A Taxonomy of Accountable Care Organizations for Policy and Practice

Stephen M. Shortell, Frances M. Wu, Valerie A. Lewis, Carrie H. Colla, and Elliott S. Fisher

Objective. To develop an exploratory taxonomy of Accountable Care Organizations (ACOs) to describe and understand early ACO development and to provide a basis for technical assistance and future evaluation of performance.

Data Sources/Study Setting. Data from the National Survey of Accountable Care Organizations, fielded between October 2012 and May 2013, of 173 Medicare, Medicaid, and commercial payer ACOs.

Study Design. Drawing on resource dependence and institutional theory, we develop measures of eight attributes of ACOs such as size, scope of services offered, and the use of performance accountability mechanisms. Data are analyzed using a two-step cluster analysis approach that accounts for both continuous and categorical data.

Principal Findings. We identified a reliable and internally valid three-cluster solution: *larger, integrated systems* that offer a broad scope of services and frequently include one or more postacute facilities; *smaller, physician-led practices*, centered in primary care, and that possess a relatively high degree of physician performance management; and *moderately sized, joint hospital–physician and coalition-led groups* that offer a moderately broad scope of services with some involvement of postacute facilities.

Conclusions. ACOs can be characterized into three distinct clusters. The taxonomy provides a framework for assessing performance, for targeting technical assistance, and for diagnosing potential antitrust violations.

Key Words. Accountable care organizations, Medicare, health care reform, incentives in health care, health policy, delivery of health care

The Affordable Care Act (ACA) granted the Centers for Medicare and Medicaid Services (CMS) the authority to create accountable care organizations (ACOs) with the intent that this new payment and delivery model might help achieve the triple aim goals of better quality of care, greater population health, and lower growth in health care cost (Berenson and Devers 2009; Shortell and Casalino 2010; Colla et al. 2012; Fisher et al. 2012). Private insurers and Medicaid programs have also begun to contract with ACOs (Larson

et al. 2012; McGinnis and Small 2012; Lewis et al. 2014). ACOs are entities that take responsibility for both the cost and quality of care for a defined population of patients. Although there are a variety of different payment arrangements, the key idea is that the ACO has financial incentives to improve quality based on predefined criteria and keep overall costs within a target budget.

But given the historical difficulty of bringing together hospitals, physicians, and other delivery organizations to provide integrated care, the ACO concept has met with skepticism (Burns and Pauly 2012; Mathews 2012; Christensen, Flier, and Vijayaraghavan 2013). Yet today, there are an estimated over 600 ACOs, both federal and private, with diverse organizational attributes (Larson et al. 2012; Lewis et al. 2014; Muhlestein, Crowshaw, and Pena 2014). With so much activity under way and so little known about the ACO model (Fisher et al. 2012), there is a great need to understand these new organizations; identify some of the characteristics that may be associated with their success or failure; help target needs for technical assistance and support; and measure their progress in achieving performance goals (Fisher et al. 2012; Kroch et al. 2012; Larson et al. 2012). With these objectives in mind, we develop a conceptually based exploratory taxonomy of ACOs that policy makers, practitioners, and researchers can use to achieve the above objectives.

THE SURVEY

To construct our taxonomy, we use data from the first National Survey of ACOs, fielded between October of 2012 and May of 2013, which has been previously described (Colla et al. 2014). The survey sample included (1) ACOs participating in Medicare ACO programs; (2) ACOs participating in state Medicaid ACO programs; and (3) ACOs formed in partnership with commercial payers. ACOs in each of the three categories were identified through various sources, primarily from publicly available announcements, articles, and press releases. Of the 292 potentially eligible organizations, 30

Address correspondence to Stephen M. Shortell, Ph.D., School of Public Health, University of California, Berkeley, 50 University Hall, Berkeley, CA 94720; e-mail: shortell@berkeley.edu. Frances M. Wu, Ph.D., is with the School of Public Health, University of California, Berkeley, CA. Valerie A. Lewis, Ph.D., Carrie H. Colla, Ph.D., and Elliott S. Fisher, M.D., are with The Dartmouth Institute for Health Policy and Clinical Practice, Geisel School of Medicine at Dartmouth, Lebanon, NH.

failed to meet the screening criteria defined above, 42 did not complete the screening questions, and 47 were eligible but did not complete the survey. This resulted in 173 ACOs potentially available for analysis yielding a response rate of 70 percent (American Association for Public Opinion Research 2011). This analysis is based on 162 ACOs with complete data on all relevant variables.

The survey was primarily web-based (three respondents completed by phone) and was completed by the person most knowledgeable about the ACO—typically the president, chief executive officer, chief medical officer, or chief administrative officer.

DEVELOPING THE TAXONOMY

The taxonomy is grounded in two well-developed theories of organizations—resource dependence theory (Aldrich and Pfeffer 1976; Pfeffer and Salancik 1978) and institutional theory (Meyer and Rowan 1977; DiMaggio and Powell 1983; Scott et al. 2000; and Davis and Cobb 2010). Resource dependence theory emphasizes the organization's desire to minimize uncertainty and dependence. Institutional theory emphasizes that organizations are embedded within larger societal norms and cultures that over time reflect "appropriate" or desired behavior (Selznick 1957). Given the sea-change created by the ACA, ACOs will need to obtain resources required by new models of care and to respond to new quality, cost, patient experience and related measures, standards, and expectations. As a result, we developed measures that reflect these resource and institutional considerations.

The eight specific measures included the ACO's size, number of different types of participating provider organizations within the ACO (including nursing or postacute care facilities), the scope of services offered, whether the ACO belongs to an integrated delivery system (IDS), the percent of primary care clinicians, their institutional leadership model, the performance management system used for accountability, and the ACO's prior experience with payment models other than fee-for-service. The survey questions used for each measure are shown in Table 1.

Larger organizations are often relatively less dependent on the environment as a result of economies of scale, having greater resources to invest in electronic health records, chronic disease care managers, and related service innovations (Banaszak-Holl, Zinn, and Mor 1996; Casalino et al. 2003; Robinson et al. 2009; Jha et al. 2010; Rittenhouse et al. 2011; DesRoches

Table 1:   NSACO Survey Questions Used for Cluster Analysis

Item	NSACO Survey Questions
Size (total FTE)	Approximately, how many full-time equivalent (FTE) primary care clinicians are participating in the ACO? Approximately, how many FTE specialty clinicians are participating in the ACO?
Breadth of participation	For each type of provider organization, please identify how many are participating (i.e., have members attributed) in the ACO for which you completed this survey: Hospital, Nursing facility (e.g., nursing home skilled nursing facilities), Federally Qualified Health Center or rural health center, Medical group, Specialist group
Scope of services	Please indicate the highest level of engagement that the following provider groups have with the ACO: Primary care, Routine specialty care (e.g., orthopedics), Specialized care, such as transplants, Hospital inpatient care, Emergency care, Nonemergency urgent care, Inpatient rehabilitation services, Outpatient rehabilitation services, Behavioral health, Skilled nursing facility, Pediatric health, Palliative/hospice, Home health/visiting nurse, Outpatient pharmacy, Other. Response options: Within the ACO, Contracted outside, No formal relationship, Don't know
Integrated delivery system	Do you consider your organization to be an integrated delivery system? Response options: Yes, No, Don't know
Percent primary care	Approximately, how many FTE primary care clinicians are participating in the ACO? Approximately, how many FTE specialty clinicians are participating in the ACO?
Institutional Leadership type	Which of the following best describes the organization of your ACO? Response options: Physician-led, Hospital-led, Jointly led by physicians and hospital, Coalition-led, State, region, or county-led, Some other arrangement
Physician performance management	Which of the following approaches are used to manage physician performance in the ACO (choose all that apply)? Response options: individual physician performance measures on quality are reported and shared among peers within the organization, Individual physician performance measures on cost are reported and shared among peers within the organization, Active management through one-on-one review and feedback, Individual financial incentives, Individual nonfinancial awards or recognition, None
Payment reform experience	Has the ACO or any of its participating provider organizations participated in any of the following payment reform efforts? Response options: Bundled or episode-based payments. Patient centered medical home (PCMH), Pay-for-performance programs, Publicly report quality measures, Other risk-bearing contracts, for example, capitation, Other payment reform effort. Responses: ACO, ACO Provider Group, Neither ACO nor Group, Don't know

et al. 2013). Size is measured by the number of full-time equivalent (FTE) clinicians associated with the ACO.

ACOs involving a greater number of health care organizations may also minimize dependence on the environment, and larger networks have been associated with greater chances for survival (Baum and Oliver 1996) and overall effectiveness (Provan and Milward 1995). One point was assigned for the presence of each of the five provider types: hospitals, medical groups, specialist groups, nursing facilities, or federally qualified health centers that participated in the ACO (1–5).

Having a broad scope of services may be part of a differentiation strategy enabling an ACO to attract more patients and better meet patient needs (Bazzoli et al. 1999; Dubbs et al. 2004). Each ACO was assigned a point for each of 15 services for which the respondent answered that the service was offered "Within the ACO" or "Contracted outside."

An IDS is an entity that oversees a set of organizations that provide a continuum of care to a defined population and are willing to be held clinically and fiscally accountable for the outcomes and health status of the population served (Shortell et al. 1996). These ACOs may have more experience in managing highly complex patients with multiple chronic illnesses, establishing linkages with community agencies, and transferring clinical data electronically across settings (Weeks et al. 2010). Survey respondents were asked directly whether they belong to an IDS.

Normative pressures have been created for ACOs to emphasize primary care to be seen as "legitimate" or credible (Arndt and Bigelow 2000) in efforts to reduce hospital readmissions and emergency department visits (Davis, Schoenbaum, and Audet 2005; Bodenheimer 2008). For example, the National Committee for Quality Assurance has developed accrediting criteria for patient-centered medical homes and most recently for ACOs as well. We measured the percentage of primary care clinician FTEs affiliated with the ACO by dividing the number of affiliated primary care FTEs by total number of affiliated primary and specialty care FTEs.

Little is known about which institutional leadership model might be best suited to successful ACO development and performance, but there is wide agreement on its importance (Crosson and Tollen 2010; Kocher and Sahni 2010; Goldsmith 2011; Burns and Pauly 2012; Colla et al. 2014). We measured institutional leadership by whether the ACO was physician-led, jointly-led (between physicians and hospitals), or some other arrangement.

Given the emphasis on holding ACOs accountable, the mechanisms they use to hold their individual physicians accountable is important to assess.

Questions were asked about individual physician performance feedback measures on quality, cost, active management through one-on-one review and feedback, individual financial incentives, and nonfinancial awards of recognition. The ACO was assigned one point for each of the five strategies used.

Finally, an ACO's ability to assess and manage patient care risk under the new payment models that reward value over volume will likely be an important determinant of its success. Even large medical groups may lack the necessary capabilities if they lack risk contracting experience (Mechanic and Zinner 2012). Prior experience with new payment models might provide the ACO with greater knowledge and skills to achieve their cost and quality targets. Respondents were asked whether they had prior experience participating in bundled or episode-based payments, pay-for-performance, and related arrangements. One point was assigned for every payment reform effort for which the respondent replied that the "ACO" or "ACO Provider Group" participated (0–6).

Methods

The primary analytic steps in taxonomical work have been identified in prior work (Alexander, Anderson, and Lewis 1985; Ketchen and Shook 1996; Bazzoli et al. 1999) and consist of the following three stages:

1. Cluster analysis to formulate groupings based on several ACO characteristics that are similar among grouped observations;
2. Pairwise comparisons to determine which characteristics are similar or dissimilar across clusters;
3. Discriminant analysis to validate the cluster solutions, using discriminant functions to determine rates of correct classifications.

The two-step cluster analysis approach was used to account for both continuous and categorical variables in a single analysis (Chiu et al. 2001). The first stage of the algorithm is similar to the k-means algorithm, the results of which are used in the second stage to form homogeneous clusters. The continuous variables, size as measured by the total number of FTE clinicians and percent of FTE clinicians who were primary care, were standardized for the analysis. We repeated the two-step procedure on random split halves of the sample to assess the reliability of the cluster solutions.

We use the Duncan multiple range test for cross-cluster comparisons, but validated them with the Tukey–Kramer multiple comparison procedure, which reduces the false-positive rate (Ramsey 1993).

In the final stage, discriminant analysis was used to internally validate the cluster solutions. Discriminant functions use the eight ACO attributes as independent variables, similar to a regression equation, to distinguish between the groups or clusters. The functions maximize the distance between the means of the dependent variable clusters to increase the discriminatory power between groups (May 1982). We compare the cluster classification through the discriminant analysis with the original cluster assignments.

PASW version 17.0 (IBM Corp, Somers, NY, USA) was used for two-step cluster analysis. We used *STATA* version 12.0 (StataCorp, College Station, TX, USA) for all other statistical analyses.

RESULTS

Exploring both the automatic clustering algorithm and fixing the cluster solutions to recognize potential limitations of the two-step approach (Bacher, Wenzig, and Vogler 2004) resulted in three significant statistically different clusters of ACOs as shown in Table 2. In order of predictor importance, the relative contribution of the eight attributes to the cluster solution from greatest to least

Table 2: Summary of Three-Cluster Solutions Using the Two-Step Approach

	Cluster		
Measure	*IDS*	*Physician-Led*	*Hybrid*
N	65	55	42
Total FTE physicians**, mean	566.2	180.7	351.3
Provider group participation (0–5)**, mean	3.0	1.4	2.7
Scope of services (0–15)**, mean	11.1	4.6	10.1
Integrated delivery system**, % yes	93.8	10.9	26.2
Percent primary care**, mean	42.5	68.8	58.5
Institutional leadership type**			
% Physician-led	40.0	90.9	21.4
% Jointly-led	56.9	0.0	38.1
Performance management/accountability** (0–5), mean	2.4	3.1	1.8
Payment reform experience (0–5)**, mean	3.9	2.3	3.7

Note. Chi-square test used for cross-cluster comparisons for integrated delivery system and leadership type, ANOVA for all other variables.
**Significance at the .01 level across clusters; *significance at the .05 level across clusters.

was as follows: IDS status, institutional leadership type, breadth of provider group participation, size, prior payment reform experience, scope of services, percent primary care, and physician performance management. The first cluster, representing 40.1 percent of respondents ($N = 65$), consists of large IDS ACOs, with over 90 percent of organizations in the cluster self-identifying as an IDS. About 40 percent of these organizations identify as physician-led. These large ACOs have a mean of 566 FTE physicians and offer a very broad scope of services (mean = 11, out of 15 possible). They are more likely to involve postacute facilities (29.2 percent include a nursing facility) and have a relatively low percent of primary care clinicians (mean = 42.5 percent). These ACOs have the most experience with payment reform but are relatively lower on their use of performance management/accountability mechanisms (mean = 2.4, out of 5 possible). We label them "larger, integrated delivery system" ACOs, due to their size and capacity.

The second cluster, representing 34 percent of respondents ($N = 55$), is characterized by smaller size (mean = 181 FTE), being primarily physician-led (mean = 90.9 percent), and offering a relatively narrow scope of services within the organizations that are formally part of the ACO (mean = 4.6, out of possible 15). These ACOs are typically not associated with an IDS, include fewer types of organizations (mean = 1.4, out of 5 possible), and fewer report involving any nursing facility (3.6 percent). These organizations have little prior experience with payment reform (mean = 2.3, out of 5 possible), have a relatively high percentage of primary care clinicians (mean = 68.8 percent), and have a relatively high degree of performance management/accountability in place (mean = 3.1, out of 5 possible). We label these "smaller, physician-led" ACOs.

The third, representing 28.1 percent of the respondents ($N = 42$) are of moderate size, with a mean of 351 FTE physicians. These ACOs offer a moderately broad scope of services, including a mean 10.1 of 15 possible services. They tend to be hospital-led, coalition-led, state/region/county-led, or some other arrangement (40.5 percent), are somewhat likely to be part of an IDS (58.5 percent), and include some postacute facilities (28.6 percent include a nursing facility). On average, primary care clinicians make up 59 percent of the clinician workforce in these ACOs. They have some experience with payment reform (mean = 3.7, of five possible reform programs) but score relatively low on performance management/accountability (mean = 1.8, of five possible). We label these "hybrid ACOs."

Figure 1a and b provide information on the specific items of accountability mechanisms and payment reform efforts, respectively. In terms of physician

Figure 1:   (a) ACO Participation in Physician Performance Management/ Accountability, Percent within Cluster Who Participate; (b) ACO Participation in Payment Reform Strategies, Percent within Cluster with ACO or ACO Provider Group–Level Participation
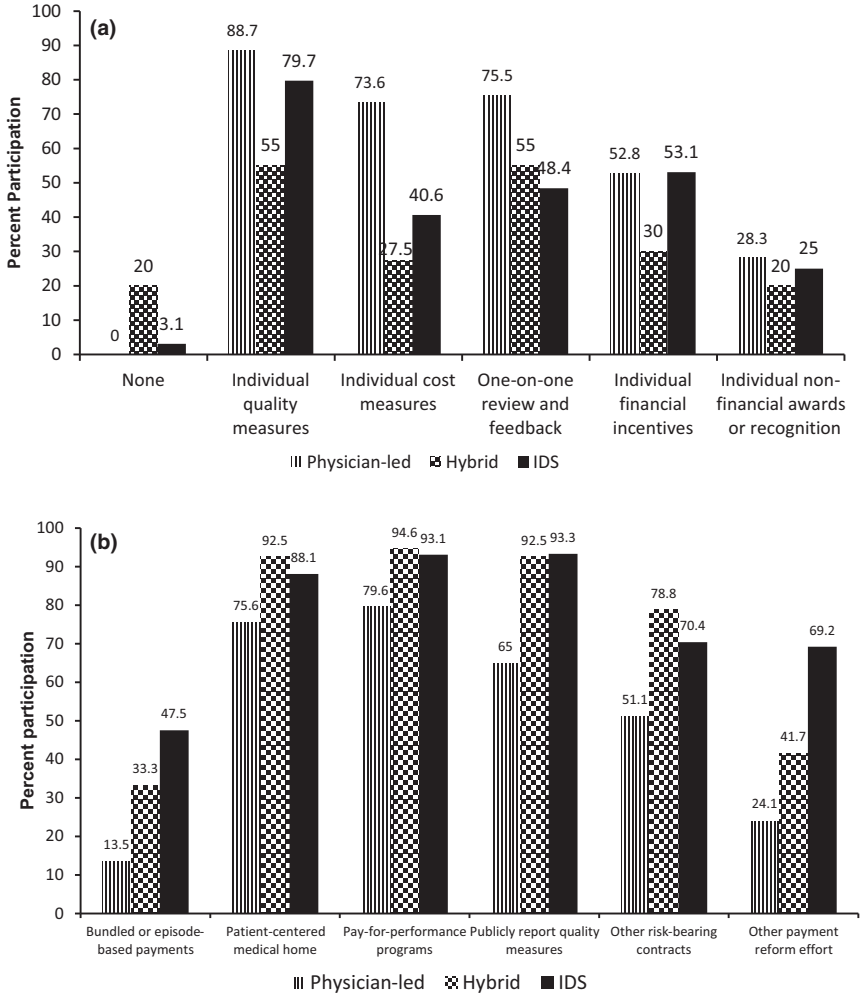
performance accountability mechanisms, it appears that physician-led ACOs report and share individual measures on quality and cost, and use individual incentives and one-on-one feedback more than the other two types. With regard to prior experience with different payment models, both hybrid led and IDS

Figure 2:   Plot of Discriminant Function Scores for Each ACO, $N = 162$
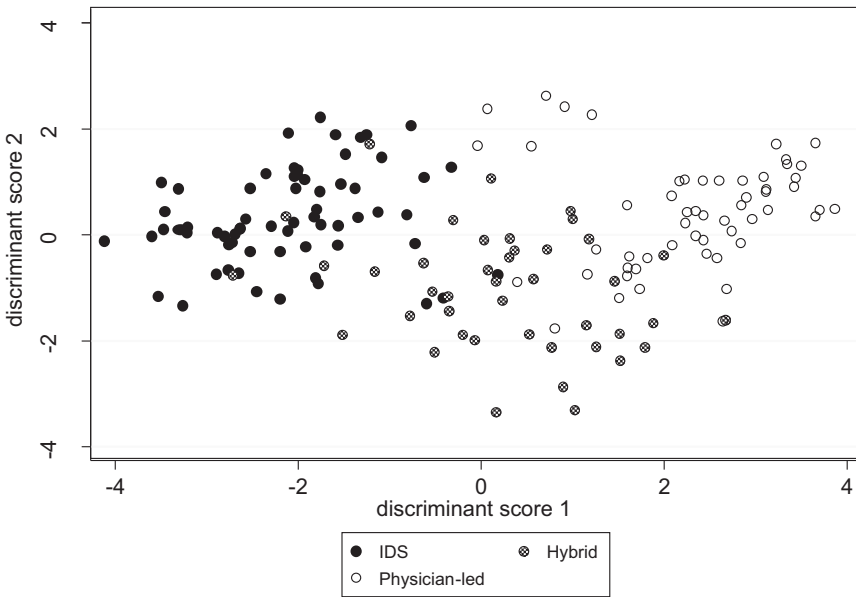
ACOs have more experience than physician-led ACOs with regard to patient-centered medical homes, pay-for-performance, public reporting on quality, and exposure to other risk-bearing contracts.

     The pairwise comparisons (data not shown) suggested a clear distinction between the physician-led ACOs and the hybrid ACOs and between the IDS ACOs and physician-led ACOs; the difference between the IDS ACOs and the hybrid ACO clusters is more nuanced. This is true specifically with regard to the breadth of participation and scope of services provided as well as payment reform experience.

     Based on the discriminant analysis, 93.8 percent of the IDS ACOs, 87.3 percent of the physician-led ACOs, and 76.2 percent of the hybrid ACOs were determined to be correctly classified through the cluster analysis. Overall, 87.0 percent of all ACOs were classified into the same groups in which they were originally assigned through the cluster approach. This provides relatively strong support for the resulting taxonomy. A visual representation of the three clusters based on their discriminant scores is presented in Figure 2.

     Preliminary tests of predictive validity indicated that the large IDS ACOs were more likely to take on two-sided risk and had higher care management capability, quality improvement capability, and electronic health record

capability than the smaller physician-led and the hybrid ACOs (data not shown). There were small differences between the latter two types.

LIMITATIONS

The taxonomy developed based on data from the first wave of the National Survey of ACOs is exploratory. It is based on only 162 of the earliest ACOs for which complete data were available. Thus, it is important that future research attempt to replicate the current taxonomy as additional ACOs are formed and as current ACOs continue to evolve.

The data were generated by the ACO respondent that we felt was the most knowledgeable about the ACOs operations and activities. This individual may not have been equally knowledgeable about each question, so some degree of measurement error exists. Also, while the responding ACOs were very similar to the nonresponding universe of Medicare ACOs on key variables, we know less about the representativeness of the ACOs that have Medicaid or commercial contracts. While the high 70 percent response rate guards against the possibility that inclusion of the nonrespondents would result in a substantially different taxonomic clustering of ACO types, it cannot be ruled out.

DISCUSSION AND IMPLICATIONS

This exploratory taxonomy suggests that given the conceptual grounding and measures used, ACOs can be grouped into three distinct clusters based on eight attributes involving size, breadth of provider group participation, scope of services provided, IDS participation, percent primary care physicians, institutional leadership model, performance management accountability, and prior payment reform experience. These attributes reflect the potential ability of ACOs to deal with the uncertainty and complexity associated with implementation of the ACA; to address new regulations and performance standards; and to be seen as legitimate or credible to payers and patients. The emergence of the three distinct types makes it potentially easier to assess performance with regard to quality, cost, and population health; to provide more targeted technical assistance and learning opportunities; to address potential antitrust issues; and to help both payers and current delivery organizations in deciding whether to enter into an ACO arrangement. With regard to assessing

performance, the taxonomy provides parsimony in analysis by not having to include eight separate variables or measures of ACO characteristics. It may also help to reveal where each type may be vulnerable and therefore where technical assistance might be best targeted. For example, the smaller physician-led ACOs may need to offer a broader scope of services and build out their network of partnerships; the large IDS ACOs' exposure to potential antitrust activities may prove problematic if they cannot meet cost and quality performance targets; and the hybrid ACOs may need help in increasing their performance management oversight and accountability. But it is important to note that while there are clear differences in size, scope of services offered, institutional leadership models, and related attributes, the taxonomy should not be viewed as hierarchical or sequential or, necessarily, as stages in development. Whether ACOs "pass through" or migrate from one cluster category to another over time is an empirical question that can only be addressed with longitudinal data that examine the cluster types using the triple aim cost, quality, and population health performance metrics. Each type of ACO may develop strategies that work, though successful strategies may differ across clusters, consistent with the underlying organizational and structural differences reflected in the taxonomy.

With regard to the antitrust issue, the taxonomy may be of assistance to the Federal Trade Commission and Department of Justice particularly with regard to the large IDS ACOs, which may be a primary target in terms of their potential ability to raise prices due to their negotiating leverage. Most of the current antitrust concern involves larger IDS hospital/health system mergers and consolidations (Haas-Wilson and Garmon 2011). Smaller physician-led ACOs may pose less of a threat because they typically are less able to exert the same negotiating leverage with insurers relative to the large hospital/health systems. Thus, the emergence and evolution of different types of ACO arrangements raises the question of how best to balance the potential gains of consolidations that result in more coordinated less fragmented care while mitigating the potential for raising prices through increased market power (Leibenluft 2011; Scheffler, Shortell, and Wilensky 2012).

The taxonomy may also help payers identify future ACO participants by comparing the characteristics of likely new prospects with those of the three clusters (Table 2). It also provides a potential diagnostic tool for provider organizations considering ACO formation by assessing how their attributes match those of the three clusters with regard to potential strengths and weaknesses for meeting the challenges involved.

CONCLUSION

As has been true in studying the survival of hospitals over many decades (Ruef and Scott 1998; Scott et al. 2000), those ACOs that succeed will likely be those who can best adapt to new sources of resources and achieve legitimacy and credibility in meeting new performance standards, norms, regulations, and expectations as reflected in the eight attributes. Additional research is needed to validate and assess the stability of this baseline exploratory taxonomy as additional provider organizations become ACOs and as current ACOs evolve. Also, consideration should be given to including additional variables that might improve the taxonomy beyond those currently considered. Finally, to further its usefulness for policy and practice, the taxonomy needs to be linked to cost, quality, and population health metrics to see whether some types are more successful than others, on which dimensions of performance, and the degree of heterogeneity in performance that may exist within each type.

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REFERENCES

Aldrich, H. E., and J. Pfeffer. 1976. "Environments of Organizations." *Annual Review of Sociology* 2: 79–105.

Alexander, J. A., J. G. Anderson, and B. L. Lewis. 1985. "Toward an Empirical Classification of Hospitals in Multihospital Systems." *Medical Care* 23 (7): 913–32.

American Association for Public Opinion Research. 2011. *Final Dispositon of Case Codes ad Outcome Rates for Surveys. Standard Definitions* [accessed on March 13, 2014]. Available at http://aapor.org/Content/NavigationMenu/AboutAAPOR/StandardsampEthics/StandardDefinitions/StandardDefinitions2011.pdf.

Arndt, M., and B. Bigelow. 2000. "Presenting Structural Innovation in an Institutionalized Environment: Hospitals Use of Impression Management." *Administrative Science Quarterly* 45: 494–552.

Bacher, J., K. Wenzig, and M. Vogler. 2004. "SPSS TwoStep Cluster—A First Evaluation" [accessed on June 28, 2013]. Available at http://www.statisticalinnovations.com/products/twostep.pdf

Banaszak-Holl, J., J. S. Zinn, and V. Mor. 1996. "The Impact of Market and Organizational Characteristics on Nursing Care Facility Service Innovation: A Resource Dependency Perspective." *Health Services Research* 31 (1): 97–117.

Baum, J. A., and C. Oliver. 1996. "Toward An Institutional Ecology of Organizational Founding." *Academy of Management Journal* 39 (5): 1378–427.

Bazzoli, G. J., S. M. Shortell, N. Dubbs, C. Chan, and P. Kralovec. 1999. "A Taxonomy of Health Networks and Systems: Bringing Order Out of Chaos." *Health Services Research* 33 (6): 1683–717.

Berenson, R. A., and K. J. Devers. 2009. *Can Accountable Care Organizations Improve the Value of Health Care by Solving the Cost and Quality Quandaries?*. Washington, DC: The Urban Institute.

Bodenheimer, T. 2008. "Coordinating Care — A Perilous Journey through the Health Care System." *The New England Journal of Medicine* 358: 1064–71.

Burns, L. R., and M. V. Pauly. 2012. "Accountable Care Organizations May Have Difficulty Avoiding the Failures of Integrated Delivery Networks of the 1990s." *Health Affairs* 31 (11): 2407–16.

Casalino, L. P., R. R. Gillies, S. M. Shortell, J. A. Schmittdiel, T. Bodenheimer, J. C. Robinson, T. Rundall, N. Oswald, H. Schauffler, and M. C. Wang. 2003. "External Incentives, Information Technology, and Organized Processes to Improve Health Care Quality for Patients with Chronic Diseases." *Journal of the American Medical Association* 289 (4): 434–41.

Chiu, T., D. P. Fang, J. Chen, Y. Wang, and C. Jeris. 2001. "A Robust and Scalable Clustering Algorithm for Mixed Type Attributes in Large Database Environments." In *Proceedings of the 7th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, pp. 263–8. New York: ACM.

Christensen, C., J. Flier, and V. Vijayaraghavan. 2013. "The Coming Failure of 'Accountable Care'." *The Wall Street Journal* [accessed on October 4, 2013]. Available at http://online.wsj.com/article/SB10001424127887324880504578296902005944398.html

Colla, C. H., D. E. Wennberg, E. Meara, J. S. Skinner, D. Gottlieb, V. A. Lewis, C. M. Snyder and E. S. Fisher. 2012. "Spending Differences Associated with the

Medicare Physician Group Practice Demonstration Program." *Journal of the American Medical Association* 308 (10): 1015–23.

Colla, C. H., V. A. Lewis, S. M. Shortell, and E. S. Fisher. 2014. "First National Survey of ACOs Finds That Physicians Are Playing Strong Leadership and Ownership Roles." *Health Affairs* 33 (6): 1–9.

Crosson, F. J., and L. A. Tollen. 2010. *Partners in Health: How Physicians and Hospitals Can Be Accountable Together*. San Francisco, CA: Jossey-Bass.

Davis, G. F., and J. A. Cobb. 2010. "Resource Dependence Theory: Past and Future." *Research in the Sociology of Organizations* 28: 21–42.

Davis, K., S. C. Schoenbaum, and A.-M. Audet. 2005. "A 2020 Vision of Patient-Centered Primary Care." *Journal of General Internal Medicine* 20: 953–7.

DesRoches, C. M., C. Worzala, M. S. Joshi, P. D. Kralovec, and A. K. Jha. 2013. "Small, Nonteaching, and Rural Hospitals Continue to Be Slow in Adopting Electronic Health Record Systems." *Health Affairs* 31 (5): 1092–9.

DiMaggio, P. J., and W. W. Powell. 1983. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields." *American Sociological Review* 48 (2): 147–60.

Dubbs, N. L., G. J. Bazzoli, S. M. Shortell, and P. D. Kralovec. 2004. "Reexamining Organizational Configurations: An Update, Validation, and Expansion of the Taxonomy of Health Networks and Systems." *Health Services Research* 39: 207–20.

Fisher, E. S., S. M. Shortell, S. A. Kreindler, A. D. Van Citters, and B. K. Larson. 2012. "A Framework for Evaluating the Formation, Implementation, and Performance of Accountable Care Organizations." *Health Affairs* 31 (11): 2368–78.

Goldsmith, J. 2011. "Accountable Care Organizations the Case for Flexible Partnerships between Health Plans and Providers." *Health Affairs* 30 (1): 32–40.

Haas-Wilson, D., and C. Garmon. 2011. "Hospital Mergers and Competitive Effects: Two Retrospective Analyses." *International Journal of Economics of Business* 18 (10): 17–32.

Jha, A. K., C. M. DesRoches, P. D. Kralovec, and M. S. Joshi. 2010. "A Progress Report on Electronic Health Records in U.S. Hospitals." *Health Affairs* 29 (10): 1951–7.

Ketchen, D. J., and C. L. Shook. 1996. "The Application of Cluster Analysis in Strategic Management Research: An Analysis and Critique." *Strategic Management Journal* 17 (6): 441–58.

Kocher, R., and N. R. Sahni. 2010. "Physicians versus Hospitals as Leaders of Accountable Care Organizations." *New England Journal of Medicine* 363: 2579–82.

Kroch, E., R. W. Champion, S. D. DeVore, M. R. Kugel, D. A. Lloyd, and L. Rothney-Kozlak. 2012. "Measuring Progress toward Accountable Care." *The Commonwealth Fund*. [accessed on September 12, 2013]. Available at http://www.commonwealthfund.org/Publications/Fund-Reports/2012/Dec/Measuring-Accountable-Care.aspx

Larson, B. K., A. D. Van Citters, S. A. Kreindler, K. L. Carluzzo, J. N. Gbemudu, F. M. Wu, E. C. Nelson, S. M. Shortell, and E. S. Fisher. 2012. "Insights from Transformations under Way at Four Brookings-Dartmouth Accountable Care Organization Pilot Sites." *Health Affairs* 31 (11): 2395–406.

Leibenluft, R. F. 2011. "ACOs and the Enforcement of Fraud, Abuse, and Antitrust Laws." *New England Journal of Medicine* 364: 99–101.

Lewis, V. A., C. H. Colla, W. L. Schpero, S. M. Shortell, and E. S. Fisher. 2014. "ACO Contracting with Private and Public Payers: A Baseline Comparative Analysis." *American Journal of Managed Care* Forthcoming.

Mathews, A. W. 2012. "Can Accountable Care Organization Improve Health Care While Reducing Costs?" *The Wall Street Journal* [accessed on October 4, 2013]. Available at http://online.wsj.com/article/SB10001424052970204720204577 128901714576054.html

May, R. W. 1982. "Discriminant Analysis in Cluster Analysis." In *Classifying Social Data*, edited by H. C. Hudson & Associates, pp. 39–55. San Francisco, CA: Jossey-Bass.

McGinnis, T., and D. Small. 2012. Accountable Care Organizations in Medicaid: Emerging Practices to Guide Program Design. Center for Health Care Strategies, Inc. [accessed on September 12, 2013]. Available at http://www.chcs.org/usr_doc/Creating_ACOs_in_Medicaid.pdf

Mechanic, R., and D. E. Zinner. 2012. "Many Large Medical Groups Will Need to Acquire New Skills and Tools to Be Ready for Payment Reform." *Health Affairs (Millwood)* 31 (9): 1984–91.

Meyer, J. W., and B. Rowan. 1977. "Institutionalized Organizations: Formal Structure as Myth and Ceremony." *American Journal of Sociology* 83: 41–62.

Muhlestein, D., T. Crowshaw, and C. Pena. 2014. "Accountable Care Growth in 2014: A Look Ahead." *Health Affairs Blog* [accessed on February 3, 2014]. Available at http://healthaffairs.org/blog/2014/01/29/accountable-care-growth-in2014-a-lookahead/

Pfeffer, J., and G. R. Salancik. 1978. *The External Control of Organizations: A Resource Dependence Perspective*. New York: Harper & Row.

Provan, K. G., and B. H. Milward. 1995. "A Preliminary Theory of Interorganizational Network Effectiveness; A Comparative Study of Four Community Mental Health Systems." *Administrative Science Quarterly* 40 (1): 1–33.

Ramsey, P. H. 1993. "Multiple Comparisons of Independent Means." In *Applied Analysis of Variance in Behavioral Science*, edited by L. K. Edwards, pp. 25–62. New York: Marcel Dekker.

Rittenhouse, D. R., L. P. Casalino, S. M. Shortell, S. R. McClellan, R. R. Gillies, J. A. Alexander, and M. L. Drum. 2011. "Small and Medium-Size Physician Practices Use Few Patient-Centered Medical Home Processes." *Health Affairs* 30 (8): 1575–84.

Robinson, J. C., L. P. Casalino, R. R. Gillies, D. R. Rittenhouse, S. M. Shortell, and S. Fernandes-Taylor. 2009. "Financial Incentives, Quality Improvement Programs, and the Adoption of Clinical Information Technology." *Medical Care* 47 (4): 411–7.

Ruef, M., and W. R. Scott. 1998. "A Multidimensional Model of Organizatoanl Legitimacy: Hospital Survival in Changing Institutional Markets." *Administrative Science Quarterly* 43 (4): 877–904.

Scheffler, R. M., S. M. Shortell, and G. R. Wilensky. 2012. "Accountable Care Organizations and Antitrust." *Journal of the American Medical Association* 307 (14): 1493–4.

Scott, W. R., M. Reuf, P. J. Mendel, and C. A. Caronna. 2000. *Institutional Change and Health Care Organizations: From Professional Dominance to MANAGED CARE.* Chicago: University of Chicago Press.

Selznick, P. 1957. *Leadership in Administration.* New York: Harper and Row.

Shortell, S. M., and L. P. Casalino. 2010. "Implementing Qualifications Criteria and Technical Assistance for Accountable Care Organizations." *Journal of the American Medical Association* 303 (17): 1747–8.

Shortell, S. M., R. R. Gillies, D. A. Anderson, K. M. Erickson, and J. B. Mitchell. 1996. *Remaking Health Care in America.* San Francisco, CA: Jossey-Bass.

Weeks, W. B., D. J. Gottlieb, D. E. Nyweide, J. M. Sutherland, J. Bynum, L. P. Casalino, R. R. Gillies, S. M. Shortell, and E. S. Fisher. 2010. "Higher Health Care Quality and Bigger Savings Found at Large Multispecialty Medical Groups." *Health Affairs (Millwood)* 29 (5): 991–7.

Supporting Information

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.
Appendix SA2: Criterion Measures Used for Predictive Validity.