

# Primary Care Clinics and Accountable Care Organizations

Health Services Research and  
Managerial Epidemiology  
1-8

© The Author(s) 2015

Reprints and permission:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/2333392815613056

hme.sagepub.com



Judith Ortiz, PhD<sup>1</sup>, Chiung-Ya Tang, PhD<sup>2</sup>, Yi-Ling Lin, MS<sup>1</sup>,  
and Maysoun D. Masri, ScD, MBA, MPH<sup>1</sup>

## Abstract

**Background:** The Accountable Care Organization (ACO) is one of the new models of health care delivery in the United States. To date, little is known about the characteristics of health care organizations that have joined ACOs. We report on the findings of a survey of primary care clinics, the objective of which was to investigate the opinions of clinic management about participation in ACOs and the characteristics of clinic organizational structure that may contribute to joining ACOs or be willing to do so.

**Methods:** A 27-item survey questionnaire was developed and distributed by mail in 3 annual waves to all Rural Health Clinics (RHCs) in 9 states. Two dependent variables—participation in ACOs and willingness to join ACOs—were created and analyzed using a generalized estimating equation approach.

**Results:** A total of 257 RHCs responded to the survey. A small percentage (5.2%) of the respondent clinics reported that they were participating in ACOs. Rural Health Clinics in isolated areas were 78% less likely to be in ACOs (odds ratio = 0.22,  $P = .059$ ). Nonprofit RHCs indicated a higher willingness to join an ACO than for-profit RHCs ( $B = 1.271$ ,  $P = .054$ ). There is a positive relationship between RHC size and willingness to join an ACO ( $B = 0.402$ ,  $P = .010$ ).

**Conclusion:** At this early stage of ACO development, many RHC personnel are unfamiliar with the ACO model. Rural providers' limited technological and human resources, and the lack of ACO development in rural areas, may delay or prevent their participation in ACOs.

## Keywords

accountable care organizations, primary care, rural health, family health, practice management

## Background

New models for health care delivery are bringing about change at an accelerated rate. Unlike models of the past that were perceived as health insurer driven (the managed care model) or hospital driven (the hospital system model), these models promise to be more primary care oriented and patient centered.

One of these new models is the Accountable Care Organization (ACO). Facilitated by the enactment of the Patient Protection and Affordable Care Act (ACA), ACOs are of several types. One of these, the Medicare ACO, has been described as "... groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients."<sup>1</sup>

This article reports on the findings of a survey about Rural Health Clinic (RHC) participation in ACOs and RHC characteristics related to their participation in ACOs and their willingness to join ACOs. Rural Health Clinics are a large portion

of the primary care providers serving rural areas—there are about 4000 nationwide. These clinics are certified through the RHC Program, which was established in 1977 to improve access to primary care in underserved rural areas.<sup>2</sup> Many RHCs and other primary care providers are currently evaluating the prospect of joining ACOs.

The survey investigated the opinions of RHC management about RHC participation in ACOs as well as the characteristics

<sup>1</sup> College of Health and Public Affairs, University of Central Florida, Orlando, FL, USA

<sup>2</sup> Rural Health Research Group, University of Central Florida, Orlando, FL, USA

## Corresponding Author:

Judith Ortiz, College of Health and Public Affairs, University of Central Florida, PO Box 162369, Orlando, FL 32816, USA.

Email: judith.ortiz@ucf.edu



Creative Commons CC-BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 3.0 License (<http://www.creativecommons.org/licenses/by-nc/3.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access page (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

of RHC organizational structure that may contribute to RHCs' joining ACOs or being willing to do so. It was conducted as part of a larger, longitudinal study that concerns the 8 states that comprise region 4 (as defined by the Department of Health and Human Services (DHHS)): Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi.

## Literature Review

Much of the literature to date describes contributors to ACO formation,<sup>3,4</sup> decision making about ACO participation,<sup>5</sup> or factors related to ACO success.<sup>6</sup> Less is known about the characteristics of health care organizations that have either joined ACOs or are willing to do so. On the system level, integrated delivery systems (IDSs) are often viewed as likely candidates to evolve into ACOs because of their ACO-like features such as network structure and an emphasis on coordinating care to a defined population. Indeed, the number of network affiliations has been found to be positively and significantly related to pro-ACO orientation in a recent study of acute care hospitals.<sup>7</sup>

Primary care organizations and hospitals located in rural areas may be delayed in joining ACOs or deterred from joining them altogether. Thus far, ACOs are more often located in urban areas.<sup>3</sup> Urban hospitals have been found to be more likely than rural hospitals to be involved in ACO development.<sup>7</sup> In rural areas, on the other hand, the disparate missions of RHCs, rural Federally Qualified Health Centers, small rural hospitals, and other independent rural ambulatory care practices may impede the collaboration necessary for ACO formation.<sup>8</sup> Furthermore, in sparsely populated rural areas, Medicare ACOs may not be accessible to RHCs because the surrounding area does not have the required minimum patient base of 5000 Medicare beneficiaries.

Among physician practices like RHCs, size and ownership may be significant contributors to ACO participation. It may be easier for physicians in group practices to participate in ACOs than physicians in solo or small practices because of their greater financial resources for IT and training.<sup>9,10</sup> A recent survey of physicians found large practices (of 100 or more physicians) to be positively and significantly associated with ACO participation, whereas ownership of a physician practice by a hospital, system, or health maintenance organization (HMO), however, had a negative association.<sup>11</sup>

## Methods

We developed a survey as one of several research activities of a larger project that examines the impact of ACO participation and other factors on preventive care effectiveness and cost efficiency of RHCs. Institutional review board approval to conduct the research was obtained by the University of Central Florida.

### Study Population

The survey was conducted in 3 annual waves. The study population was composed of all RHCs existing in 9 states (as

reported in the CMS Online Survey, Certification and Reporting database)—Mississippi, Alabama, Florida, Georgia, North Carolina, South Carolina, Tennessee, Kentucky, and California—for the years 2012, 2013, and 2014.

## Survey Development and Administration

The survey questionnaire addressed 3 topic areas developed from the recent literature: (1) RHC organizational structure and culture (as indicated by implementation of national quality standards and commitment to improving the value of services); (2) health care delivery models involving RHCs (as indicated affiliation structure and affiliation partners); and (3) data collection and information technology infrastructure (as measured by data collection processes and the extent of and barriers to electronic medical record (EMR) adoption). The draft questionnaire was circulated to the research team's advisory committee for comments. This Committee (composed of 5 RHC clinical and administrative management personnel) commented on the content, sequencing, and number of the survey questions. Several revisions of the draft survey were made. The final questionnaire contained 27 survey items.

To examine its internal face validity, pilot survey questionnaires were mailed to a random sample of 30 RHCs drawn from the study population and stratified by state. Respondents were asked to complete the survey and to comment on its length and clarity. Based on the results of the pilot study, the survey tool was modified.

The final version of the questionnaire was distributed by mail during the Spring of each of the years 2012, 2013, and 2014. Although the individual questionnaires were not matched to a specific individual, we matched the respondents' data to the respondent clinic's characteristics to be able to analyze organizational factors influencing participation in ACOs and/or willingness to join them. In an effort to increase the response rate, a second mailing was distributed in each year.

## Measures

Table 1 describes the study variables. We created 2 dependent variables: (1) participation in ACOs and (2) willingness to join ACOs. In addition, we created several independent variables to capture organizational characteristics.

## Analytic Strategies

We merged the 3 annual waves of data. We then considered that when repeated measures are applied to subjects over time, it is appropriate to use a research method that takes into account correlations within panels (in this case, RHCs that responded in each wave) and across time. Thus, to analyze RHC characteristics related to "participation in ACOs" and "willingness to join ACOs," we chose to apply population-averaged panel data models to take into account the nonindependence within the RHC respondent panel and across waves. Furthermore, the 3 RHC characteristic variables that were continuous (clinical

**Table 1.** Variables and Operational Definitions.

Variable	Operational Definition
<b>Dependent variables</b>	
Participation in ACOs	1 = clinic is currently in an ACO or will soon be in an ACO; 0 = all other situations
Willingness to join ACOs	Range from 0 (not willing to join an ACO) to 10 (completely willing to join an ACO)
<b>Independent variables</b>	
Size	Clinic's total number of physician, PA, and NP FTEs
% Older adults	Percentage of the population aged 65 and older for the county in which the clinic is located
Control	Three categories: (1) for-profit, (2) nonprofit, and (3) government controlled, and used for-profit RHCs as the reference group
Rural status of RHC or "rurality"	Four classifications based on the zipcode rural-urban commuting area code (RUCA) approximation <sup>a</sup>
Clinical infrastructure	4-Point scale ranging from 1 (strongly disagree) to 4 (strongly agree)
Information infrastructure	Three categories: (1) RHC with an EMR system, (2) RHC without an EMR system but willing to adopt an EMR in the near future, and (3) RHC without an EMR system and NOT willing to adopt an EMR in the near future

Abbreviations: ACO, Accountable Care Organization; RHC, Rural Health Clinic; NP, nurse practitioner; PA, physician assistant.

<sup>a</sup>The RUCA is a classification scheme that uses the Bureau of Census urbanized area and urban cluster definitions in combination with work commuting information to characterize US Census tracts regarding their rural and urban status.

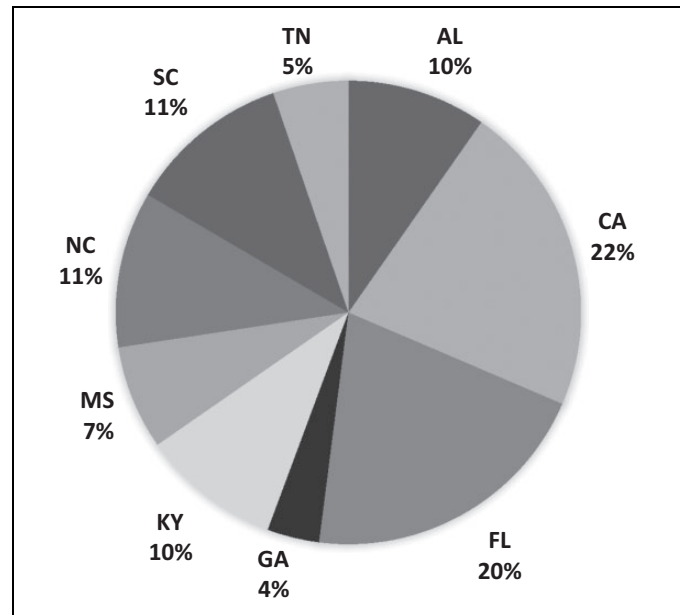
infrastructure, size, and percentage of county population that is older) were centered at the grand mean before being entered into the model. Continuous variables were centered to reduce multicollinearity. For correlated categorical variables, we created interaction terms, and then examined how the dependent variables changed when these terms were added to the models.

Because of the nature of clustered data, we adopted the generalized estimating equation (GEE) approach to analyze the data. The GEE method is based on quasi-likelihood theory rather than maximum likelihood theory. We selected a best-fitting model based on the quasi-likelihood using the independence model criterion.<sup>12</sup> First, we used the Quasi-likelihood under the Independence model Criterion (QIC) (note 1) to select a best-working correlation structure. Second, we compared the QIC values of the full model to the null model in which only the dependent variable is considered to determine the goodness of fit.

## Findings

### Respondent Characteristics

Figure 1 illustrates the percentage of respondents by state. In total, 249 surveys were returned (note 2). A total of 9 to 24

**Figure 1.** Respondents by State.

surveys were returned from each of the 9 states where the survey was distributed.

Most survey respondent clinics (74%) were independent, and 26% were provider based (hospital or nursing home-affiliated). These percentages are roughly comparable to those for the 9 study states, where (in 2012) 65.4% of all the clinics were independent and 34.6% were provider based. The majority (60.6%) of the respondent clinics were for profit. Almost equal percentages were located in either small rural areas (31.3%) or large rural areas (30.9%). The mean clinic size was 3.3 full-time equivalents (FTEs). Finally, three-quarters of the respondent clinics reported having EMR systems in place.

### Participation in ACOs

The ACO concept is still new to many RHCs and other health care providers. Forty-five percentage of the survey respondents reported knowing very little about ACOs. At the other end of the spectrum, 16.5% reported being either very knowledgeable or knowledgeable about ACOs.

A small percentage (5.2%) of the respondent RHCs reported that they were currently participating in ACOs, and an additional 7.6% reported that they were implementing changes to participate in one. Twenty-two and a half percent reported that there were either no ACOs in their clinic's area or none that wished to partner with their clinic at the time of the survey.

### Characteristics Related to ACO Participation and Willingness to Join ACOs

In this section, we relate the organizational characteristics of RHCs to (1) their participation in ACOs and (2) their willingness to join ACOs. We first examined the correlation among the

**Table 2.** Correlation Between the Independent Variables.

	Clinical Infrastructure	% Older Adults	Size	Control	Information Infrastructure	Rural Status of RHC
Clinical infrastructure	1.000	−.182 <sup>a</sup>	.029	.028	−.053	−.030
% Older adults		1.000	−.030	−.287 <sup>a</sup>	−.098	.000
Size			1.000	.119	.056	−.124
Control				1.000	.129 <sup>b</sup>	.083
Information infrastructure					1.000	−.053
Rural status of RHC						1.000

Abbreviation: RHC, Rural Health Clinic.

<sup>a</sup>Correlation is significant at the .01 level (2-tailed).

<sup>b</sup>Correlation is significant at the .05 level (2-tailed).

**Table 3.** Rural Health Clinic Participation in ACOs: Regression Odds Ratio From GEE Model.

	Odds Ratio (OR)	Bootstrap Sd Err	95% CI	P Value
Constant	0.093	0.068	0.022-0.387	.001
Clinical infrastructure	3.631	2.483	0.950-13.872	.059
Percentage of older people in country (2011)	18.937	116.783	0.0001-3362423 <sup>a</sup>	.633
RHC size	1.141	0.105	0.953-1.366	.151
Control type				
For-profit <sup>b</sup>	1			
Nonprofit	1.972	1.387	0.497-7.824	.334
Government based	2.577	3.000	0.263-25.234	.416
Technology infrastructure				
With EMR system <sup>b</sup>	1			
Without EMR but is willing to adopt	0.416	0.685	0.016-10.492	.594
Without EMR but no willingness to adopt	2.035	2.246	0.234-17.703	.520
Rurality				
Urban <sup>b</sup>	1			
Large rural	1.488	1.251	0.286-7.735	.637
Small rural	0.708	0.606	0.132-3.793	.687
Isolated	0.218	0.176	0.045-1.057	.059

Abbreviations: CI, confidence interval; ACO, Accountable Care Organization; RHC, Rural Health Clinic; GEE, generalized estimating equation; Sd Err, standard error.

<sup>a</sup>Table 3 presents odds ratio rather than estimated values.

<sup>b</sup>indicates a reference group.

independent variables (see Table 2). Next, when selecting the optimal correlation structure, we compared 3 types: independent, exchangeable, and autoregressive. In terms of analyzing participation in ACOs, we selected the exchangeable correlation structure, meaning any 2 observations for the same respondent are equally correlated, but between observations from different respondents are not correlated (QIC = 113.958 for exchangeable vs QIC = 114.078 for independent correlation structure). To analyze willingness to join an ACO, we selected the correlation structure to be “independent,” meaning there is no correlation within a respondent (QIC = 1021.183 for independent vs QIC = 1042.898 for exchangeable correlation structure). Finally, in order to account for the possible bias due to small sample size and to ensure the stability of results, we applied the bootstrapping method with replications of 3000 samples. The number of replications was determined by a series of comparisons between different random seeds with the same number of replications.<sup>13</sup>

According to our analyses of organizational characteristics related to ACO participation, we found that the full model with all

the variables included has a smaller QIC than the null model in which ACO participation is the only variable (QIC = 113.958 vs QIC = 191.151, respectively). Because the dependent variable is bivariate, we also report the odds ratio in the results table (see Table 3).

We found that there are significant variations among RHCs in terms of their “rurality” (rural status of RHC in terms of geographic location). Specifically, RHCs located in isolated areas are 78% less likely to be in ACOs than those located in areas with a rural–urban commuting area (RUCA; note 3) classification of “urban” (odds ratio = 0.22,  $P = .059$ ).

According to our analyses of organizational characteristics related to willingness to participate in an ACO, we found that the full model with all the variables included has a smaller QIC than the null model, where willingness to join an ACO is the only variable in the model (QIC = 1021.183 vs QIC = 1605.121 vs respectively; see Table 4).

We found statistical significance in the variance of willingness to join ACOs in terms of RHC size, control, and rurality. Specifically, there is a positive relationship between RHC size

**Table 4.** Willingness to Participate in ACOs (0 to 10): Regression Coefficients From GEE Model.<sup>a</sup>

	Model 1				Model 2 (With Interaction Effects)			
	Coefficients	Bootstrap Std Err	95% CI	P Value	Coefficients	Bootstrap Std Err	95% CI	P Value
Constant	5.014	0.666	3.709 to 6.318	<.001	5.418	0.720	4.007 to 6.830	<.001
Clinical infrastructure	0.655	0.448	−0.222 to 1.534	.143	.541	0.466	−0.372 to 1.455	.245
Percentage of older people in county (2011)	4.301	6.584	−8.603 to 17.206	.514	3.422	7.388	−11.058 to 17.903	.643
RHC size	0.402	0.155	0.097 to 0.707	.010	0.368	0.146	0.082 to 0.655	.012
Control type								
For-profit <sup>b</sup>	I							
Nonprofit	1.271	0.660	−0.022 to 2.565	.054	1.499	0.655	0.215 to 2.783	.022
Government based	−0.538	1.038	−2.572 to 1.497	.604	−0.939	1.068	−3.032 to 1.154	.379
Technology infrastructure								
With EMR system <sup>b</sup>	I				I			
Without EMR but is willing to adopt	−0.357	0.608	−1.548 to 0.835	.557	−1.561	1.117	−3.752 to 0.630	.163
Without EMR but no willingness to adopt	−1.710	2.229	−6.079 to 2.658	.443	−0.057	2.477	−4.912 to 4.798	.982
Rurality								
Urban <sup>b</sup>	I				I			
Large rural	−1.307	0.847	−2.967 to 0.352	.123	−1.397	1.005	−3.367 to 0.573	.165
Small rural	−1.274	0.746	−2.737 to 0.189	.088	−1.950	0.899	−3.712 to −0.187	.030
Isolated	0.375	0.852	−1.295 to 2.045	.660	0.430	1.007	−1.545 to 2.406	.699
Rurality × IT								
With EMR system × urban <sup>b</sup>					I			
Large rural × without EMR but is willing to adopt					1.990	1.859	−1.653 to 5.634	.284
Large rural × without EMR but no willingness to adopt					−4.902	2.710	−10.214 to 0.410	.070
Small rural × without EMR but is willing adopt					2.523	1.230	−0.021 to 5.066	.052
Isolated × without EMR but is willing to adopt					−1.363	1.634	−4.572 to 1.844	.405
Isolated × without EMR but no willingness to adopt							0 (empty)	

Abbreviation: CI, confidence interval; ACO, Accountable Care Organization; RHC, Rural Health Clinic; GEE, generalized estimating equation; Sd Err, standard error.

<sup>a</sup>The “small rural × without EMR but no willingness to adopt” group is omitted because of collinearity.

<sup>b</sup>Indicates a reference group.

and willingness to join an ACO ( $B = 0.402$ ,  $P = .010$ ). Moreover, those classified as nonprofit show a higher willingness to join an ACO than those classified as for profit ( $B = 1.271$ ,  $P = .054$ ). Finally, compared to RHCs located in areas classified as urban, RHCs in small rural areas reported a lower willingness to join ACOs ( $B = -1.274$ ,  $P = .088$ ).

We further analyzed the interaction effects between technology infrastructure and rurality on willingness to join ACOs, finding that willingness to join ACOs varies depending on the level of technology infrastructure and rurality. We calculated the margins for each clinic based on the level of technology infrastructure and rurality to present how these 2 factors together shape willingness of joining ACOs. Specifically, for the clinics with EMR systems, those located in urban and isolated areas have a higher willingness to join an ACO.

## Discussion

The survey identified organizational structure characteristics that were associated with ACO participation. Based on our sample of 257 respondents from region 4 RHCs, only 12.8% were currently either participating or implementing changes to participate in ACOs. This actual or planned participation is about one-third of that reported in a recent survey of physician practices that found (during roughly the same time period of 2012–2013) that 39.4% of physician practices to be either joining an ACO or planning to become involved in one during the upcoming year.<sup>11</sup>

The low participation in ACOs by Southeastern RHCs may be related to a number of factors. First, the ACO model is among several issues—including the consideration of other delivery models, and (for some) changes in reimbursement—that currently command the attention of RHCs. In addition,

many respondents reported having little knowledge about the ACO model and its purpose. This may be attributed in part to the scarcity of ACOs within respondent RHCs' rural service areas—18.1% of the respondents indicated that there were no ACOs in their areas. The ACOs are reported to be forming in geographic areas that are urban and have lower poverty rates.<sup>3</sup> Providers in urban areas are often in closer proximity to IDSs that are transitioning to become ACOs and are more likely to be aware of and involved in the current momentum toward ACO creation. From the ACO standpoint, fewer Medicare Shared Savings Program ACOs may approach providers in rural areas, where the population density will not meet the required 5000 Medicare beneficiary threshold. A final point is that the survey questions regarding ACO participation and willingness to join ACOs did not distinguish between ACO types. It may be that RHCs are formulating opinions based on their familiarity with non-Medicare ACOs and have little knowledge of the benefits and distribution of savings of Medicare Shared Savings Program ACOs, for example.

### Size

Echoing the findings of previous studies of physician practice participation in ACOs, we found that RHCs of larger size to be more willing to join ACOs. For the survey time period (2012–2014), the respondent clinics were small—at a mean size of 3.71 FTEs and ranging from 0.60 to 20.83 FTEs ( $n = 137$ ). Although RHCs and other physician practices of small size can become part of the team of providers in an ACO, smaller practices may not have the information technology (IT) and human resources to facilitate the transition to an ACO arrangement. The lack of resources may contribute to the perceived barriers to small practice participation in ACOs.<sup>14</sup>

### Control

Respondent clinics were classified into 1 of the 3 categories of control: for profit, nonprofit, and government. Of these, nonprofit RHCs were associated with a greater willingness to join ACOs when compared to the for-profit ones. This finding suggests that the ACO model's potential to improve patient care and population health may be more highly valued than any financial gain derived from ACO participation, such as through shared savings.

### Rural Location

We found that RHCs located in isolated areas are much less likely to be participating in ACOs. This finding may relate to the age-old workforce challenge of rural areas. Meeting the patient quality-of-care and outcome expectations of ACOs places certain demands on personnel of their member organizations that may be more difficult to achieve in primary care organizations that have only 1 or 2 primary care practitioners and difficulty in recruiting a stable workforce. The emphasis on a team approach, patient-centered care, and population health

are important goals set by ACOs. However, in small rural practices that treat many older, more impoverished patients with one or multiple chronic diseases, these goals may appear to be particularly difficult to achieve.

With the momentum of ACO development throughout the country, providers in small rural and isolated areas will need to continually assess the value of their becoming ACO participants. Likewise, to reach the goal of providing quality health care, ACOs will need to objectively weigh the value of the services offered by these providers. Primary care is fundamental to the ACO model. In the absence of accessible primary care, other attributes of primary care can have no impact,<sup>15</sup> and optimal patient outcomes may not be achieved.

### Information Infrastructure and ACO Participation

We found that among RHCs with EMR systems, those located in areas classified as urban or “isolated” have a higher willingness to join ACOs. Thus, although RHCs in isolated areas are currently less likely to be participating in ACOs, those with EMR systems report a desire to join one. Having EMR systems in place appears to be key in a clinic's receptiveness to participate in ACOs.

Health information technology infrastructure is central to the success of the ACO model. This infrastructure includes processes and functions in several categories: care coordination, cohort management, patient and caregiver relationship management, clinician engagement, financial management, reporting, and knowledge management.<sup>16</sup> Having EMR systems in place increases RHCs' readiness to participate in ACOs. The ability to gather, organize, report, and analyze data is critical to the success of ACOs and their member organizations. Rural Health Clinics will continue to need the technical support from Regional Extension Centers, State Offices of Rural Health, and national professional associations to enable their participation in ACOs, patient-centered medical homes (PCMHs), and other value-focused health care delivery systems.

### Limitations

The study had a few limitations. The survey was distributed to RHCs in 9 states and resulted in 249 responses. Although the response rate was low, the responses are a reasonable statistical sample of all the clinics in the study states. The study findings provide a foundation for understanding the factors of primary care organizational structure that may contribute to participation in ACOs.

Finally, although there is some theoretical basis for relating the number of the health care provider's network affiliations to a pro-ACO orientation,<sup>7</sup> we were not able to examine this association for the RHC respondents. We had posed a question on the number and nature of the respondent clinic's network affiliations. However, in that most survey respondents were from independent RHCs, and most skipped this question indicating that their clinics had few network affiliations.

## Conclusions and Future Research

There is much speculation about the extent to which physician practice providers will participate in ACOs. Although rural and urban primary care providers' needs and experiences coincide on a number of issues, rural providers' assessment of the benefits and drawbacks of ACO participation are likely to differ from those of their urban counterparts. Rural providers' limited technological and human resources, and the lack of ACO development in rural areas, may detain or prevent their participation in ACOs.

At this early stage of ACO development, many RHC personnel are unfamiliar with the ACO concept and how this model may benefit their patients and costs. Future research will evaluate multiple years of ACO participation by RHCs and other rural providers. Analyses will clarify which organizational characteristics most contribute to the success of the ACO and its rural provider members.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This analysis for this article was supported by the National Institute on Minority Health and Health Disparities of the National Institutes of Health under Award Number U24MD006954. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## Notes

1. The interpretation of QIC is similar to Akaike information criterion (AIC) where the smallest QIC value indicates the best-fitting model to the data (The Stata Journal).
2. Of the total number of surveys distributed, 2% were determined to be "undeliverable." After eliminating these, the combined total returned surveys was 249, resulting in an overall response rate of 7.2%.
3. The rural-urban commuting area (RUCA) is a classification scheme that uses the Bureau of Census urbanized area and urban cluster definitions in combination with work commuting information to characterize US Census tracts regarding their rural and urban status.

## References

1. Centers for Medicare and Medicaid Services. Accountable Care Organizations. Web site. <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ACO/index.html?redirect=/ACO>. Accessed January 6, 2015.
2. Rural Assistance Center. Web site. <http://www.raonline.org>. Accessed February 15, 2013.
3. Lewis VA, Colla CH, Carluzzo KL, Kler SE, Fisher ES. 2013: Accountable care organizations in the United States: market and demographic factors associated with formation. *Health Serv Res*. 2013;48(6 pt 1):1840-1858.
4. Miller HD. How to create accountable care organizations: executive summary. Center for Healthcare Quality & Payment Reform. Web site. <http://www.chqpr.org/downloads/HowtoCreateAccountableCareOrganizations.pdf>. Published September 7, 2009. Accessed October 9, 2015.
5. Moore KD, Coddington DC. Accountable care: the journey begins. *Healthc Financ Manage*. 2010;64(8):57-63.
6. Gandhi N, Weil R, The ACO surprise, Oliver Wyman. Web site. [http://www.oliverwyman.com/content/dam/oliver-wyman/global/en/files/archive/2012/OW\\_ENG\\_HLS\\_PUBL\\_The\\_ACO\\_Surprise.pdf.%20Published%20November%2026,%202012](http://www.oliverwyman.com/content/dam/oliver-wyman/global/en/files/archive/2012/OW_ENG_HLS_PUBL_The_ACO_Surprise.pdf.%20Published%20November%2026,%202012). Published November 26, 2012. Accessed October 9, 2015.
7. Wan TTH, Masri MD, Ortiz J. Infrastructural mechanisms leading toward pro-accountable care organization orientation: a survey of hospital managers. *Int J Public Policy*. 2014;(4-5):243-256.
8. MacKinney AC, Mueller KJ, McBride TD. The march to accountable care organizations – How will rural fare? *J Rural Health*. 2010;27(1):131-137.
9. Bowers LA. ACOs can accommodate various practice sizes. Medical Economics. Web site. <http://medicaleconomics.modernmedicine.com/medical-economics/news/modernmedicine/modern-medicine-feature-articles/acos-can-accommodate-various?page=full>. Published October 19, 2012. Accessed October 9, 2015.
10. Shields MC, Patel PH, Manning M, Sacks L. A model for integrating independent physicians into accountable care organizations. *Health Aff (Millwood)* 2011;30(1):161-172.
11. Shortell SM, McClellan SR, Ramsay PP, Casalino LP, Ryan AM, Copeland KR. Physician practice participation in accountable care organizations: the emergence of the unicorn. *Health Serv Res* 2014;49(5):1519-1536.
12. Cui J. QIC program and model selection in GEE analyses. *Stata J*. 2007;7(2):209-220.
13. Gould W, Pitblado J. (2010). Guidelines for bootstrap samples. Online discussion group by StataCorp. Web site. <http://www.stata.com/support/faqs/statistics/bootstrapped-samples-guidelines/>. Published August 2010. Accessed October 9, 2015.
14. Porter S. AAFP and other primary care association release joint principles for accountable care organizations. *Ann Fam Med*. 2011;9(1):87-88.
15. Mold JW. How primary care produces better outcomes: A logic model. *Ann Fam Med*. 2014;12(5):483-484.
16. The Certification Commission for Health Information Technology (CCHIT). A health IT framework for accountable care. CCHIT. Web site. [https://www.healthit.gov/FACAS/sites/faca/files/a\\_health\\_it\\_framework\\_for\\_accountable\\_care\\_0.pdf](https://www.healthit.gov/FACAS/sites/faca/files/a_health_it_framework_for_accountable_care_0.pdf). Accessed June 6, 2013.

## Author Biographies

**Judith Ortiz**, Ph.D., M.B.A., is a Research Associate Professor and the Director of the Rural Health Research Group at the University of Central Florida. She has held positions in Administration and Marketing in a variety of healthcare organizations. Her research interests are in the area of primary care and the evaluation of health care delivery

systems. Her current research is supported by the NIH grant award number U24MD006954.

**Chiung-Ya Tang**, Ph. D. received a BS in Applied Life Science from Fu-Jen Catholic University, Taipei, Taiwan, a MS in Family Sciences from Texas Woman's University, TX, USA, and a doctoral degree in Human Development and Family Studies from Purdue University, IN, USA. Dr. Tang received her post-doctoral training in Public Affairs from the University of Central Florida, FL, USA. where she currently works as a research consultant for the Rural health Research Group.

**Yi-Ling Lin**, M. S., is a doctoral candidate in Public Affairs at the University of Central Florida specializing in health care research

and management. Her research interests center around resource utilization and clinical outcomes. Currently, Miss Lin is the Graduate Research Associate on the NIH grant award number U24MD006954.

**Maysoun D. Masri**, Sc.D, M.B.A., M.P.H., received her Doctor of Science in Health Systems Management at Tulane University, New Orleans. Previously, Dr. Masri was an assistant professor in Healthcare Finance and Economics at the University of Central Florida. Currently, she is in Abu Dhabi, United Arab Emirates where she conducts research projects on the use of W2 technologies in Health Education.