Original Investigation | HEALTH CARE REFORM

Outpatient Care Patterns and Organizational Accountability in Medicare

J. Michael McWilliams, MD, PhD; Michael E. Chernew, PhD; Jesse B. Dalton, MA; Bruce E. Landon, MD, MBA, MSc

IMPORTANCE Fostering accountability in the Medicare Accountable Care Organization (ACO) programs may be challenging because traditional Medicare beneficiaries have unrestricted choice of health care providers, are attributed to ACOs based on utilization, and often receive fragmented care.

OBJECTIVE To measure 3 related constructs relevant to ACO incentives and their capacity to manage care: stability of patient assignment, leakage of outpatient care, and contract penetration.

DESIGN, SETTING, AND PARTICIPANTS Using 2010-2011 Medicare claims and rosters of physicians in organizations participating in ACO programs, we examined these constructs among 524 246 beneficiaries hypothetically assigned to 145 ACOs prior to the start of the Medicare ACO programs. We compared estimates by patient complexity, ACO size, and the primary care orientation of ACO specialty mix.

MAIN OUTCOMES AND MEASURES Three related construct measurements: *stability of assignment*, defined as the proportion of patients whose assignment to an ACO in 2010 was unchanged in 2011; *leakage of outpatient care*, defined as the proportion of office visits for an assigned population that occurred outside of the contracting organization; and *contract penetration*, defined as the proportion of Medicare outpatient spending billed by an ACO that was devoted to assigned patients.

RESULTS Of beneficiaries assigned to an ACO in 2010, 80.4% were assigned to the same ACO in 2011. Of those assigned to an ACO in 2010 or 2011, 66.0% were consistently assigned in both years. Unstable assignment was more common among beneficiaries with fewer conditions and office visits but also among those in several high-cost categories, including the highest decile of per-beneficiary spending. Among ACO-assigned beneficiaries, 8.7% of office visits with primary care physicians were provided outside of the assigned ACO, and 66.7% of office visits with specialists were provided outside of the assigned ACO. Leakage of outpatient specialty care was greater for higher-cost beneficiaries and substantial even among specialty-oriented ACOs (54.6% for lowest quartile of primary care orientation). Of Medicare spending on outpatient care billed by ACO physicians, 37.9% was devoted to assigned beneficiaries. This proportion was higher for ACOs with greater primary care orientation (60.0% for highest quartile vs 33.6% for lowest).

CONCLUSIONS AND RELEVANCE Care patterns among beneficiaries served by ACOs suggest distinct challenges in achieving organizational accountability in Medicare. Continued monitoring of these patterns may be important to determine the regulatory need for enhancing ACOs' incentives and their ability to improve care efficiency.

JAMA Intern Med. doi:10.1001/jamainternmed.2014.1073
Published online April 21, 2014.

Invited Commentary

Supplemental content at jamainternalmedicine.com

Author Affiliations: From the Department of Health Care Policy, Harvard Medical, Boston, Massachusetts (McWilliams, Chernew, Dalton, Landon); Division of General Internal Medicine and Primary Care, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts (McWilliams); Division of General Internal Medicine and Primary Care, Department of Medicine, Beth Israel Deaconess Medical Center, Boston, Massachusetts (Landon).

Corresponding Author: J. Michael McWilliams, MD, PhD, Department of Health Care Policy, Harvard Medical School, 180 Longwood Ave, Boston, MA 02115 (mcwilliams@hcp.med.harvard.edu).

To foster greater accountability in the traditional fee-for-service (FFS) Medicare program, the Medicare Accountable Care Organization (ACO) programs reward participating health care provider groups that achieve slower spending growth and high quality of care. Concerns have been raised, however, that features of the programs may weaken these incentives and undermine ACO efforts to manage care.[1] Specifically, unrestricted choice of health care providers is maintained for beneficiaries in the ACO programs. Furthermore, Medicare must rely on utilization patterns to attribute patients to ACOs because traditional Medicare beneficiaries are not required to select a primary care physician (PCP).

To characterize the potential challenges posed by the Medicare ACO model when applied to outpatient care that is often fragmented and unstable,[2] we examined 3 related constructs: (1) *stability of assignment*, defined as the proportion of patients assigned to an ACO in one year that remains assigned to the same ACO in the subsequent year; (2) *leakage of outpatient care*, defined as the proportion of office visits for an ACO's assigned patients that occurs outside of the contracting organization; and (3) *contract penetration*, defined as the proportion of Medicare outpatient spending billed by the contracting organization that is devoted to assigned patients.

These factors may be important determinants of ACO incentives and the ability of ACOs to improve care efficiency. Stability in patient assignment increases future returns on patient-specific investments in care management. Leakage of outpatient care increases the costs of care coordination and diminishes the reach of ACO influence. Greater contract penetration enhances incentives for ACOs to implement systemic changes that affect all Medicare beneficiaries they serve.

Using 2010-2011 Medicare claims and rosters of ACO physicians, we quantified stability of assignment, leakage of outpatient care, and contract penetration for 145 ACOs at baseline, prior to the start of the Medicare ACO programs. We compared estimates by patient complexity because unstable assignment and leakage among high-cost groups may be of particular concern to ACOs. We also compared estimates by organizational size and specialty mix to describe the incentives and challenges faced by different types of ACOs.

Methods

Our study was approved by the Harvard Medical School Committee on Human Studies and the Privacy Board of the Centers for Medicare & Medicaid Services (CMS).

Assignment of Beneficiaries to ACOs

The CMS requires ACOs to post online lists of all health care providers included in ACO contracts (hereinafter referred to as *ACO contracting networks*); contracts may include only subsets of organizations' constituent practices or physicians.[3] From ACO websites or officials, we obtained lists of physicians making up the ACO contracting networks for 145 of the 252 organizations entering the Medicare Shared Savings Program (SSP) or Pioneer ACO program in 2012 or 2013, including 28 (88%) of the 32 Pioneer ACOs and 75 (66%) of the 114 SSP ACOs entering in 2012. The ACOs excluded from our study had not posted lists of contracting physicians at the time of our data collection and tend to be smaller. We converted 95.6% of physician names to National Provider Identifiers (NPIs) using the CMS NPI Registry.[4]

Following the Medicare SSP rules for beneficiary assignment[5] and using 2010-2011 Medicare claims for a random 20% sample of beneficiaries, we attributed each beneficiary in each year to 1 of the 145 ACOs if the ACO (defined by the NPIs included in its contracting network) accounted for more spending for outpatient primary care services (Current Procedural Terminology [CPT] codes 99201-15, G0402, and G0438-9 for outpatient office visits) than any other ACO or tax identification number present in claims (eAppendix in the Supplement). We used assignment rules from the SSP because it is much larger than the Pioneer program, particularly after the departure of 9 ACOs from the Pioneer program in 2013 and the addition of 123 ACOs to the SSP in 2014.[6,7] Per the 2-step SSP assignment algorithm, beneficiaries receiving at least 1 primary care service from a PCP (defined by specialty codes for general practice, family practice, internal medicine, or geriatric medicine) were assigned based on primary care services provided by PCPs. Beneficiaries receiving no primary care services from a PCP were assigned based on primary care services provided by physicians of other specialties, nurse practitioners, or physician assistants. Beneficiaries receiving no primary care services were not assigned. Importantly, these assignments were hypothetical because the ACO programs did not begin until 2012.

For reasons detailed in the eAppendix in the Supplement, we focused on outpatient primary care services when assigning beneficiaries and excluded other services (eg, physician visits in nursing facilities) that also are considered primary care services by SSP assignment rules (eTable 1 in the Supplement).[8] In a sensitivity analysis including these other services in the assignment algorithm, assignment of high-cost beneficiaries to ACOs was slightly less stable than we report (eTable 2 in the Supplement).

Study Population

Our study included 524 246 beneficiaries who were continuously enrolled in traditional fee-for-service Medicare in both 2010 and 2011 (ie, no enrollment in Medicare Advantage managed care plans), lived in the same county in both years, and were assigned to 1 of the 145 ACOs in either year. Most of our analyses focused on the 430 658 beneficiaries who were assigned to an ACO in 2010. Because assignment to an ACO in a given year requires at least 1 primary care service in that year, our study excluded beneficiaries with no primary care services in both years.

Study Variables

Stability of Assignment

Among beneficiaries assigned to an ACO in 2010, we calculated the proportion assigned to the same ACO in 2011 rather than to a different health care provider group or no health care provider (unassigned). Among beneficiaries assigned to an ACO in 2010 or 2011, we also calculated the proportion assigned to the same ACO in both years.

Leakage of Outpatient Care

Using 2010 claims, we calculated the percentage of all outpatient primary care services provided to beneficiaries assigned to an ACO that were not provided by ACO physicians. We focused on leakage of these commonly billed office visits with PCPs and specialists (defined as non-PCP physicians) as a proxy for an ACO's potential direct influence over outpatient testing and procedures, preventive care, and recommendations for elective hospitalization and emergency care. We did not analyze leakage of inpatient care because we could not reliably measure the extent to which independent physician groups provide or influence inpatient care at hospitals to which they admit patients.

The network of physicians included in an ACO contract is often a subset of the participating organization's member physicians. To recognize care provided within the larger organization but not necessarily within the ACO contracting network, we used American Medical Association (AMA) Group Practice data describing organizational membership (updated through 2011) for 90% of PCPs and 81% of medical and surgical specialists in the AMA Physician Masterfile who practice in groups of 3 or more physicians and billed for office visits in 2009 Medicare claims.[9,10] For each of the 145 ACOs, we assembled NPIs from all groups in the AMA Group Practice File with names matching the organization or one of its constituent parts (enumerated from organizational websites) into a single inclusive group of NPIs. In each organization's physician membership, we also included NPIs not recognized by the Group Practice File but whose most frequently appearing tax identification number in claims for office visits was shared by NPIs identified as ACO members (eAppendix in the Supplement). For 23 ACOs whose constituent practices were not consistently found in the Group Practice File, we obtained physician directories describing the organizations' full physician membership directly from the organizations or their websites.

When measuring leakage for each ACO, we considered both physicians listed in the ACO's contracting network and additional member physicians identified by these methods as part of the participating organization. Combined, these methods increased the total number of physicians recognized as members of organizations participating in ACO programs by 43.9% relative to the ACO contracting networks alone (74 201 vs 51 563) and by 58.7% among physicians billing for office visits; 71.3% of the additional NPIs were specialists, suggesting disproportionate inclusion of PCPs in ACO contracting networks by multispecialty organizations.

We calculated leakage rates both for primary care services provided specifically by PCPs and for the same set of office visits (CPT codes 99201-15, G0402, and G0438-9) provided by specialists. Of note, after the elimination of separate billing codes for outpatient specialty consultations effective January 2010, these consultations have been billed as office visits and are thus captured by this set of codes.[11]

Contract Penetration

For each ACO, we summed all spending in 2010, including coinsurance amounts, for all services delivered in outpatient settings that were billed by ACO physicians (eAppendix in the Supplement). We then calculated the proportion of this spending that was devoted to beneficiaries assigned to the ACO as opposed to other beneficiaries receiving outpatient care from the ACO. To better reflect incentives for systemic changes in care delivery at the organizational level, we considered all of an organization's member physicians, not just those included in its ACO contract, when assigning beneficiaries and totaling spending for the purpose of this measure. A sensitivity analysis using ACO contracting networks for this measure produced similar results.

Patient Complexity and Per-Beneficiary Spending

From Medicare enrollment files, we determined disability as the original reason for Medicare eligibility, presence of end-stage renal disease, and receipt of Medicaid benefits. For each of 25 conditions in the Chronic Condition Warehouse,[12] we determined if beneficiaries had been diagnosed with the condition before 2010. We also assessed total annual per-beneficiary spending in 2010 and 2011 for all services covered by Parts A and B of Medicare and the number of office visits for each beneficiary in 2010.

Organizational Size and Primary Care Orientation

We created 3 size categories for ACOs based on the number of assigned beneficiaries: (1) fewer than 2000 (or <10 000 when scaled to 100% of the Medicare population); (2) 2000 to 2999 (10 000-14 999); and (3) 3000 or more (≥15 000). We characterized the primary care orientation of each ACO's specialty mix as the percentage of office visits provided by physicians in the full participating organization that was provided by PCPs.[9] To facilitate interpretation of results, we categorized organizations into quartiles of primary care orientation.

Statistical Analysis

We first compared patient complexity and per-beneficiary spending across 3 groups of beneficiaries: (1) assigned to the same ACO in both years; (2) assigned to an ACO in 2010 but to a different health care provide group or unassigned in 2011; and (3) assigned to an ACO in 2011 but to a different health care provider group or unassigned in 2010. Among beneficiaries assigned to an ACO in 2010, we then compared stability of assignment, leakage of outpatient care, and contract penetration across categories of beneficiaries and ACOs. For comparisons of assignment stability, we used χ^2 tests. For comparisons of leakage, we calculated beneficiary-specific leakage percentages and conducted analysis of variance across categories of interest, weighting beneficiaries by the number of services received. Similarly, for comparisons of contract penetration, we calculated physician-level percentages and conducted analysis of variance, weighting physicians by the amount of outpatient spending billed. Differences across beneficiary or ACO categories were statistically significant (defined as $P < .05$ for a 2-sided test) except where noted in **Tables 1**, **2**, and **3**. We accounted for clustering of observations within organizations in statistical tests.[13]

Table 1. Medicare Beneficiary Characteristics by ACO Assignment From 2010 to 2011

Beneficiary Characteristics in 2010	Assigned to ACO in Either 2010 or 2011 (n = 524 246)	Assigned to Same ACO in 2010 and 2011 (n = 346 243)[b]	Assigned to ACO in 2010 but to Different Group or Unassigned in 2011 (n = 84 415)[b]	Assigned to ACO in 2011 but to Different Group or Unassigned in 2010 (n = 100 231)[b]
CCW conditions[c] present by 2010, No.				
0-2	23.6	19.9	29.6	31.5
3-5	34.1	35.4	31.5	31.5
6-8	26.3	27.9	23.7	23.0
≥9	16.0	16.8	15.2	14.0
End-stage renal disease present by 2010	1.0	0.8	1.4	1.4
Disability as original reason for Medicare eligibility	21.0	18.8	25.3	25.5
Medicaid recipient in 2010	19.0	17.5	22.2	22.1
Total spending in 2010				
Lowest quartile	25.0	22.4	26.2	32.7
Quartile 2	25.0	26.5	23.0	21.5
Quartile 3	25.0	26.3	23.8	21.7
Highest quartile	25.0	24.9	27.0	24.1
Highest decile	10.0	9.5	11.9	10.4
Total spending in 2011				
Lowest quartile	25.0	23.4	30.4	25.5
Quartile 2	25.0	26.4	21.1	23.5
Quartile 3	25.0	26.0	22.0	24.1
Highest quartile	25.0	24.2	26.6	26.9
Highest decile	10.0	9.2	11.8	11.7
Office visits[d] in 2010				
With PCPs, No.				
0	16.7	6.9	24.7	44.2
1-2	27.4	27.5	34.8	21.2
3-5	31.4	36.9	23.2	18.9
≥6	24.5	28.7	17.3	15.7
With PCPs or specialists, No.				
0, unassigned in 2010	3.3	0.0	0.0	17.5
1-2	11.7	9.5	19.4	12.9
3-5	21.6	22.0	23.6	18.7
≥6	63.3	68.5	57.0	50.9

Abbreviations: ACO, Accountable Care Organization; CCW, Chronic Condition Warehouse; CPT, Current Procedural Terminology; PCP, primary care physician.

[a] All data are reported percentage of assigned beneficiaries in the column category.

[b] $P < .05$ for comparisons of all characteristics between each unstably assigned group and the stably assigned group. These 3 groups combined exceed the total of 524 246 because a small group of 6643 beneficiaries was assigned to an ACO in both years but to different ACOs (thus included in both the last 2 groups).

[c] Chronic conditions analyzed from the CCW include acute myocardial infarction, Alzheimer disease, Alzheimer disease and related disorders or senile dementia, anemia, asthma, atrial fibrillation, benign prostatic hyperplasia, cataract, chronic kidney disease, chronic obstructive pulmonary disease, depression, diabetes, glaucoma, heart failure, hip/pelvic fracture, hyperlipidemia, hypertension, hypothyroidism, ischemic heart disease, osteoporosis, rheumatoid arthritis/osteoarthritis, stroke/transient ischemic attack, breast cancer, colorectal cancer, endometrial cancer, lung cancer, prostate cancer. We included all of these conditions in counts except cataracts and glaucoma.

[d] Outpatient primary care services as defined by rules for beneficiary attribution in the Medicare Shared Savings and Pioneer Program (CPT codes 99201-15, G0402, and G0438-9).

Results

Among beneficiaries assigned to an ACO in either 2010 or 2011 (Table 1), 66.0% were assigned to the same ACO in both years. Compared with beneficiaries stably assigned to ACOs, unstably assigned groups disproportionately included beneficiaries with few chronic conditions and office visits and included all those who were unassigned (no office visits with a PCP or specialist) in one year, but also disproportionately included other beneficiaries with end-stage renal disease, disabilities, Medicaid coverage, and high spending. Among beneficiaries assigned to an ACO in 2010, 80.4% remained assigned to the same ACO in 2011 (Table 2). This percentage increased from 77.8% among beneficiaries in the lowest quartile of 2010 spending to 82.5% among those in the second quartile but decreased to 76.6% among those in the top decile. Stability of assignment was lower for beneficiaries with 2 or fewer chronic conditions but varied minimally among those with more conditions.

Of office visits with PCPs for beneficiaries assigned to an ACO in 2010, 8.7% were provided by PCPs outside of the assigned ACO (Table 2). Of office visits with specialists for ACO-assigned beneficiaries, 66.7% were provided by specialists outside of the assigned ACO. These leakage percentages were larger for beneficiaries with more chronic conditions, more office visits, and higher spending. The association between leakage of office visits with specialists and per-beneficiary spending was particularly strong (54.3% among beneficiaries in the lowest quartile of spending vs 68.1% among those in the highest quartile [$P < .001$]). Among the 23 ACOs for which we obtained complete physician directories for the participating organizations, leakage of office visits with specialists ranged from 37.6% to 100% and was greater than 50% for 11 of 14 organizations in the bottom half of primary care orientation (ie, organizations with >45% of office visits provided by specialists).

As detailed in Table 3, stability of assignment and leakage of office visits with PCPs varied considerably among ACOs but differed minimally by ACO size. Assignments were more stable

Table 2. Stability of Assignment and Leakage of Outpatient Care Among Medicare Beneficiaries Assigned to an ACO in 2010, Stratified by Beneficiary Characteristics

Characteristic	Beneficiaries, No.	Stability of Assignment	Leakage of Outpatient Care in 2010	
		Assigned to Same ACO in 2010 and 2011	Office Visits[b] With PCPs	Office Visits[b] With Specialists
All beneficiaries assigned to an ACO in 2010	430 658	80.4	8.7	66.7
CCW conditions present by 2010, No.				
0-2	93 944	73.4	7.8	63.1
3-5	149 179	82.2	7.9	65.9
6-8	116 642	82.9	8.8	67.0
≥9	70 893	81.9	10.2	68.9
End-stage renal disease present by 2010				
Yes	3978	69.3	11.1	61.0
No	426 680	80.5	8.7	66.8
Disability as original reason for Medicare eligibility				
Yes	86 409	75.3	10.6	65.7[c]
No	344 249	81.7	8.2	66.9[c]
Medicaid recipient in 2010				
Yes	79 143	76.4	10.7	67.5[c]
No	351 515	81.3	8.1	66.5[c]
Total spending in 2010				
Lowest quartile	99 646	77.8	4.4	54.3
Quartile 2	111 083	82.5	6.7	64.2
Quartile 3	111 092	81.9	8.9	68.0
Highest quartile	108 837	79.1	11.3	68.1
Highest decile	42 909	76.6	11.9	67.5
Office visits[b] in 2010				
With PCPs, No.				
0	44 793	53.4	NA	32.6
1-2	124 521	76.4	4.1	70.9
3-5	147 185	86.7	6.7	71.4
≥6	114 159	87.2	10.5	71.6
With specialists, No.				
0	64 078	82.0	5.1	NA
1-2	94 834	78.5	7.3	61.1
3-5	104 054	81.1	8.3	64.4
≥6	167 692	80.4	10.5	67.5
With PCPs or specialists, No.				
1-2	49 300	66.7	2.6	25.7
3-5	96 100	79.3	4.9	55.5
≥6	285 258	83.1	9.4	67.9

Abbreviations: ACO, Accountable Care Organization; CCW, Chronic Condition Warehouse; CPT, Current Procedural Terminology; NA, not applicable; PCP, primary care physician.

[a] Unless otherwise noted, data are reported as percentage of beneficiaries (stability) or office visits (leakage) among beneficiaries in the row category.

[b] Outpatient primary care services as defined by rules for beneficiary attribution in the Medicare Shared Savings and Pioneer Program (CPT codes 99201-15, G0402, and G0438-9) .

[c] Differences across beneficiary categories not statistically significant ($P \geq .05$).

for ACOs with greater primary care orientation. As expected, leakage of office visits with specialists was greater for smaller than larger ACOs (77.7% vs 63.6% [$P < .001$]) and for ACOs with specialty mixes oriented more toward primary care (95.6% for the highest quartile of primary care orientation vs 54.6% for the lowest quartile [$P < .001$]).

Of Medicare spending on outpatient care billed by ACO physicians, 37.9% was devoted to ACO-assigned beneficiaries, varying from 24.6% at the 10th percentile of ACOs to 65.6% at the 90th percentile. This proportion varied minimally with size and was substantially higher for ACOs with specialty mixes oriented more toward primary care (60.0% for the highest quartile of primary care orientation vs 33.6% for the lowest quartile [$P < .001$]).

Discussion

In this study of 145 organizations participating in the Medicare ACO programs, over one-third of beneficiaries attributed to an ACO in 2010 or 2011 was not assigned to the same ACO in both years. Thus, in any given year, a substantial share of patients for whom an ACO is held accountable may be newly or

Table 3. Stability of Assignment, Leakage of Outpatient Care, and Contract Penetration Among ACOs With Specific Characteristics[a]

Characteristic	ACOs, No.	Stability of Assignment	Leakage of Outpatient Care in 2010		Contract Penetration in 2010
		Proportion of Patients Assigned to ACO in 2010 That Was Assigned to Same ACO in 2011	Office Visits[b] With PCPs	Office Visits[b] With Specialists	Proportion of Medicare Outpatient Spending Billed by ACO in 2010 That Was Devoted to Assigned Patients
Total	145	80.4 (73.1, 77.1-84.3, 87.2)	8.7 (4.9, 6.7-10.3, 13.7)	66.7 (38.4, 56.7-89.9, 97.2)	37.9 (24.6, 33.2-55.2, 65.6)
Size[c]					
Small, <10 000	72	81.2[d] (72.7, 76.5-85.0, 87.4)	8.2[d] (4.4, 5.8-10.4, 12.5)	77.7 (55.9, 69.2-95.3, 98.4)	41.8[d] (25.0, 35.8-58.4, 66.3)
Medium, 10 000-14 999	27	79.7[d] (71.8, 76.9-82.9, 86.2)	8.6[d] (5.0, 6.7-9.8, 14.1)	64.3 (29.8, 53.1-78.9, 92.7)	35.4[d] (20.3, 27.8-48.0, 65.0)
Large, 15 000	46	80.3[d] (74.7, 77.6-83.0, 86.6)	8.9[d] (5.6, 6.9-10.2, 13.7)	63.6 (36.9, 44.2-85.8, 94.3)	37.3[d] (27.7, 32.3-48.8, 63.0)
Primary care orientation[e]					
Lowest quartile, <45	37	78.9 (73.6, 76.4-80.3, 82.8)	9.5[d] (6.2, 7.1-11.4, 15.3)	54.6 (37.2, 43.4-68.7, 79.3)	33.6 (20.0, 25.0-38.8, 49.3)
Quartile 2, 46-55	36	79.6 (71.5, 76.4-83.6, 86.2)	8.7[d] (4.0, 6.6-10.7, 12.5)	60.8 (30.9, 53.4-75.0, 82.4)	37.9 (23.2, 29.7-45.2, 48.3)
Quartile 3, 56-78	36	81.5 (75.2, 78.8-85.0, 87.2)	8.0[d] (4.7, 5.2-9.5, 11.1)	75.7 (56.9, 71.2-85.0, 90.5)	43.9 (34.8, 39.0-55.2, 59.8)
Highest quartile, ≥79	36	83.5 (72.2, 76.6-87.2, 88.6)	8.3[d] (4.6, 6.7-10.4, 14.6)	95.6 (88.8, 93.9-98.7, 99.9)	60.0 (35.7, 54.1-69.0, 71.4)

Abbreviations: ACO, Accountable Care Organization; CPT, Current Procedural Terminology; IQR, interquartile range; PCP, primary care physician.

[a] Unless otherwise noted, data are reported as overall percentage (distribution across ACOs: 10th percentile, IQR, 90th percentile) of beneficiaries (stability), office visits (leakage), or spending (contract penetration) among ACOs in the row category.

[b] Outpatient primary care services as defined by rules for beneficiary attribution in the Medicare Shared Savings and Pioneer Program (CPT codes 99201-15, G0402, and G0438-9).

[c] Size categories by number of assigned beneficiaries are scaled to the entire traditional Medicare population.

[d] Differences across beneficiary categories not statistically significant ($P \geq .05$).

[e] Percentage of ACO office visits, as defined in footnote b, provided by PCPs.

transiently assigned. Although healthy beneficiaries using little primary care contributed to this instability, unstably assigned beneficiaries were more likely than stably assigned beneficiaries to be in several high-cost groups that may be targeted for care management, including the top decile of total spending.

Much of the outpatient specialty care for patients assigned to ACOs, particularly higher-cost patients with more office visits and chronic conditions, was provided by specialists outside of patients' assigned organizations, even among more specialty-oriented ACOs. In contrast, leakage of office visits with PCPs for ACO-assigned patients was minimal. In addition, less than 40% of outpatient Medicare spending billed by ACO physicians was for care provided to beneficiaries assigned to the billing ACO. This percentage was much lower for specialty-oriented than for primary care–oriented organizations, suggesting that ACOs currently provide substantial amounts of specialty care to patients receiving primary care elsewhere. Thus, at least initially, incentives in traditional Medicare for organizations participating in ACO programs may continue to be largely fee-for-service in nature, particularly for outpatient specialty care.

These findings suggest that the factors we examined could play important roles in modifying the strength of payment incentives to ACOs and determining their approaches to improving care efficiency. First, returns on patient-specific investments in care management by ACOs may be diminished considerably by annual flux in populations for which ACOs are held accountable. Specifically, if the enrollment or reenrollment phase of case management requires more effort per patient than subsequent phases, and if care coordination activities, disease control, and patient education have some lasting effects on quality and spending, instability in the population managed would increase the costs and decrease the rewards of care management for an ACO.

Second, limited influence of ACO contracts over the care provided by contracting organizations (low penetration) could discourage ACOs from making important changes in processes or inputs of care that cannot be easily confined to specific groups of patients. For example, savings achieved by an ACO by restricting organizational capacity for overused services, implementing clinical decision support systems, or modifying physician compensation could be offset by losses in fee-for-service revenue for care of Medicare beneficiaries not assigned to the ACO.[10]

Third, our findings suggest that leakage of outpatient specialty care, particularly among high-cost and medically complex patients, could pose a significant care coordination challenge to ACOs and substantially limit their ability to achieve economies of scope in both patient-specific and systemic approaches to controlling spending.

Fourth, the minimal leakage of primary care provided by PCPs suggests that ACOs could exert nearly complete control over the primary care delivered to their assigned patients. Thus,

expanding the capabilities of constituent primary care practices may be a priority of initial efforts by ACOs to improve quality and achieve savings, though the impact of advanced models of primary care on health care utilization remains unclear.[14-16]

Finally, we identified a tradeoff across different types of ACOs between leakage of outpatient specialty care and contract penetration. Smaller primary care–oriented ACOs (higher leakage but higher contract penetration) may have greater incentives to make fundamental changes in capacity and care delivery that are organization-wide but confined to primary care. In contrast, larger specialty-oriented organizations (lower leakage but lower contract penetration) may have greater incentives to invest in care management of assigned patients and refrain from systemic changes that might limit use of specialty services from which they derive most of their revenue.

Importantly, our estimates were derived from claims data prior to the start of the Medicare ACO programs. In the absence of changes to Medicare ACO program rules, participating organizations could take several steps to meet the challenges suggested by our findings and enhance the payoff of successful efforts to improve quality and control spending. Multi-specialty organizations could integrate with primary care practices in their current referral base to align accountability with the patients they serve. Current trends suggest willingness of PCPs to join large multi-specialty organizations.[17] Although ACOs cannot modify beneficiary cost sharing to limit leakage, they may be able to steer patients to specialists internally by improving access and referral systems. Also, ACOs could partner with health management firms to establish preferred networks of efficient specialty practices for external referrals. In addition, ACOs are permitted to provide some medical services to patients at low cost (eg, free blood pressure cuffs) to improve care management and outcomes,[3] and these in-kind benefits may encourage patient loyalty to the organization across specialties and over time. Accountable Care Organizations are also permitted to engage patients through nondiscriminatory marketing efforts approved by CMS and through public reporting of performance on quality measures.

Should future measurement of the constructs we examined suggest persistent diminishment of ACO incentives, several policy changes could be considered. The beneficiary assignment rules could be modified to optimize stability, but such modifications are likely to involve tradeoffs. For example, prospective assignment (based on utilization in the preceding rather than concurrent year) may better support care management strategies but at the expense, our results suggest, of greater leakage (care for some prospectively assigned high-cost patients would tend to shift to non-ACO health care providers) and lower contract penetration (fewer patients served would be assigned).[18] Alternatively, Medicare could incorporate into the assignment algorithm information collected from physician groups on patients' stated PCPs. In addition, policymakers could consider regulatory changes to allow the benefits and physician networks of Medicare supplemental plans to be tailored to ACOs and to encourage beneficiaries to choose such plans.[19]

Our study had several limitations. Most importantly, we lacked the necessary data to assess the extent of risk contracting between organizations in the Medicare ACO programs and other insurers. Both Pioneer and SSP ACOs are expected by Medicare to enter similar contracts with other payers by their second contract period if not sooner,[3,20] which would increase organizations' incentives to implement changes in processes of care for all patients they serve. The development of all-payer claims databases may allow the measures we constructed to be applied to private insurer and Medicaid claims as well to better characterize the system-wide incentives and challenges facing ACOs across their multiple payers.

Because organizations often include subsets of physicians in ACO contracts with Medicare, we relied on AMA Group Practice data to identify other physicians in the organizations. Use of comprehensive physician directories obtained for a subgroup of ACOs, however, produced rates of outpatient specialty care leakage that were similar to rates calculated for other ACOs from the AMA data. Our study included only 145 of the organizations participating in Medicare ACO programs,[6,7,21-23] but our findings are generally consistent with previous analyses of physician-hospital networks, suggesting other ACOs that encompass health care provider referral networks may exhibit similar baseline patterns.[18,24,25] Finally, we could not distinguish health care provider switching from changing health care needs as sources of unstable assignment to ACOs.

Conclusions

Although the structure of ACOs and their responses to new payment incentives will evolve over time, baseline outpatient care patterns among Medicare beneficiaries served by ACOs suggest distinct challenges in achieving organizational accountability. Monitoring the constructs we examined may be important to determine the regulatory need for enhancing ACOs' incentives and their ability to improve care efficiency.

ARTICLE INFORMATION

Accepted for Publication: December 19, 2013.

Published Online: April 21, 2014. doi:10.1001/jamainternmed.2014.1073.

Author Contributions: Dr McWilliams had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Study concept and design: McWilliams, Chernew, Landon.
Acquisition of data: McWilliams, Dalton.
Analysis and interpretation of data: McWilliams, Landon.
Drafting of the manuscript: McWilliams.
Critical revision of the manuscript for important intellectual content: McWilliams, Chernew, Dalton, Landon.
Statistical analysis: McWilliams, Chernew, Dalton.
Obtained funding: McWilliams.
Administrative, technical, or material support: McWilliams, Dalton.
Study supervision: McWilliams.

Conflict of Interest Disclosures: None reported.

Funding/Support: This research was supported by grants from the Beeson Career Development Award Program (the American Federation for Aging Research and National Institute on Aging grant K08 AG038354), the Doris Duke Charitable Foundation (Clinical Scientist Development Award 2010053), and National Institute on Aging grant P01 AG032952.

Role of the Sponsors: The funding sources did not play a role in the design and conduct of the study;

collection, management, analysis, and interpretation of the data; or preparation, review, and approval of the manuscript.

Additional Contributions: We are grateful to Pasha Hamed, MA, Department of Health Care Policy, Harvard Medical School, for statistical programming support. Mr Hamed's contributions were supported by the same funding sources as the authors' contributions.

REFERENCES

1. Sinaiko AD, Rosenthal MB. Patients' role in accountable care organizations. *N Engl J Med*. 2010;363(27):2583-2585.

2. Pham HH, Schrag D, O'Malley AS, Wu B, Bach PB. Care patterns in Medicare and their implications for pay for performance. *N Engl J Med*. 2007;356(11):1130-1139.

3. Department of Health and Human Services; Centers for Medicare & Medicaid Services. Medicare program: Medicare Shared Savings Program: Accountable Care Organizations: final rule. http://www.gpo.gov/fdsys/pkg/FR-2011-11-02/pdf/2011-27461.pdf. Accessed January 13, 2014.

4. Centers for Medicare & Medicaid Services. National Provider Identifier Registry. https://npiregistry.cms.hhs.gov/NPPESRegistry/NPIRegistryHome.do. Accessed January 13, 2014.

5. Center for Medicare & Medicaid Services. Medicare Shared Savings Program: shared savings and losses and assignment methodology specifications. http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/Shared-Savings-Losses-Assignment-Spec-v2.pdf. Accessed January 13, 2014.

6. Centers for Medicare & Medicaid Services. Pioneer Accountable Care Organizations succeed in improving care, lowering costs. http://www.cms.gov/Newsroom/MediaReleaseDatabase/Press-Releases/2013-Press-Releases-Items/2013-07-16.html. Accessed January 13, 2014.

7. Centers for Medicare & Medicaid Services. More partnerships between doctors and hospitals strengthen coordinated care for Medicare beneficiaries. http://www.cms.gov/Newsroom/MediaReleaseDatabase/Press-Releases/2013-Press-Releases-Items/2013-12-23.html. Accessed January 13, 2014.

8. McWilliams JM, Chernew ME, Zaslavsky AM, Landon BE. Post-acute care and ACOs: who will be accountable? *Health Serv Res*. 2013;48(4):1526-1538.

9. McWilliams JM, Chernew ME, Zaslavsky AM, Hamed P, Landon BE. Delivery system integration and health care spending and quality for Medicare beneficiaries. *JAMA Intern Med*. 2013;173(15):1447-1456.

10. McWilliams JM, Landon BE, Chernew ME. Changes in health care spending and quality for Medicare beneficiaries associated with a commercial ACO contract. *JAMA*. 2013;310(8):829-836.

11. Song Z, Ayanian JZ, Wallace J, He Y, Gibson TB, Chernew ME. Unintended consequences of eliminating Medicare payments for consultations. *JAMA Intern Med*. 2013;173(1):15-21.

12. Centers for Medicare & Medicaid Services Chronic Condition Data Warehouse. https://www.ccwdata.org/index.htm. Accessed January 13, 2014.

13. Binder DA. On the variances of asymptotically normal estimators from complex surveys. *Int Stat Rev*. 1983;51:279-292.

14. Peikes D, Zutshi A, Genevro JL, Parchman ML, Meyers DS. Early evaluations of the medical home: building on a promising start. *Am J Manag Care*. 2012;18(2):105-116.

15. Rosenthal MB, Friedberg MW, Singer SJ, Eastman D, Li Z, Schneider EC. Effect of a multipayer patient-centered medical home on health care utilization and quality: the Rhode Island chronic care sustainability initiative pilot program. *JAMA Intern Med*. 2013;173(20):1907-1913.

16. Jackson GL, Powers BJ, Chaterjee R, et al. The patient-centered medical home: a systematic review. *Ann Intern Med*. 2013;158(3):169-178. http://annals.org/article.aspx?doi=10.7326/0003-4819-158-3-201302050-00579&an_fo_ed. Accessed March 5, 2014.

17. Welch WP, Cuellar AE, Stearns SC, Bindman AB. Proportion of physicians in large group practices continued to grow in 2009-11. *Health Aff (Millwood)*. 2013;32(9):1659-1666.

18. Lewis VA, McClurg AB, Smith J, Fisher ES, Bynum JP. Attributing patients to accountable care organizations: performance year approach aligns stakeholders' interests. *Health Aff (Millwood)*. 2013;32(3):587-595.

19. Kaiser Health News. MedPAC contemplates link between ACOs and Medigap plans. http://www.kaiserhealthnews.org/Daily-Reports/2013/September/13/medpac-and-acos.aspx.

20. Center for Medicare & Medicaid Innovation. Pioneer Accountable Care Organization (ACO) model request for application. http://innovation.cms.gov/Files/x/Pioneer-ACO-Model-Request-For-Applications-document.pdf. Accessed January 13, 2014.

21. Centers for Medicare & Medicaid Services. CMS names 88 new Medicare Shared Savings Accountable Care Organizations. http://www.cms.gov/apps/media/press/factsheet.asp?Counter=4405&intNumPerPage=10&checkDate=&checkKey=&srchType=1&numDays=3500&srchOpt=0&srchData=&keywordType=All&chkNewsType=6&intPage=&showAll=&pYear=&year=&desc=&cboOrder=date. Accessed January 13, 2014.

22. Centers for Medicare & Medicaid Services. First Accountable Care Organizations under the Medicare Shared Savings Program. http://www.cms.gov/apps/media/press/factsheet.asp?Counter=4334&intNumPerPage=10&checkDate=&checkKey=&srchType=1&numDays=3500&srchOpt=0&srchData=&keywordType=All&chkNewsType=6&intPage=&showAll=&pYear=&year=&desc=false&cboOrder=date. Accessed January 13, 2014.

23. Centers for Medicare & Medicaid Services. More doctors, hospitals partner to coordinate care for people with Medicare. http://www.cms.gov/apps/media/press/release.asp?Counter=4501&intNumPerPage=10&checkDate=&checkKey=&srchType=1&numDays=3500&srchOpt=0&srchData=&keywordType=All&chkNewsType=1%2C+2%2C+3%2C+4%2C+5&intPage=&showAll=&pYear=&year=&desc=&cboOrder=date. Accessed January 13, 2014.

24. Bynum JP, Bernal-Delgado E, Gottlieb D, Fisher E. Assigning ambulatory patients and their physicians to hospitals: a method for obtaining population-based provider performance measurements. *Health Serv Res*. 2007;42(1 Pt 1):45-62.

25. Fisher ES, Staiger DO, Bynum JP, Gottlieb DJ. Creating accountable care organizations: the extended hospital medical staff. *Health Aff (Millwood)*. 2007;26(1):w44-w57.