



Published in final edited form as:

*Res Sociol Health Care*. 2014 ; 32: 259–273. doi:10.1108/S0275-495920140000032023.

## Predictors of Rural Health Clinics Managers' Willingness to Join Accountable Care Organizations

Thomas T.H.Wan, Ph.D., MHS<sup>1</sup> [Professor of Doctoral Program in Public Affairs], Maysoun Dimachkie Masri, Sc.D, MBA, MPH<sup>2</sup> [Assistant Professor], and Judith Ortiz, Ph.D, MBA<sup>3</sup> [Research Associate Professor and Director]

<sup>1</sup>College of Health and Public Affairs, University of Central Florida, HPA 1, Room219, P.O. Box 163680, Orlando, Florida 32816-3680. thomas.wan@ucf.edu

<sup>2</sup>Department of Health Management and Informatics, College of Health and Public Affairs University of Central Florida, P.O. Box 163680, Orlando, Florida 32816-3680. maysoun.dimachkie@ucf.edu

<sup>3</sup>Rural Health Research Group, College of Health and Public Affairs, University of Central Florida, P.O. Box 163680, Orlando, Florida 32816-3680.. jortiz2@cfl.rr.com

### Abstract

**Purpose**—The implementation of the Patient Protection and Affordable Care Act has facilitated the development of an innovative and integrated delivery care system, Accountable Care Organizations (ACOs). It is timely, to identify how health care managers in rural health clinics are responding to the ACO model. This research examines RHC managers' perceived benefits and barriers for implementing ACOs from an organizational ecology perspective.

**Methodology/Approach**—A survey was conducted in Spring of 2012 covering the present RHC network working infrastructures – 1) Organizational social network; 2) organizational care delivery structure; 3) ACO knowledge, perceived benefits, and perceived barriers; 4) quality and disease management programs; and 5) health information technology (HIT) infrastructure. One thousand one hundred sixty clinics were surveyed in the United States. They cover eight southeastern states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee) and California. A total of ninety-one responses were received.

**Findings**—RHC managers' personal perceptions on ACO's benefits and knowledge level explained the most variance in their willingness to join ACOs. Individual perceptions appear to be more influential than organizational and context factors in the predictive analysis.

**Research limitations/implications**—The study is primarily focused in the Southeastern region of the U.S. The generalizability is limited to this region. The predictors of rural health

---

Copyright © 2014 by Emerald Group Publishing Limited

This article is © Emerald Group Publishing and permission has been granted for this version to appear here. Emerald does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from Emerald Group Publishing Limited.

Corresponding author: Thomas T.H. Wan, Ph.D., MHS Professor and Associate Dean for Research HPA 1, Room219, P.O. Box 163680 Public Affairs Doctoral Program, College of Health and Public Affairs University of Central Florida, Orlando, FL 32816-2200 Thomas.Wan@ucf.edu Tel: (407) 823-3678 Fax: (407) 823-0822.

clinics' participation in ACOs are germane to guide the development of organizational strategies for enhancing the general knowledge about the innovativeness of delivering coordinated care and containing health care costs inspired by the Affordable Care Act.

**Originality/Value of Paper**—Rural health clinics are lagged behind the growth curve of ACO adoption. The diffusion of new knowledge about pros and cons of ACO is essential to reinforce the health care reform in the United States.

### Keywords

Rural Health Clinics; Accountable Care Organizations (ACOs); Patient Protection and Affordable Care Act (PPACA); Information Technology

## Background

The implementation of the Patient Protection and Affordable Care Act (PPACA) has facilitated the development and transformation of health care delivery systems such as Accountable Care Organizations (ACOs). ACOs are provider-run groups (of physicians, hospitals, and/or other health care organizations) that accept responsibility for the cost and quality of care of a defined population. To date, little is known about how managers of Rural Health Clinics (RHCs) will navigate their strategic move and participate in ACOs.

RHCs were developed under the Rural Health Clinics Act (P.L. 95–210). The Act was passed by Congress and signed into law by President Carter in 1977. The main goal of this Act was to (1) promote a collaborative model of health care delivery and encourage the utilization of nurse practitioners, physician assistants, certified nurse midwives, psychologists and clinical social workers in non-urbanized areas under RHCs; (2) create a cost-based reimbursement mechanism for services provided at clinics located in underserved rural areas (HRSA, 2006). Today, like many healthcare organizations RHCs are faced by the challenge of providing effective and affordable health services as emphasized under the new Healthcare Reform legislation, the Patient Protection and Affordable Care Act (PPACA).

The PPACA was passed in December 2009 and signed into law in March 2010 by the U.S. Senate. Access to good-quality services in rural underserved areas has been a continuous challenge for the United States (Ortiz et.al. 2011; Utz et al., 2011). For more than thirty years, RHCs have played an important role in meeting the needs of the rural elderly and other vulnerable populations. Some of the challenges faced by RHCs included difficulties in recruitment and retention of qualified healthcare professionals, major reimbursement barriers, and information technology and source barriers (Ortiz et.al. 2011). Although, according to some policy analysts rural populations will benefit from the PPACA, the effects are still to be studied (Bailey 2010; Murray, 2011). Furthermore, the ACO model is still evolving in its early stages. Thus, it is timely to identify how health care managers in RHCs are responding to its development.

This research examined RHC health care managers' perceived benefits and barriers to participating in ACOs from an organizational ecology perspective. Organizational ecology was the theoretical framework used to guide the model development and specification for this study (Hannan and Freeman, 1989). Because RHC managers are nested within different

states whereby organizational and contextual differences may be observed, it is imperative to determine the net influence of predictor variables on the willingness to participate in ACOs while all other contextual factors are being held constant. A risk adjustment methodology is therefore needed in the analysis of net influences of individual predictors of ACO participation while the effects of organizational and contextual variables are held constant (Heckman et al., 1998; Heckman et al., 1999; Bickel, 2007; Izzoni, 1994; King, 1997).

Individuals are seen as possessing different degrees of willingness to adopt innovations (Rogers, 1995). As such, diffusion research was used to analyze the conditions which increase or decrease the likelihood that a new idea (in this case, participating in an ACO), will be adopted by RHC managers. The innovation-diffusion construct was also used to frame the major research question: Do RHC managers' perceptions of ACOs benefits, barriers, and organizational factors such as social capital and the use of health information technology, influence their willingness to participate in ACOs? It is hypothesized that health care managers' perceived benefits and knowledge level about ACOs have a stronger influence on the willingness to participate in ACOs than organizational factors, holding the contextual factor which is the community propensity score factor (PSF) of high likelihood of ACO's adoption constant.

## Methods

Current secondary sources of RHC data do not include important information on a rural health clinic's organizational structure and culture, implementation of disease, quality management programs or the use of information technology. The unavailability of this type of data created the need to develop and conduct a survey to capture all this information and identify the organizational and community contexts that may serve as predictor variables for estimating PSF of high likelihood of ACO's adoption. Because certain organizational and community characteristics such as large hospitals and integrated care delivery systems (IDSs) are more likely to form organizational alliances and develop diversification strategies than small RHCs, it was necessary to perform a propensity score analysis to eliminate any potential selection bias factor such as size, volume, payer mix, case mix, referral medical center for remote areas, and presence of ACOs in the community.

A structured mail-survey tool (37 Likert scale question items), covering the present RHC network working infrastructures – 1) Organizational social network; 2) organizational care delivery structure; 3) ACO participation, benefits, and barriers; 4) quality and disease management programs; and 5) health information technology infrastructure was developed. The survey questionnaire was reviewed and approved by the University IRB Office. No names were obtained from the survey. Thus, the anonymity of respondents was ensured.

In turn, a causal model of predictors of rural health care managers' willingness to participate in ACOs (ACO\_join) was formulated, using the PSF as the correction variable of biased selection in a predictive equation. In this analysis, ACO\_join was considered the endogenous variable (Y1), whereas predictor variables ( $X_i$ ) included perceived benefits, perceived barriers, knowledge level about ACOs, RHCs organizational factors such as

organizational social capital, adoption of electronic medical records (EMRs), and the contextual variable which is the PSF predictor variable identified as high likelihood of expected markets for ACO adoption and development.

### The Propensity Score Approach

A propensity score of having a high expectation to be involved with ACOs (a dummy dependent variable; 1= high presence of ACOs in a state with two or more ACOs established and 0= low presence of ACOs in a state with less than two ACOs established in 2012) is estimated from multiple ecological and contextual variables in the propensity score analysis, using [R-Project.Org](#) with the subroutine of Matchit (upon request, scores could be obtained from principal investigators). The list of ecological variables include: 1) health information technology adoption rate; 2) disparities index; 3) percentage of elderly population; 4) regional location; 5) urban population size; 6) uninsured population size; 7) physician-population ratio; and 8) volunteerism rate. Logit analysis generated the propensity score for each state.

### Measurements and Analysis

The willingness to participate in ACOs, an endogenous variable, is measured by an analog scale, ranging from the lowest (0) to highest (10) score. Predictors included several Likert-Scale measures of the theoretical constructs such as perceived benefits, perceived barriers, and organizational social capital were developed and validated, using structural equation modeling. Covariance structure analysis was performed to validate a theoretically specified model of predictors of rural health care managers' willingness to participate in ACOs. The propensity score for a state with high-expected involvement in ACOs was the control variable in order to adjust the state-level variation in ACO involvement in the analysis.

## Results

### Survey Results

One thousand one hundred sixty RHC managers from eight southeastern states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee) and California were surveyed either by regular mail or electronic mail using Qualtrics. A total of ninety-one responses were received. After eliminating the missing cases, only eighty-nine respondents were included in the analysis. Of the 89 respondents, 37.6 percent belonged to a provider-based practice. About 83 percent of them did not have sufficient knowledge about ACOs. Health care managers from the provider-based rural clinics had a statistically significant higher perception of the ACO benefits than those in the independent practice (Table 1). Only 8 percent of the respondents reported that their clinics were affiliated with an integrated delivery system (IDS). However, 22 percent of provider-based clinics had an affiliation with IDS.

### Propensity Score Analysis Results

The propensity score matching and analysis was performed for 50 states plus District of Columbia. The matching analysis eliminated 9 states (Idaho, Iowa, Kansas, Maine, Montana, Nebraska, North Dakota, Oklahoma and South Dakota). The score ranged from

0.1930 (the lowest) for Alaska to 0.9231 (the highest) for Florida. The propensity scores for the nine study states were: Alabama (0.8605), California (0.4757), Florida (0.9231), Georgia (0.8957), Kentucky (0.8577), Mississippi (0.8365), North Carolina (0.8809), South Carolina (0.8579) and Tennessee (0.8879). The eight southeastern states experienced a higher likelihood of adoption rate of ACOs than other states in the United States.

### Measurement Models for the Predictor (Latent) Variables

Three latent variables were constructed, using multiple indicators. Each of these theoretical constructs or latent variables was independently evaluated, using confirmatory factor analysis. The summary statistics for these measurement models are presented in Table 2.

The variance in perceived benefits of ACOs is shared in common by six indicators, such as 1) improve population health, 2) improve quality of care, 3) improve patient-focused care, 4) improve physicians leadership, 5) lower costs of care, and 6) share savings. These indicators were found statistically significant at 0.05 or lower level, with the strongest factor loading observed for “improve patient-focused care” as the most dominant or influential indicator and the lowest one observed for “share savings” (Figure 1). The summary of goodness of fit (GOF) statistics for the “perceived benefits” measurement model showed that the measurement model fits the data very well, with Chi-square value of 3.036 for 7 degrees of freedom, P value of 0.882, CFI of 1, GFI of 0.980, AGFI of 0.967, and RMSEA of 0.034 (Table 2).

The measurement model of perceived barriers was examined with six indicators, namely 1) legal barriers, 2) ACO is not a mission for RHC, 3) lose autonomy, 4) not large enough population to serve, 5) inadequate capital, and 6) limited payments. The results showed that the indicator for a limited ACO payment has the largest factor loading (0.784) with the latent construct of perceived barriers (Figure 2). All six indicators were statistically significantly related to the common construct although “lose autonomy” has a factor loading of 0.296. The overall GOF statistics showed that this was an excellent fitted measurement model for perceived barriers, with Chi-square value of 9.918 for 8 degrees of freedom, CFI of 0.988, GFI of 0.966, AGFL of 0.910, and RMSEA of 0.036.

Five indicators in terms of mutual trust, shared vision, collective problem-solving, teamwork, and interactions with colleagues socially outside workplace were reflective of organizational social capital (OSC). The first three indicators had relatively large factor loadings associated with the common construct, OSC. The last indicator was considered the weakest one (0.348) although it was statistically significant. The overall GOF statistics showed that this measurement model was also well-fitted with the data, having Chi-square value of 5.761 for 5 degrees of freedom, a P value of 0.330, CFI of 0.995, GFI of 0.968, AGFI of 0.904, and RMSEA of 0.041.

Five predictor variables and one control variables were regressed on the willingness to join ACOs (figure 4). They accounted for 18.3 percent of the total variance in this endogenous variable. The statistical results are summarized in Table 3. Only two predictor variables were statistically significant at 0.05 level; perceived benefit (standardized regression coefficient = 0.318) and the ACO knowledge level (0.265) were positively associated with

the willingness to join ACOs. Other variables exerted a relatively weak or no influence on this endogenous variable. The propensity score, a contextual variable as an adjuster, did not appear to be influential in this analysis.

## Implications and Conclusions

The study findings showed that RHC managers' personal perceptions on ACO's benefits and knowledge level explained the most variance in their willingness to join ACOs. Individual perceptions appeared to be more influential than organizational and context factors in this analysis. Should ACOs be the future healthcare delivery system within the United States, a joined effort should be made to provide evidence of clinical and operational effectiveness in patient care for both rural and urban areas. In addition, it is imperative to improve the general and specific knowledge about ACOs so that RHC managers are well informed about the pros and cons of varying modalities of ACOs.

The study has several limitations. First, the study focused on eight southeastern states and the state of California. The results may not be generalizable to the entire United States. Second, the response rate of the ACO survey was relatively low. More effort should be made to generate the interest of health care managers in responding to the ACO initiative organized and monitored by the Centers for Medicare and Medicaid Services.

Rural health clinics are lagged behind the growth curve of ACO adoption. The diffusion of new knowledge about pros and cons of ACO is essential to reinforce the health care reform in the United States (Kronenfeld, 2012). The use of organizational ecology guiding the development of research questions can help shape the investigation of personal and contextual determinants of adoption of innovative delivery systems. The predictors of rural health clinics' willingness to participate in ACOs are germane to guide the development of organizational strategies for enhancing the knowledge about the innovativeness of delivering coordinated care and containing health care costs promoted by the Affordable Care Act.

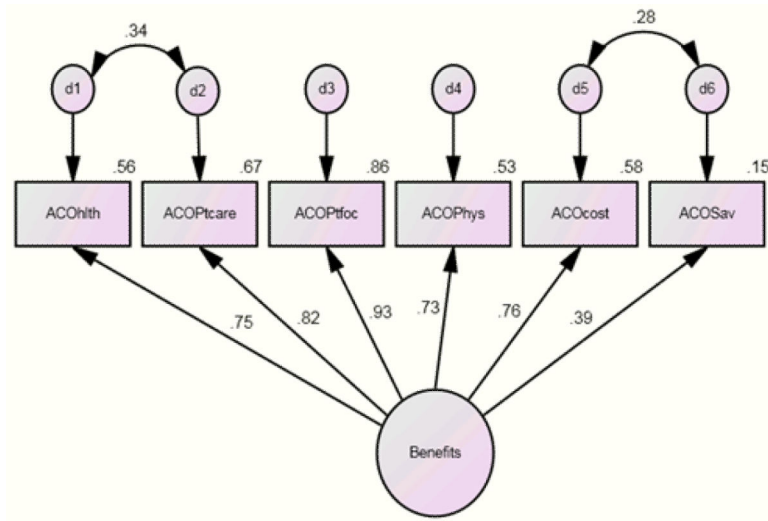
## Acknowledgement

This research, in part, is supported by a federal grant U24MD006954 from the National Institute on Minority Health and Health Disparities, NIH. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## References

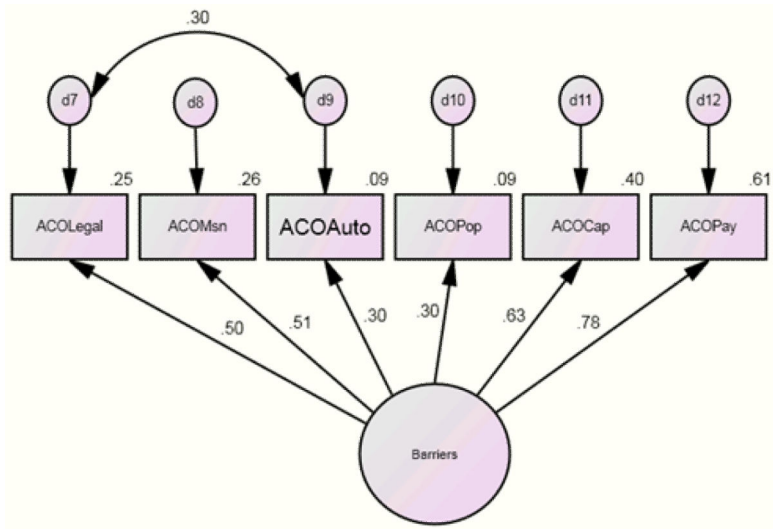
- Bailey, J. Why healthcare reform can't wait: The benefits of health reform for rural America. Center for Rural Affairs; Lyons, NE: 2010. 2010
- Bickel, R. Multilevel Analysis for Applied Research. Guilford Press; New York: 2007.
- Hannan, MT.; Freeman, J. Organizational Ecology. Harvard University Press; Cambridge: 1989. Organizations and Social Structure; p. 3-27.1989
- Heck, RH.; Thomas, SL.; Tabata, LN. Multilevel and Longitudinal Modeling with IBM SPSS. Routledge; New York: 2010.
- Heckman J, Ichimura H, Todd P. Matching as an Econometric Evaluation Estimator. Review of Economic Studies. 1998; 65(2):261–294.
- Heckman, J.; LaLonde, R.; Smith, J. The Economics and Econometrics of Active Labor Market Programs. In: Ashenfelter, O.; Card, D., editors. Handbook of Labor Economics. Vol. 3. Elsevier; Amsterdam: 1999. p. 1865-2097.

- Health Resources and Services Administration (HRSA). Comparison of the Rural Health Clinic and Federally Qualified Health Centers Program. 2006. Retrieved from: <http://www.ask.hrsa.gov/downloads/fqhc-rhccomparison.pdf>
- Iezzoni, LI. Risk Adjustment for Measuring Health Care Outcomes. Health Administration Press; Ann Arbor, MI: 1994.
- King, G. A Solution to the Ecological Inference Problem: Reconstructing Individual Behavior from Aggregate Data. Princeton University Press; Princeton: 1997.
- Kronenfeld, JJ. Systems of Health-Care Delivery: Sociological Issues Linked to Health Reform and Roles of Patients and Providers. In: Kronenfeld, Jennie Jacobs, editor. Access to Care and Factors that Impact Access, Patients as Partners in Care and Changing Roles of Health Providers (Research in the Sociology of Health Care. Vol. 29. 2012. p. 3-17.
- Murray LR. Health Reform to Have Significant Benefits for Rural Americans. *The Nation's Health*. 2011; 41(4):3.
- Ortiz J, Meemon N, Tang CY, Wan TTH. Rural Health Clinic Efficiency and Effectiveness: Insight from a Nationwide Survey. *Journal of Medical Systems*. 2011; 35:671–681. [PubMed: 20703522]
- Rogers, EM. Diffusion of innovations. 4th edition. The Free Press; New York: 1995.
- Utz, RL.; Nelson, R.; Dien, P. American Health Care: Public Opinion Differences in the Confidence, Affordability, and Need for Reform. In: Kronenfeld, Jennie Jacobs, editor. Access to Care and Factors that Impact Access, Patients as Partners in Care and Changing Roles of Health Providers (Research in the Sociology of Health Care. Vol. 29. 2011. p. 243-272.
- Wan, TTH. Evidence-Based Health Care Management: Multivariate Modeling Approaches. Kluwer Academic Publishers; Boston: 2002.

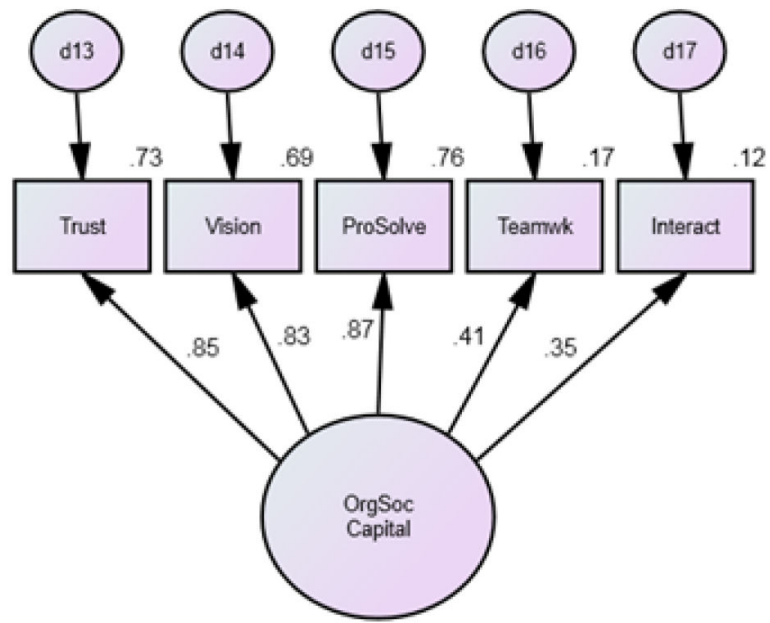


**Figure 1.**  
The measurement model of perceived benefits of ACOs

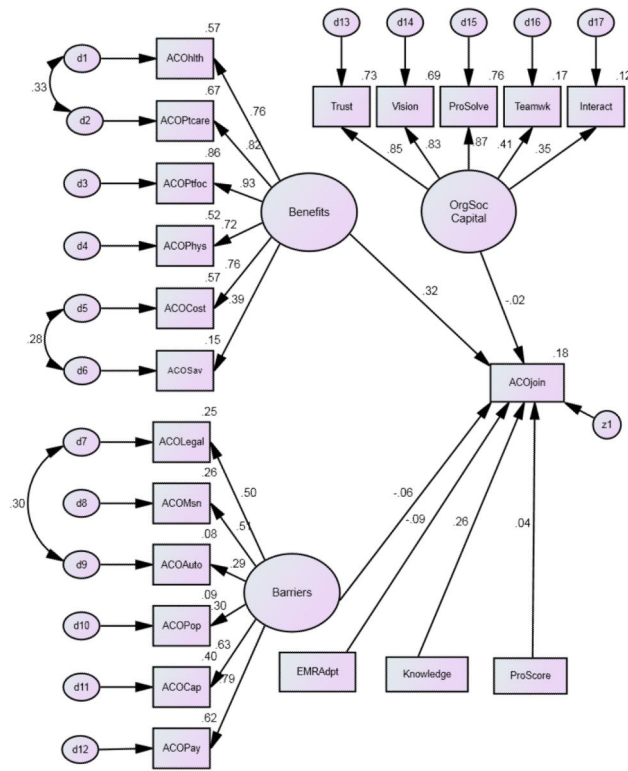




**Figure 2.**  
The measurement model of perceived barriers of ACOs



**Figure 3.**  
Measurement model of organizational social capital



**Figure 4.** Predictors of willingness to join accountable care organizations With Propensity Score (ProScore) as an Adjuster

**Table 1**

Means and Standard Deviations of Selected Study Variables for 89 Respondents by Ownership Status of Rural Health Clinics (RHCs)

Study Variables	Total Mean	Provider based RHC Mean	Independent RHC Mean	Provider-based RHC SD	Independent RHC SD	F- value
Knowledge about ACOs (ranging from 1 to 4)	1.716	1.839	1.649	0.735	0.790	1.213
No. Perceived Benefits (ranging from 0 to 6)	2.022	2.656	1.672	2.223	2.180	4.143*
No. Perceived Barriers (ranging from 0 to 6)	2.267	2.156	2.328	1.668	1.877	0.186
IDS affiliated (1=affiliated; 0 otherwise)	0.08	0.220	0.000	0.420	0.000	15.879*

\* Statistically significant at 0.05 or lower level.

**Table 2**

## Summary Statistics of Measurement Models for Three Exogenous Latent Variables

Latent Variable and Indicators	Parameter Estimate	SE	Critical Value	Standardized Parameter Estimate
<b>Perceived Benefits: Cronbach' Alpha =.883</b>				
Improve population health (ACOhlth)	1.000			<b>0.750</b>
Improve quality of care (ACOPtcare)	1.147	0.118	9.682*	<b>0.817</b>
Improve patient-focused care (ACOPtfoc)	1.288	0.150	8.605*	<b>0.926</b>
Physicians led (ACOPhys)	0.885	0.128	6.895*	<b>0.728</b>
Lower costs(ACOCost)	1.029	0.142	7.226*	<b>0.760</b>
Share savings (ACOSav)	0.470	0.131	3.581*	<b>0.393</b>
Summary of Goodness of fit statistics:				
Chi-square value (Degrees of freedom)	3.034 (7)			
P value	0.882			
CFI	1			
GFI	0.980			
AGFI	0.967			
RMSEA	0.034			
<b>Perceived Barriers: Cronbach' Alpha=.822</b>				
Legal barrier (ACOLegal)	1.000			<b>0.495</b>
Not a mission of RHCs (ACO Msn)	0.913	0.281	3.324*	<b>0.505</b>
Lose autonomy (ACOAuto)	0.565	0.223	2.532*	<b>0.296</b>
Not large enough population(ACOPop)	0.596	0.265	2.251*	<b>0.305</b>
Inadequate capitals (ACOCap)	1.237	0.342	3.623*	<b>0.629</b>
Limited payments (ACOPay)	1.586	0.426	3.718*	<b>0.784</b>
Summary of Goodness of fit statistics:				
Chi-square value (Degrees of freedom)	8.918 (8) 0.349			
P value	0.988			
CFI	0.966			
GFI	0.910			
AGFI	0.036			
RMSEA				
<b>Org. Social Capital: Cronbach's Alpha = .681</b>				
Fully trust each other (Trust)	1.000			<b>0.854</b>
Share a same vision (Vision)	1.131	0.123	9.177*	<b>0.833</b>
Collectively solve problems (ProSolve)	1.045	0.109	9.604*	<b>0.871</b>
Do teamwork (Teamwk)	0.671	0.178	3.777*	<b>0.406</b>

Latent Variable and Indicators	Parameter Estimate	SE	Critical Value	Standardized Parameter Estimate
Interact socially outside workpl ace(Interact)	0.437	0.139	3.140*	<b>0.348</b>
Summary of Goodness of fit statistics:				
Chi-square value (Degrees of freedom)	5.761 (5)			
P value	0.330			
CFI	0.995			
GFI	0.968			
AGFI	0.904			
RMSEA	0.041			

\* Statistically significant at 0.05 or lower level.

**Table 3**

## Predictors of the Willingness to Join Accountable Care Organizations

Predictors	Parameter Estimate	Standard Error	Critical Value	P-value	Standardized Estimate
Benefits	55.128	23.868	2.310*	.021	<b>0.318</b>
Barriers	-4.183	8.986	-0.466	.642	- <b>0.052</b>
Org. Social Capital	-1.258	6.401	- 0.197	.844	<b>0.022</b>
EMR Adoption	-1.149	1.421	- 0.829	.419	- <b>0.085</b>
Knowledge about ACO	9.968	4.017	2.481*	.013	<b>0.265</b>
Propensity Score	5.989	16.284	0.368	.713	<b>0.039</b>

Notes:

Summary of Goodness of Fit Statistics: Chi-square = 215.727 with 184 degrees of freedom; CFI = 0.943; TLI = 0.939; RMSEA = 0.045.

\* Statistically significant at 0.05 or lower level.