent the widening of health care disparities as ACOs expand. First, given that previous work²⁸ has shown **limited capital to be a major concern of physician leaders in starting an ACO, providing physician groups that serve vulnerable populations with additional incentives to form an ACO or assistance with start-up costs could ameliorate these disparities**. The CMS ACO Investment Model is a new policy intervention to encourage new ACOs to form in rural and underserved areas by addressing their lack of adequate access to capital. Our findings suggest that this new model should help address barriers, but future versions of this program may need to increase incentives for physicians' participation in ACOs to attract participation from the physicians in the most underserved parts of these areas.

Second, **risk-adjusting ACO-linked quality indicators for patients' sociodemographic characteristics, or perhaps rewarding improvements over time, may encourage providers with vulnerable patient panels to pursue involvement in ACO contracts**.³²

Despite the fact that our study was limited by our inability to assess which patients were directly attributed to ACOs, the results of sensitivity analyses were consistent with our main findings. Specifically, using publicly available Medicare patient-panel data, we found that physicians who participated in ACOs saw significantly fewer black beneficiaries than physicians who did not participate in ACOs. Additionally, patient panels of primary care physicians tend to closely approximate the population of the ZIP Code Tabulation Areas in which they practice because patients seek primary care services close to home. The fact that the associations we documented were slightly stronger when we limited our sample to primary care physicians supports the conclusion that physicians serving vulnerable patients are less likely to participate in ACOs than physicians serving more affluent populations.

Finally, because of our relatively short study period, we could not test whether rates of ACO participation were increasing over time among physicians who serve vulnerable populations. In particular, ongoing ACO expansion in Medicaid

and federally qualified health centers may alleviate some potential disparities.³³ However, in conjunction with previous studies covering periods through 2012,^{15,16} our study—which extended through 2013—found persistent trends in ACO location and physician participation in ACOs with respect to population sociodemographic characteristics. Additionally, even if such expansion increases access to ACOs for vulnerable populations, the quality improvements documented for early ACOs—which were likely achieved among relatively affluent patient populations—may differ as ACOs expand to care for more diverse populations.

Conclusion

Overall, our results suggest that current patterns of physician participation in ACOs risk exacerbating disparities in the quality of care received between vulnerable populations and other groups. Greater consideration is warranted in creating policies to encourage the development of ACOs and physicians' participation in them in areas with vulnerable populations. Additionally, any changes in the care and health outcomes of these populations should be monitored to assess the potential effects of ACO implementation on health care disparities. ■

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