# Science-based and practice-based innovativeness and performance of substance abuse treatment facilities

**Preethy Nayar**
**Fang Yu**
**Bettye Apenteng**

**Background:** The fields of mental health and substance abuse treatment lag significantly behind other health care organizational fields in the adoption, implementation, and dissemination of evidence-based practices. Innovative organizational practices may be science based or practice based. The implementation of innovative practices requires considerable organizational resources. Whether this organizational investment actually pays off in terms of superior performance is unclear. This issue in the context of substance abuse treatment facilities (SATFs) in the United States is examined in this study.
**Purpose:** The purpose of this study is to examine the influence of the use of innovative organizational practices, both science based (psychosocial interventions) and practice based, on the organizational performance of SATFs.
**Methodology/Approach:** The study uses cross-sectional data on 13,513 SATFs in the United States, obtained from the National Survey of Substance Abuse Treatment Services 2009 database.
**Findings:** Multinomial logistic regression models find a positive association between the use of science-based innovations and practice-based innovations and organizational performance, that is, the provision of comprehensive (core and wraparound) services. SATFs that were located in metropolitan areas, those accredited by the Commission on Accreditation of Rehabilitation Facilities and Joint Commission, that had a mixed (Substance Abuse and Mental Health) focus or were recipients of earmark funds also had higher organizational performance.
**Practice Implications:** The results signify that substance abuse facilities that are high innovators in terms of implementing science based and practice-based innovative practices have higher organizational performance. Organizations that have institutionalized these practices have invested considerable resources in innovation. The shown higher organizational performance provides justification for the organizational investment in innovation.

**Key words:** multinomial logistic regression, organizational innovativeness, organizational performance, practice-based innovation, science-based innovation

***Preethy Nayar, MD, PhD, MPhil,*** *is Assistant Professor, Department of Health Services Research and Administration, College of Public Health, University of Nebraska Medical Center, Nebraska Medical Center, Omaha. E-mail: pnayar@unmc.edu.*
***Fang Yu, PhD,*** *is Assistant Professor, Department of Biostatistics, University of Nebraska Medical Center, Nebraska Medical Center, Omaha.*
***Bettye Apenteng, BSc,*** *is Research Associate, Department of Health Services Research and Administration, College of Public Health, University of Nebraska Medical Center, Nebraska Medical Center, Omaha.*

*The authors have disclosed that they have no significant relationships with, or financial interest in, any commercial companies pertaining to this article.*

DOI: 10.1097/HMR.0b013e318282663f

*Health Care Manage Rev*, 2014, 39(1), 66–74
Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

The Institute of Medicine report, *To Err Is Human*, released in 2000, called for the reorganization of the U.S. health care delivery system into one that provided care that was safe, effective, patient-centered, efficient, timely, and equitable (Institute of Medicine, 2000). As a result, a greater emphasis has been placed on the adoption and implementation of evidence-based practices (EBPs) in the health care system, with the goal of improving the quality of care patients receive. It has been widely reported, however, that the fields of mental health and substance abuse treatment lag significantly behind in the adoption, implementation, and dissemination of EBPs (Haug, Shopshire, Tajima, Gruber, & Guydish, 2008; Knudsen, Ducharme, & Roman, 2007; Knudsen, Roman, & Oser, 2010). Although more research is needed to determine why this is so, studies on substance abuse treatment facilities (SATFs) in the United States indicate that organizational characteristics greatly influence the adoption of innovative practices and EBPs in these facilities (Delany, Shields, & Roberts, 2009; Ducharme, Knudsen, & Roman, 2006; Ducharme, Mello, Roman, Knudsen, & Johnson, 2007). Panzano and Roth (2006) noted that the willingness of a mental health organization to adopt any innovative practice was significantly influenced by the perceived risk associated with the desired change, the availability of resources to the organization, prior exposure to EBPs, an organizational history of risk taking, as well as the capacity of the organization to manage risks. Conversely, the lack of financial and human resources have been associated with the discontinuation of innovative practices in mental health agencies after adoption (Massatti, Sweeney, Panzano, & Roth, 2008).

It is expected that the incorporation of these EBPs in the treatment of substance abuse patients will translate into better outcomes for patients. The provision of expanded supportive services, for example, has been associated with shorter length of stay in treatment, decreased use of substances, improved mental health symptoms, increased employment, improved self-reported health status, decreased risk for HIV, and improved birth outcomes for women (Ashley, Marsden, & Brady, 2003). However, although many studies have examined the organizational factors influencing the adoption of pharmacotherapies, behavioral therapies, and supportive services, there is paucity of research on the association between the extent of adoption or use of innovative practices, including but not limited to EBPs, and organizational performance in SATFs. Although the structural characteristics of SATFs that impact their performance as well as their propensity to adopt innovative practices have been extensively studied in the literature (Ducharme et al., 2006, 2007; Fields & Roman, 2010), little attention has been paid to deciphering the relationship between the incorporation of innovative practices into standard operating procedures and performance in SATFs.

Salge and Vera (2009) distinguish between two types of innovative practices: science-based innovation (SBI) and practice-based innovation (PBI). They describe SBI as those that "typically rely on and add to the codified body of scientific and technical knowledge." SBI includes, among others, the discovery of new medication as well as clinical trials to prove its effectiveness. The use of evidence-based pharmacotherapies and psychosocial therapies by SATFs may be considered as the adoption of SBI. PBIs, on the other hand, "are typically driven by mundane challenges encountered in daily practice…[and are] deeply embedded within daily work activities…[and] highly distributed across the entire organization" (Salge & Vera, 2009). Salge and Vera further describe PBIs as "ubiquitous yet often hidden even to insiders within the organization." Facilities incorporating, into their standard operating practices, processes that seek to enhance the quality of care they provide to their clients can be described as adopting PBIs. Standard organizational practices such as continuing staff education, patient satisfaction surveying, regularly scheduled case reviews conducted by supervisors and dedicated quality review committees, periodic utilization review, and outcome follow-up after discharge have received little attention in the SATFs literature as practice-based innovative practices.

In their study of hospital innovativeness and performance, Salge and Vera (2009) report a positive association between science- and practice-based innovativeness and clinical performance. Their findings also indicate that, relative to science-based innovativeness, a stronger association exists between practice-based innovativeness and the quality of clinical services provided. Scholars believe that the relationship between innovativeness and performance is contingent on a number of factors, including environmental, as well as empirical contexts within which these associations are examined (Salge & Vera, 2009). Thus, given that organizational and environmental factors influencing SATFs are different from those influencing hospitals, findings in the hospital industry may not necessarily reflect what occurs in SATFs. It remains to be determined whether SATFs that have incorporated and institutionalized innovative practices as a part of their standard operating procedures would be more likely to perform better. In other words, are SATFs that are implementing innovative practices and incorporating them in their daily operations performing better than their counterparts?

Therefore, the purpose of this study is to describe the use of innovative organizational practices by SATFs and to examine the influence of the use of innovative practices, both science based and practice based (SBI and PBI), on the organizational performance of SATFs. This study will distinguish between the use of SBI and PBI and examine how the use of these innovative practices is related to a measure of performance—the provision of comprehensive services. On the basis of the findings of past studies, it is expected that science-based and practice-based innovative practices may have different beneficial effects on organizational performance.

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

## Conceptual Framework

The conceptual framework for this study is based on Donabedian's structure, process, and outcomes framework of quality (Donabedian, 1988). Structural characteristics of the SATF that are included in the conceptual model are facility level measures of funding source, patient mix, service mix, geographical location, and accreditation status. The process measures are measures of organizational innovativeness: the frequency of use of SBIs and the frequency of use of PBI. The outcome is the performance of the SATF, operationalized as the provision of comprehensive (core and wraparound) services. Operationalizing of the variables and measures used in the study is guided by this conceptual framework and described below.

## Methods

### Variables and Measures

**Science-Based Innovativeness.** Many psychosocial therapeutic approaches have been proven to be effective especially when used in combination with pharmacotherapies (Saxon & McCarty, 2005; Stitzer & Vandrey, 2008; Weiss & Kueppenbender, 2006). These therapeutic approaches include cognitive behavioral therapy, 12-step facilitation, behavioral couples therapy, motivational interviewing (Haug et al., 2008; McCaul & Petry, 2003), contingency management (Haug et al., 2008; Stitzer & Vandrey, 2008), multidimensional family therapy, psychodynamic expressive support therapy (Ducharme et al., 2007; Haug et al., 2008), and the matrix model (Ducharme et al., 2007; Fields & Roman, 2010).

Brief interviewing has been shown to be a cost-effective intervention in substance abuse treatment (Babbor & Kadden, 2005; Bien, Miller, & Tonigan, 1993; Graham, 2002). Rational emotive behavioral therapy is another psychosocial intervention that has been used in SATF (Adelman, McGee, Power, & Hanson, 2005). The frequency of use of these innovative psychosocial practices may be considered a measure of science-based innovativeness. The frequency of use of SBIs is measured in this study by a 1–4 Likert's scale (1 = *never*, 4 = *always*) using the responses of facilities to the question of how often they used each of these psychosocial interventions.

**Practice-Based Innovativeness.** The frequency of use of PBIs is measured by a 1–4 Likert's scale (1 = *never*, 4 = *always*) where facilities responded to the question of how often they used the following processes as part of their standard operating procedures: (a) continuing staff education, (b) patient satisfaction surveying, (c) regularly scheduled case reviews conducted by supervisors, (d) regularly scheduled case reviews conducted by dedicated quality review committees, (e) periodic utilization review, (f) periodic drug testing, and (g) outcome assessment after discharge. This study measures organizational innovativeness as two latent constructs of science-based and practice-based innovativeness by principal components analysis, using the measures of frequency of use of Science-based innovation and PBI as described above.

**Organizational Performance.** Well-defined measures of quality and clinical performance in SATFs are lacking in the literature. Brannigan, Schackman, Falco, and Millman (2004) identified nine domains of quality in SATFs. In a 2009 study, Knudsen identified organizational characteristics influencing quality. However, both of these studies focused on a subset of SATFs—facilities providing care for adolescents—and only examined organizational correlates of quality.

The provision of comprehensive services has been used in past studies as a measure for performance in SATFs (Ducharme et al., 2007; Fields & Roman, 2010). The adoption of evidence-based medication and behavioral therapies have also been described and examined in existing literature as innovative practices (Fuller et al., 2007; Oser & Roman, 2007; Roman, Abraham, Rothrauff, & Knudsen, 2010). The use of a comprehensive measure of innovativeness has, however, been lacking in studies assessing innovativeness in SATFs.

In this study, we assessed performance by an index (Fields & Roman, 2010) that measures the comprehensiveness of services provided in SATFs. The National Institute on Drug Abuse (NIDA) defines comprehensive substance abuse services as including both core and wraparound services (NIDA, 1999). NIDA has identified eight services as core services for substance abuse treatment, including intake assessment or processing, treatment plan, behavioral therapy and counseling, substance use and monitoring, clinical and case management, pharmacotherapy, self-help and peer support groups, and finally, aftercare or continuing care (Ducharme et al., 2007; NIDA, 1999). Supportive services or wraparound services are those services intended to help "stabilize patients, improve their psychosocial functioning, enhance treatment engagement and retention and reduce the risk of treatment drop out and early relapse" (Delany et al., 2009). There has also been extensive support for the inclusion of supportive services to augment the effectiveness of core services provided by SATFs (Andrews et al, 2011; Delany et al., 2009; Ducharme et al., 2007). Supportive services include the provision of medical services, mental health services, child care services, transportation assistance, housing assistance, employment and vocational services, family services, AIDS/HIV screening and treatment services, legal assistance, and educational services (Delany et al., 2009; Ducharme et al., 2007; NIDA, 1999). These services have been shown to directly enhance recovery or indirectly support recovery by improving the patient's skills and abilities, as well as their health

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

(Andrews, Dingcai, Marsh, & Shin, 2011; Delany et al., 2009; Ducharme et al., 2007; NIDA, 1999). The index for comprehensive services used in this study is computed by summing up dichotomous indicators for the provision of a total of 50 core and wraparound services. The core services include self-help groups, assessment/screening, peer support/mentoring, counseling services, case management, pharmacotherapy, and after care, all of which were identified by NIDA as core services. The wraparound services include child care services; specific group programs for adolescents, gay/lesbians, women, pregnant/postpartum women, seniors, and dually diagnosed; transportation services; housing; HIV education and interventional services; employment services; language services; acupuncture; and mental health services. The list of comprehensive services does not overlap with the items used to construct the SBI and PBI measures.[1]

**Organizational and Environmental Control Variables.** Several studies have identified organizational factors influencing the adoption of pharmacotherapy (Ducharme et al., 2006; Koch, Arfken, & Schuster, 2006) and psychosocial therapies (Bride, Abraham, & Roman, 2011) as well as the provision of expanded supportive services for substance abuse patients (Delany et al., 2009; Ducharme et al., 2007). Organizational factors influencing the adoption of pharmacotherapies include ownership, staff size, and payment source (Knudsen et al., 2010). Specifically, Knudsen et al. (2010) reported that organizations that were government owned, those that were dependent on Medicaid, and those with more medical staff were more likely to adopt substance abuse treatment pharmacotherapies in publicly funded SATFs. Ducharme et al. (2006) also reported that private sector facilities and those with greater revenue from commercial insurance were more likely to adopt evidence-based medications such as naltrexone and disulfiram. Organizational correlates for the provision of supportive services have been identified to include organizational size (Oser, Knudsen, Staton-Tindall, & Leukefeld, 2009), government ownership, the percentage of female clients served, and the number of social service agency referrals (Ducharme et al., 2007). Findings from a study by Delany et al. (2009) also indicate that staff mix, accreditation status, diversity of organizations' revenue sources, managed care contracts, and client characteristics were all associated with the provision of wraparound services.

This study controlled for facilities' primary treatment focus (substance abuse treatment or mix of substance abuse and mental health treatment or other) geographical location: metropolitan statistical areas (MSA) and ownership (private not-for-profit and private for-profit status). MSAs are defined by the U.S. Office of Management and Budget. An MSA is a county or group of contiguous counties that contains at least one city with a population of 50,000 or more or includes a Census Bureau-defined urbanized area of at least 50,000 with a metropolitan population of at least 100,000. Patient mix was controlled for in this study by the inclusion of variables measuring the proportion of patients treated for both alcohol and substance abuse and the proportion of patients with both substance abuse and mental health diagnoses cared for in the facility. Finally, a dummy variable was also included to indicate whether the facility provided hospital inpatient care, non-hospital residential treatment, or outpatient care.

Environmental control variables included a binary variable to indicate whether the Joint Commission (JCAHO) or the Commission on Accreditation of Rehabilitation Facilities (CARF) accredited the facility, indicators of revenue sources for the facility (Medicare, Medicaid, private insurance, and self-pay), as well as a variable to indicate whether the facility received earmarked public funds.

The study uses data from the 2009 National Survey of Substance Abuse Treatment Services (N-SSATS) database. The N-SSATS database has information from all facilities in the United States, both public and private, that provide substance abuse treatment. The N-SSATS data quantify the dynamic character and composition of the U.S. substance abuse treatment delivery system (U.S. Department of Health and Human Services, 2009). The total survey universe for the 2009 N-SSATS data was 17,226 facilities. With a response rate of over 88%, data on a total of 13,513 (88.8%) facilities are available in the 2009 database. The data are publicly available for download. For a detailed description of the survey collection and data elements, the reader is referred to the Web site of the Inter-University Consortium for Political and Social Research (http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/28781/detail#bibliographic-description). The data were analyzed by descriptive analysis and multivariate regression models using Stata 10 software.

## Findings

Of the 13,513 facilities in the sample, 61.1% had a substance abuse focus and 30.27% had a mixed (substance abuse and mental health) focus. The rest provided mental health and general health services. Most of the facilities in the sample (76.43%) were located in MSAs. Over half (57.91%) of all the facilities were private not-for-profit entities, and 29.3% were private for-profit facilities. Only about 20% of the sample had JCAHO and CARF accreditation. As noted above, the organizational performance of SATFs was measured by the comprehensiveness of the services provided or the total number of comprehensive services that the facility offered. Of a total of 50 core and wraparound services, the mean number of services offered was 20.02 ($SD$ = 6.79). The number of comprehensive services offered ranged between 1 and 46. Table 1

[1]*The complete list of core and wraparound services used to compute the measure of comprehensiveness of services is available from the authors on request.*

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

**Table 1**

**Sample descriptive characteristics (*N* = 13,513)**

| Variable | Description | Frequency (%) | Mean | *SD* |
|---|---|---|---|---|
| Outcome | | | | |
| Organizational performance | Provision of comprehensive services | Range: 1–46 | 21.02 | 6.79 |
| Structure | | | | |
| Organizational variables | | | | |
| | Substance abuse focus | 8,257 (61.10) | | |
| | Mix of SA and mental health focus | 4,091 (30.27) | | |
| | Metropolitan location | 10,328 (76.43) | | |
| | Private for-profit | 3,959 (29.3) | | |
| | Private not-for-profit | 7,826 (57.91) | | |
| | % Clients with SA and mental health diagnosis | | 40.02 | 31.49 |
| | % Clients treated for both alcohol and drug abuse | | 52.28 | 31.00 |
| | Provides hospital/inpatient care | 797 (5.9) | | |
| | Provides nonhospital residential care | 3,520 (26.05) | | |
| | Provides outpatient care | 10,905 (80.7) | | |
| Environmental variables | Accepts private insurance | 8,447 (63.93) | | |
| | Accepts Medicare | 4,405 (33.72) | | |
| | Accepts Medicaid | 7,266 (55.12) | | |
| | Accepts self-pay | 12,140 (90.51) | | |
| | Receives earmark funds | 8,117 (61.77) | | |
| | JCAHO accreditation | 2,665 (20.73) | | |
| | CARF accreditation | 2,932 (23.15) | | |

JCAHO = Joint Commission; CARF = Commission on Accreditation of Rehabilitation Facilities.

summarizes the variables used in the study and the descriptive statistics of the study sample.

A factor analysis of the frequency of use of innovative practices (SBI and PBI) was done using principal components analysis and varimax rotation, and a two-factor solution was obtained. The eigenvalue for the first component was 3.0, and it explained 20% of the total variance. The eigenvalue of the second component was 1.705, explaining 11.37% of the total variance. Table 2 lists the variables used for the factor analysis and the factor loadings of the rotated component matrix. All of the psychosocial interventions loaded on Factor 1 (science-based innovativeness) and all the PBIs loaded on Factor 2 (practice-based innovativeness), with the lowest factor loadings being 0.36 and 0.31, respectively. The factor scores were used in the multivariate regression models to measure the latent constructs of SBI and PBI.

Because the dependent variable is a count of services provided, we examined Poisson and negative binomial regression models as well as a multinomial regression model with three levels of performance (2 = *top quartile of performance*, 1 = *mid quartiles of performance*, and 0 = *bottom quartile of performance*). Multinomial logistic regression, also known as multivariate polytomous regression, is an extension of logistic regression that is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable (in this case, three levels of organizational performance), given a set of independent variables. The Poisson regression model did not provide a good fit to the data, and between the negative binomial and multinomial logistic models, the multinomial logistic regression model provided the best fit to the data (highest pseudo $R^{2)}$. The results of the multinomial logistic regression are presented in Table 3. The mean performances for the low three levels of performance were 12.84, 20.89, and 29.77 for the bottom, mid, and top quartiles, respectively.

Multivariate polytomous (multinomial) logistic regression models were fitted to evaluate the association of the use of SBI and PBI with the mid or high level of organizational performance compared with low performance (the reference group), with adjustment for the confounding effects of organizational and environmental covariates such as metropolitan location, service mix, patient mix, focus, ownership, funding source, and JCAHO and CARF accreditation. The results of the multinomial logistic regression analyses indicate that all of the included covariates, except for private insurance, were significantly associated with the organizational performance at a significance level of $p < .05$.

The use of SBI had significant positive association with the dependent variable, the total number of comprehensive services offered. Specifically, the odds ratio of having mid-level performance associated with one unit use of SBI is 1.55 (95% CI [1.47, 1.64]) or, in other words, the odds of having mid-level performance (compared with low performance) significantly increased by 1.55 for each unit of SBI used.

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

**Table 2**

**Principal components analysis**

| Variable | Factor 1[a] | Factor 2[b] |
|---|---|---|
| Practice-based innovativeness | | |
| Satisfaction survey | .061 | .615 |
| Utilization review | .075 | .669 |
| Follow-up | .102 | .469 |
| Quality review | .078 | .632 |
| Case review | .046 | .569 |
| Drug testing | .101 | .368 |
| Continuing education | .060 | .411 |
| Science-based innovativeness | | |
| Rational behavioral therapy | .611 | −.006 |
| Brief intervention | .556 | .123 |
| Community reinforcement plus vouchers | .480 | .039 |
| Matrix model | .495 | .113 |
| Contingency management | .655 | .083 |
| Cognitive behavioral therapy | .645 | .048 |
| Motivational interviewing | .647 | .108 |
| Twelve step facilitation | .317 | .147 |

Rotated component matrix factor loadings. Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in three iterations.

[a]Science-based innovativeness.

[b]Practice-based innovativeness.

Similarly, the odds ratio of having high performance associated with one unit use of SBI is 2.57 (95% CI [2.38, 2.76]). The use of PBI also has significant positive association with the dependent variable, the total number of comprehensive services offered. The odds ratio of having mid-level performance associated with one unit use of PBI is 1.59 (95% CI [1.51, 1.68), and the odds ratio of having high performance associated with one unit use of PBI is 2.58 (95% CI [2.37, 2.82]).

Metropolitan location of the SATF was found to be significantly positively associated with the total number of comprehensive services provided. In other words, SATFs located in metropolitan areas have higher organizational performance. The odds ratio of having mid-level performance associated with metropolitan location of the facility is 1.38 (95% CI [1.22, 1.56]), and the odds ratio of having high performance associated with metropolitan location is 2.08 (95% CI [1.78, 2.43]).

All of the other covariates examined, including focus (substance abuse, mix), for-profit and not-for-profit ownership, patient mix, and funding sources were significantly associated with the number of comprehensive services offered, except for "accepts private insurance." Apart from science-based and practice-based innovativeness and metropolitan location, the other covariates that were significantly positively associated with performance were JCAHO or CARF accreditation, mixed (substance abuse, mental health) focus, and receipt of earmark funds. Significantly, SATFs that were accredited by CARF and JCAHO were more likely to be in the top quartile of performance, although not associated with mid-level performance. Those facilities that had a mixed focus or were recipients of earmark funds also had higher organizational performance compared with the bottom quartile of performance.

## Discussion

The findings of this study contribute to the existing body of literature on the innovativeness and performance of SATFs in a number of significant ways. First, the study uses data from the N-SSATS (2009) database, which contains information from all facilities in the United States providing substance abuse treatment. The N-SSATS provides us with a comprehensive data set to quantify the dynamic character and composition of the U.S. substance abuse treatment delivery system. Thus, unlike previous studies that have been conducted on a relatively small subset of SATFs (Ducharme et al., 2007; Fields & Roman, 2010), this study examines performance in SATFs using a large nationally representative sample.

Second, this study builds on previous studies on organizational innovativeness by using a more comprehensive definition of *organizational innovativeness* in the context of SATFs that distinguishes between practice-based innovativeness and science-based innovativeness. Furthermore, factor analysis is used to establish the construct validity of these two latent constructs. SBIs are described as those that "typically rely on and add to the codified body of scientific and technical knowledge" (Salge & Vera, 2009). In this study, we operationalized the science-based innovativeness by measures of the extent of use of psychosocial therapies.

PBIs, on the other hand, are usually incorporated into daily organizational operations and are implemented in response to mundane challenges that negatively affect the operations of an organization. In recent years, the government, third-party payers, and patients have all started paying much closer attention to the quality of care provided by U.S health care facilities. Consequently, SATFs, like other health care organizations, are being driven to pay critical attention to quality within their facilities to set themselves apart from their competitors. In response to these challenges, some SATFs have incorporated processes into their standard operating practices that seek to improve quality within their respective facilities. The adoption of such practices can, thus, be described as practice-based innovativeness. The incorporation of processes, such as continuing staff education, patient satisfaction surveying, regularly scheduled case reviews conducted by supervisors, and dedicated quality review committees and periodic utilization reviews, into standard operating practices have received little attention in the SATF literature as practice-based innovative practices. This study highlights the importance of PBI in the performance of SATFs.

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

**Table 3**

**Multinomial logistic regression: Quartiles of performance (low = *25th percentile*, top = *75th percentile*)**

| | Mid, *n* = 6,310 | | Top, *n* = 3,531 | |
|---|---|---|---|---|
| Covariate | RRR | 95% CI | RRR | 95% CI |
| Frequency of use of science-based innovations (Factor 1) | 1.55*** | 1.47, 1.64 | 2.57*** | 2.38, 2.76 |
| Frequency of use of practice-based innovations (Factor 2) | 1.59*** | 1.51, 1.68 | 2.58*** | 2.37, 2.82 |
| Metropolitan location | 1.38*** | 1.22, 1.56 | 2.08*** | 1.78, 2.43 |
| Substance abuse focus | 0.68*** | 0.55, 0.83 | 0.82 | 0.63, 1.07 |
| Mix (substance abuse and mental health) focus | 1.45** | 1.17, 1.80 | 2.56*** | 1.96, 3.34 |
| Private for-profit | 0.68** | 0.55, 0.85 | 0.37*** | 0.29, 0.48 |
| Private not-for-profit | 0.81** | 0.67, 0.97 | 0.55*** | 0.45, 0.68 |
| CARF accreditation | 1.07 | 0.93, 1.22 | 1.21* | 1.03, 1.41 |
| JCAHO accreditation | 0.99 | 0.85, 1.16 | 1.52*** | 1.27, 1.82 |
| % Clients with substance abuse and mental health diagnosis | 1.00 | 1.004, 1.007 | 0.99*** | 0.995, 0.999 |
| % Clients treated for both alcohol and drug abuse | 0.99** | 0.995, 0.999 | 1.00*** | 1.004, 1.007 |
| Provides hospital/inpatient care | 3.95*** | 2.65, 5.89 | 10.76*** | 7.11, 16.28 |
| Provides nonhospital residential care | 2.82** | 2.22, 3.599 | 6.83*** | 5.28, 8.84 |
| Provides outpatient care | 1.64*** | 1.27, 2.13 | 2.43*** | 1.85, 3.19 |
| Accepts self-pay patients | 0.71** | 0.58, 0.86 | 0.80 | 0.63, 1.02 |
| Accepts Medicare patients | 1.25** | 1.08, 1.44 | 1.76*** | 1.49, 2.08 |
| Accepts Medicaid patients | 1.56*** | 1.38, 1.77 | 1.95*** | 1.67, 2.28 |
| Accepts private insurance | 0.97 | 0.86, 1.09 | 1.06 | 0.91, 1.24 |
| Earmark | 1.47*** | 1.30, 1.67 | 1.70*** | 1.46, 1.99 |

Lowest quartile (25th percentile) is the reference group. RRR = relative risk ratio; CI = confidence interval; JCAHO = Joint Commission; CARF = Commission on Accreditation of Rehabilitation Facilities.

*$p < .05$.

**$p < .01$.

***$p < .001$.

It is important to distinguish between science-based and practice-based innovativeness as the two may impact performance distinctly. For example, although practice-based innovativeness appears to impact both return on income and resource use rating in organizations, science-based innovativeness appears to positively impact organizational performance in terms of income-generating potential. On the other hand, the adoption of both types of innovativeness has been shown to be positively related to clinical performance in UK hospitals (Salge & Vera, 2009). Salge and Vera's (2009) study also found a stronger association between PBI and performance than SBI and performance. Our study mirrors the findings of Salge and Vera's study, in the specific context of SATFs, by finding a stronger positive association of PBI and performance than SBI and performance, although the differences in the effect sizes were not large. In addition, it is worth noting that the PBIs are critical elements of good managerial practices in the day-to-day management of a substance abuse treatment program. A study by McConnell, Hoffman, Quanbeck, and McCarty (2009) found that measures of "good" management practice in SATFs were strongly associated with days to treatment admission. This study also finds evidence of practice-based innovativeness being positively associated with performance in terms of the comprehensiveness of services provided.

This study used the degree of provision of comprehensive services as a measure for performance. Whereas the provision of comprehensive substance abuse services has been used in prior studies (Ducharme et al., 2007; Fields & Roman, 2010) as a measure for the organizational performance of SATFs, the existing health care organizational literature has shed little light on the impact of innovativeness on organizational performance. A positive relationship between the two is more often assumed, a phenomenon that has been described as "pro-innovation bias" (Salge & Vera, 2009). This study examines the empirical relationship between organizational innovativeness and performance in the context of substance abuse facilities and finds that the use of innovative practices, both science based and practice based, have significant positive outcomes for the facilities, in terms of higher performance (comprehensiveness of services provided to the clients).

In an era of health reform and value-based purchasing, third-party payers are pushing for greater value of the

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

health care product. Therefore, health care organizations that attempt to distinguish themselves from their peers by implementing and institutionalizing innovative practices, including SBI and PBI, are likely to reap benefits in terms of higher performance in terms of quality and patient satisfaction. Whether this relationship holds for other dimensions of performance such as efficiency and financial bottom line needs to be studied. In a study of hospitals of England, innovative practices were found to have a clear influence on clinical, but not financial, performance (Salge & Vera, 2009).

There are limitations to this study that warrant discussion. First, because of the cross-sectional correlational design, this study does not attempt to establish causality. Second, as with all cross-sectional studies, this study may have omitted variable bias. We have attempted to minimize this bias by including a significant number of organizational and environmental control variables to control for potential confounders. In addition, the study used only one measure of performance—an index measuring the provision of comprehensive services. Although this measure has been used in other studies as an indicator of performance, it will be beneficial to use measures of other dimensions of performance (such as measures of financial performance, organizational efficiency, and patient outcomes) in future studies to assess the relationship between innovativeness and organizational performance in SATFs. In substance abuse treatment, the most important outcome variable would be evidence that treated patients did not drink alcohol or abuse illegal or prescription drugs for over 2–3 years. However, clinical outcomes data were not available for analyses in the database used in this study. The database used in this study is primarily collected for policy and administrative purposes, rather than for research, and there may be some concerns, with regards to who is filling out the information. Furthermore, the use of comprehensive services as the performance measure applies a unit weight to all services. All services may not be equal and may not also correlate well with clinical outcomes. However, because the database does not include patient level outcomes, we were unable to examine association with clinical outcomes and innovativeness. In addition, urban SATFs may have more exposure to SBIs.

Despite these limitations, this study builds on the previous empirical literature on the influence of organizational innovativeness on performance by validating the findings with a large nationally representative sample of SATFs and establishing construct validity using factor analysis. Future studies should reexamine this relationship using more holistic measures of organizational performance and large sample panel data.

## Practice Implications

This study has several implications for practice. First, in an era of emphasis on the value of health care provided, SATFs, like other health care organizations, would need to project an image of being innovators and high-performance organizations. Patients and payers alike are more discerning and likely to behave like rational consumers of health care and differentiate between facilities that are more innovative and also those that offer more comprehensive services. Therefore, managers would need to make a considerable investment in adopting, implementing, and institutionalizing organizational innovative practices.

The results of this study signify that substance abuse facilities that are high innovators in terms of implementing science-based and practice-based innovative practices also have higher clinical performance. Organizations that have institutionalized these practices have invested considerable resources in innovation. The higher organizational performance of these facilities provides justification for the organizational commitment to and investment in innovation.

SATFs that have institutionalized innovative practices are also likely to be more resilient to environmental pressures such as resource instability. Hovmand and Gillespie (2010) observe that "Organizations that achieve their clinical outcomes by providing services reliably through institutionalized procedures will be more likely to resist change and experience less of an impact with a sudden drop in resources." Implementing innovative practices, thus, would likely confer a competitive advantage to these innovative facilities in the health care market place. For managers, this would help make the business case for adoption of these innovative practices in an era of economic uncertainty that would justify the adoption and institutionalizing of these practices.

Finally, it is likely that science-based and practice-based innovativeness have differential impact on performance, with a greater impact of practice-based innovativeness on performance. The effectiveness of the SBIs may be dependent on having the PBIs already in place in the SATFs. The SBI components are likely to be most effective if there are already established PBI components in place, emphasizing the importance of institutionalizing sound management practices to maximize performance.

## References

Adelman, R., McGee, P., Power, R., Hanson, C. (2005). Reducing adolescent clients' anger in a residential substance abuse treatment facility. *Joint Commission Journal on Quality & Patient Safety*, *31*(6), 325–337.

Andrews, C., Dingcai, C., Marsh, J., & Shin, H. (2011). The impact of comprehensive services in substance abuse treatment for women with a history of intimate partner violence. *Violence Against Women*, *17*(5), 550–567.

Ashley, O., Marsden, M., & Brady, T. (2003). Effectiveness of substance abuse treatment programming for women: A review. *The American Journal of Drug and Alcohol Abuse*, *29*(1), 19–53.

Babbor, T. F., & Kadden, R. F. (2005). Screening and interventions for alcohol and drug problems in medical settings:

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

What works? *Journal of Trauma*, *59*(Suppl 3), S80–S87, discussion S94–S100.

Bien, T. H., Miller, W. R., & Tonigan, J. S. (1993). Brief interventions for alcohol problems: A review. *Addiction*, *88*(3), 315–335.

Brannigan, R., Schackman, B. R., Falco, M., & Millman, R. B. (2004). The quality of highly regarded adolescent substance abuse treatment programs. *Archives of Pediatric & Adolescent Medicine*, *158*904–909.

Bride, B., Abraham, A., & Roman, P. (2011). Organizational factors associated with the use of contingency management in publicly funded substance abuse treatment centers. *Journal of Substance Abuse Treatment*, *40*(1), 87–94.

Delany, P., Shields, J., & Roberts, D. (2009). Program and client characteristics as predictors of the availability of social support services in community-based substance abuse treatment programs. *The Journal of Behavioral Health Services & Research*, *36*(4), 450–464.

Donabedian, A. (1988). The quality of care. How can it be assessed? *JAMA: The Journal of the American Medical Association*, *260*(12), 1743–1748.

Ducharme, L., Mello, H., Roman, P., Knudsen, H., & Johnson, J. (2007). Service delivery in substance abuse treatment: Re-examining "comprehensive" care. *The Journal of Behavioral Health Services & Research*, *34*(2), 121–136.

Ducharme, L. J., Knudsen, H. K., & Roman, P. M. (2006). Trends in the adoption of medications for alcohol dependence. *Journal of Clinical Psychopharmacology*, *26*(Supp1), S13–S19.

Fields, D., & Roman, P. (2010). Total quality management and performance in substance abuse treatment centers. *Health Services Research*, *45*(6 Pt 1), 1630–1649.

Fuller, B. E., Rieckmann, T., Nunes, E. V., Miller, M., Arfken, C., Edmundson, E., & McCarty, D. (2007). Organizational readiness for change and opinions toward treatment innovations. *Journal of Substance Abuse Treatment*, *33*(2), 183–192.

Graham, A. (2002). Review: Brief interventions reduce drinking in patients not seeking treatment. *Evidence Based Mental Health*, *5*(4), 116–127.

Haug, N., Shopshire, M., Tajima, B., Gruber, V., & Guydish, J. (2008). Adoption of evidence-based practices among substance abuse treatment providers. *Journal of Drug Education*, *38*(2), 181–192.

Hovmand, P. S., & Gillespie, D. F. (2010). Implementation of evidence-based practice and organizational performance. *Journal of Behavioral Health Services and Research; the Journal of Behavioral Health Services*, *37*(1), 79–94.

Institute of Medicine. (2000). *To err is human: Building a safer health system*. Washington, DC: National Academy Press.

Knudsen, H., Ducharme, L., & Roman, P. (2007). The adoption of medications in substance abuse treatment: Associations with organizational characteristics and technology clusters. *Drug And Alcohol Dependence*, *87*(2–3), 164–174.

Knudsen, H., Roman, P., & Oser, B. (2010). Facilitating factors and barriers to the use of medications in publicly funded addiction treatment organizations. *Journal of Addiction Medicine*, *4*(2), 99–107.

Koch, A., Arfken, C., & Schuster, C. (2006). Characteristics of U.S. substance abuse treatment facilities adopting buprenorphine in its initial stage of availability. *Drug and Alcohol Dependence*, *83*(3), 274–278.

Massatti, R., Sweeney, H., Panzano, P., & Roth, D. (2008). The de-adoption of innovative mental health practices (IMHP): Why organizations choose not to sustain an IMHP. *Administration and Policy in Mental Health*, *35*(1–2), 50–65.

McCaul, M., & Petry, N. (2003). The role of psychosocial treatments in pharmacotherapy for alcoholism. *The American Journal on Addictions/American Academy of Psychiatrists in Alcoholism and Addictions*, *12*(Suppl 1), S41–S52.

McConnell, K. J., Hoffman, K. A., Quanbeck, A., & McCarty, D. (2009). Management practices in substance abuse treatment programs. *Journal of Substance Abuse Treatment*, *37*(1), 79–89.

National Institute on Drug Abuse. (1999). *Principles of drug addiction treatment (NIH publication 99-4180)*. Washington, DC: National Institutes of Health.

Oser, C., Knudsen, H., Staton-Tindall, M., & Leukefeld, C. (2009). The adoption of wraparound services among substance abuse treatment organizations serving criminal offenders: The role of a women-specific program. *Drug and Alcohol Dependence*, *103*(Suppl. 1), S82–S90.

Oser, C., & Roman, P. (2007). Organizational-level predictors of adoption across time: Naltrexone in private substance-use disorders treatment centers. *Journal of Studies on Alcohol and Drugs*, *68*(6), 852–861.

Panzano, P., & Roth, D. (2006). The decision to adopt evidence-based and other innovative mental health practices: Risky business? *Psychiatric Services (Washington, DC)*, *57*(8), 1153–1161.

Roman, P., Abraham, A., Rothrauff, T., & Knudsen, H. (2010). A longitudinal study of organizational formation, innovation adoption, and dissemination activities within the National Drug Abuse Treatment Clinical Trials Network. *Journal of Substance Abuse Treatment*, *38*(Suppl 1), S44–S52.

Salge, T., & Vera, A. (2009). Hospital innovativeness and organizational performance: Evidence from English public acute care. *Health Care Management Review*, *34*(1), 54–67.

Saxon, A., & McCarty, D. (2005). Challenges in the adoption of new pharmacotherapeutics for addiction to alcohol and other drugs. *Pharmacology & Therapeutics*, *108*(1), 119–128.

Stitzer, M., & Vandrey, R. (2008). Contingency management: Utility in the treatment of drug abuse disorders. *Clinical Pharmacology and Therapeutics*, *83*(4), 644–647.

U.S. Department of Health and Human Services. (2009). *Substance Abuse and Mental Health Services Administration, Office of Applied Studies, National Survey of Substance Abuse Treatment Services (N-SSATS), United States* [Computer file]. ICPSR28781-v1. Ann Arbor, MI: Inter-University Consortium for Political and Social Research [distributor], 2010-07-20. doi:10.3886/ICPSR28781

Weiss, R. D., & Kueppenbender, K. D. (2006). Combining psychosocial treatment with pharmacotherapy for alcohol dependence. *Journal of Clinical Psychopharmacology*, *26*(Suppl 1), S37–S42.

Copyright © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.