Predicting healthcare employees' participation in an office redesign program: Attitudes, norms and behavioral control

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Abstract

Background

The study examined the extent to which components based on a modified version of the theory of planned behavior explained employee participation in a new clinical office program designed to reduce patient waiting times in primary care clinics.

Methods

We regressed extent of employee participation on attitudes about the program, group norms, and perceived behavioral control along with individual and clinic characteristics using a hierarchical linear mixed model.

Results

Perceived group norms were one of the best predictors of employee participation. Attitudes about the program were also significant, but to a lesser degree. Behavioral control, however, was not a significant predictor. Respondents with at least one year of clinic tenure, being team leaders, first line supervisor, or manager-level had greater participation rates. Analysis at the clinic level indicated the highest quartile clinic scores on group norms, attitudes, and behavioral control scores were significantly higher on levels of overall participation than clinics in the lowest quartile.

Conclusion

Research findings suggest that establishing strong norms and values may influence employee participation in a change program in a group setting. Supervisory level was also significant with greater responsibility being associated with greater participation.

Background

In healthcare, organizations continually strive to implement new programs designed to improve patient care. A few recent programs have focused on implementing electronic health records [1], pay-for-performance [2], and redesigning practice to meet the needs of chronically ill patients [3]. Several papers have also examined the extent to which different practices may lead to effective implementation of changes [4, 5]. The success of the implementation effort and participation rates may be influenced by other individuals' activities in the workplace in addition to the attitudes and beliefs of the individual themselves. We believe that applying a theory based in psychology around behavior provides a helpful way to understand participation and implementation effectiveness, especially when considering factors at individual- and group-levels.

The purpose of this study was to examine how employee attitudes, perceived group norms, and perceived behavioral control predict participation in an innovative outpatient clinic redesign program designed to improve clinic operations and reduce patient waiting times. We apply a model using variables based upon the Theory of Planned Behavior (TPB) [6, 7].

Open Access

The context for the study is the U.S. Veterans Health Affairs (VHA); it operates as the largest healthcare organization in the public sector. VHA has experienced a surge in demand for care from an aging veteran population requiring more healthcare services [8]. Thus, reducing wait times is a high priority. In 1999, VHA collaborated with the Institute for Healthcare Improvement (IHI) and launched a national initiative to diffuse the principles of Open Access

across primary care clinics and five specialty clinics [9]. IHI worked with VHA for 18 months to implement Open Access by using a Framework for Spread model [10].

Open Access is a patient-centered approach that allows patients to determine when they want to be seen in a clinician's office [11-13]. The program espouses a set of ten change principles for managing clinics to improve patient access. The ten change principles are based around concepts of shaping the demand (*e.g.*, working down the backlog), matching supply (*e.g.*, providers have an appropriate number of patients on their panel) and redesigning the system to improve supply and demand balance (*e.g.*, planning for periods of provider absence) [14]. The program is often referred to as Open Access or Advanced Clinic Access (ACA).

Reports and studies of the Open Access or ACA program have shown it has led to numerous benefits to clinics that are implementing it. Benefits of the program that have been observed include more patients being able to see their own provider [15], more productive patient-provider visits, increased physician compensation, higher net gains for clinics, more efficient operations, decreased use of urgent care and higher patient satisfaction scores [16, 17], reduced demand for office visits [18], greater sustained enrollment in managed care plans [14], and less work demands on employees [17]. During the first 18 months of the implementation program for VHA in 1999, waiting times for primary care appointments were reduced from 60 days to 28 days. The improvements were sustained with waiting times averaging less than 25 days in key clinics in September 2004 [10].

The spread plan involved four components: 1) organizational infrastructure — a focus on leadership commitment and support, technical support, measurement system to monitor and provide feedback, knowledge management system to document information, progress, issues,

and questions; 2) information — distributing information about ACA, making the business case for ACA and transition materials; 3) communication — spreading awareness, technical information, and identifying key messengers; and 4) social systems as a unit of spread, including individuals who adopt new systems, developing communities of practices, motivators, and incentives.

ACA was not a mandated program during the study period. The organization strongly encouraged and promoted ACA as a way to alleviate the issues of growing patient demand in the system. Because it was not a mandated program, we evaluated the program as a natural experiment.

The current study is part of a larger comprehensive evaluation that examined program implementation structure and activities, staff capabilities, waiting times, and patient satisfaction [19]. A recent article, based on the first part of the evaluation study conceptual model, presents facility level findings on the factors contributing to implementation of the program from the perspective of employees and facility level program managers [20]. We plan to document the effects of the program on facility level waiting times and patient satisfaction separately in the future. The following study is focused on examining the extent to which individual attitudes and beliefs are related to participation in specific change program aims. We apply a well-used theory from psychology to guide our study.

Theory of Planned Behavior

The theory of planned behavior (TPB) [6, 7] postulates that behavior is influenced by intentions to perform a specific volitional behavior. Behavioral intentions are influenced by attitudes about the behavior, norms and perceived behavioral control. ‘Attitude about the behavior’ is a function

of beliefs about consequences of the behavior and an evaluation of the consequences. The 'group norms' component is a function of social expectations to perform the behavior and motivation to comply with the social group's wishes. Third, 'perceived behavioral control' is the perceived ease or difficulty of performing the behavior. This is based on a person's ability and experience.

In terms of the predicting behavior itself, a review of studies on physical activity has found strong support that attitude, intention, and behavioral control do influence behavior [21]. Research conducted in healthcare settings has found positive relationship between physician's attitudes, beliefs, and perceived behavioral control with mammography screening [22], education about sexually transmitted diseases provided to adolescents [23], smoking cessation [24], and individual health screening and physician visits [25]. The theory has been applied and supported when examining individual turnover [26] among many other areas.

For our study, we borrow themes from the model to develop our analysis. We note this is not a pure empirical test of the theory. Instead, we use the theory to help in our testing and identification of factors that may lead to employee participation. We do not test intention to engage in the behavior as specified in the model, but do model the actual behavior itself.

We found virtually all the research on TPB has examined behaviors that are within the control of the individual (*e.g.*, health screening, providing education) and have not considered behavior within the explicit context of a team setting. In the workplace setting, several individuals are working collaboratively to implement an innovation program. The efforts and beliefs of an individual may be influenced by the participation and behaviors of coworkers.

Several of the items used in the study are written to reflect the perceptions individuals have about their team in a clinic setting with respect to how the theory is framed. A clinician who decides that all appointment times should be 15 minutes would cause the support staff to be involved in that same behavior as well, although not all support staff may participate equally in this practice. This could suggest that perceived group norms might play a larger role in predicting behavior than would attitudes about the behavior or perceived behavioral control — a research question that will be more fully tested in the analyses.

Current study

Based on these generally consistent findings using the theory, we hypothesized that the three components — attitudes about the behavior, perceived group norms, and perceived behavioral control — would relate positively to extent of behavioral participation in the ACA program. The study was conducted as a cross-sectional analysis. We modeled participation at an individual level and at a clinic level.

Methods

Setting

As mentioned, the data from this study came from a larger evaluation effort designed to assess the ACA program's ability to influence appointment wait times and patient satisfaction [19]. The evaluation sample included 78 medical centers out of approximately 142 medical centers from the total population. We stratified the sample of medical centers into thirds on the basis of their average patient wait time. Some of these medical centers had multiple outpatient clinics in distinct locations that provided primary care services. The outpatient clinics were also included. This brought our total of unique primary care clinics up to 92. The practice patterns (*e.g.*, time to

see patients, procedures, staffing) of specialty clinics are different from primary care clinics and were not always represented at every medical hospital. For the purpose of this study, we report only results for individuals who indicated that primary care as their main clinic. Although many facilities have multiple clinics providing primary care (*i.e.*, red team or blue team), we consider them as a whole for the purpose of this study.

Procedure

The data source for the study was a survey of employees working in outpatient care in the sample hospitals. The employee survey consisted of four sections. In the first section, 'General Background', employees were asked to indicate the clinical area(s) in which they worked, the amount of time spent in each area, their supervisory status, professional role, and job tenure. In the second section, 'Changes to Improve Clinic Access', employees were asked to indicate their involvement in activities related to each of the ACA key changes, and to report their participation in various ACA spread activities. The third section of the questionnaire focused on issues such as attitudes about the program, perceived group norms, and influences on participating in the program. In the final section, 'Summing Up', employees were asked for their perceptions of the impact of ACA on their own work life, on the quality of patient care, and on patients' satisfaction with care and service.

A point of contact (POC) had been designated at each medical facility as part of the national ACA initiative. Survey packets consisting of a cover letter, questionnaire, and pre-paid business reply envelop addressed directly to a third-party data entry vendor were mailed to each POC, who then distributed the packets to clinic employees. The survey was anonymous; packets were addressed to 'Primary Care Staff Member', and no individual respondent ID number appeared on

the questionnaire. To increase response rate, a second wave of surveys was distributed to all employees three weeks later.

Participants

Within the medical facilities selected from the evaluation, a total of 9,053 surveys were distributed to all staff, including physicians, nurses, and program support assistants. The surveys were distributed to five specialty care clinical areas (cardiology, audiology, eye care, orthopedics, and urology), but primary care clinic employees were the focus of the study. We obtained an overall response rate of 39%. Of the total sample, 5,545 surveys were distributed in primary care. A total of 2,242 individuals responded (40%) indicating primary care as their main clinic area. We excluded respondents (n = 48) who indicated that they spent less than half of their time in primary care.

Participation in ACA

Participants were instructed to indicate whether or not they directly participated in each of the ten change activities designed to improve access. The ten items of the change initiative were presented along with a brief definition and example using language that would be familiar to employees as provided by field staff to increase their face validity. For example, the change principle of 'work down the backlog' was clarified by adding the example: 'adding extra overbook slots to schedules, extending clinic hours, adding clinic sessions, reviewing wait list to see if medical needs could be met by phone call or other means.' Responses were coded as either participated (1) or did not participate (0) based on responses. We summed the number of activities participated in for each individual to get a total participation count. Cronbach's alpha

for the set of ten activities was 0.82. Table 1 displays the list of activities, how they were described, and reported rate of involvement.

Predictor variables

Three scale scores representing attitude about the behavior, perceived group norms, and perceived behavioral control were formed based on the content of items on the survey. All items were assessed on a five-point Likert scale ranging from one (Strongly Disagree) to five (Strongly Agree). 'Attitude about the behavior' was assessed by four items. The items elicited employee perceptions of the effectiveness of the ACA program, belief that wait times are a problem to be addressed, and whether the program led to improved quality of care. 'Perceived group norms' was assessed with four items. These items elicited employee perceptions regarding leadership priority for the ACA program, the extent of discussion of the program at employee meetings, the extent of team consensus that ACA is being implemented, and that a well-respected team member is vocalizing support for the efforts. 'Perceived behavioral control' was assessed with three items. The items elicited if the team was able to adapt ACA to meet their clinic needs, and extent of influence in managing care and making improvements using the model. Cronbach's alpha for the three scales was 0.78, 0.81, and 0.80, respectively.

Individual and facility control variables

We included control variables in the model that may have an effect on participation in the ACA program. Selection of the variables was based on prior research and literature. We included multiple individual demographic factors, along with job satisfaction and two facility level context variables in our regression models.

Individual characteristics

Four variables relating to the individual's role in the clinic were included: full-time status, clinic tenure, managerial level, and occupation. Individuals were dichotomously coded as having full-time status if they reported at least 32 hours or more per week in the clinic. Clinic tenure was coded based on whether or not the individual had worked in the same clinic for at least one year. Three dichotomous variables were created to represent managerial level. These variables were 'team leader', 'first line supervisor', and 'manager', with individuals having no managerial status as the referent group. We created categorical variables for multiple professions, including physician, nurse practitioner, registered nurse, and program support assistant. The referent groups were all other clinic employees (*e.g.*, licensed practical nurses, other technical occupations). The model also included a job satisfaction item: 'Considering everything, how satisfied are you with your job?'. Responses ranged from one (Strongly Disagree) to five (Strongly Agree). Individuals with greater job satisfaction have been found to be more likely to participate in the change programs [27, 28].

Facility context

Two variables were included at a facility level. Clinic size, as reported by the POC, was included in the model. Research suggests that size has a pervasive influence on several outcome variables, with larger size having a negative influence on outcomes. We also included teaching affiliation, and whether the hospital was affiliated with a university. Resident physicians can work in primary care clinics at teaching affiliated hospitals. Although, residents were not included in, or participated in, our survey distribution methodology, there may be differences in the way clinics are operated in academic affiliated settings.

Data Analysis

The hypotheses in the study were tested using a hierarchical mixed linear model. The purpose of the model was to account for employees being clustered in primary care clinics. This provides an advantage over traditional ordinary least squares (OLS) models because the interdependence of variables within a given unit of observation is not considered using OLS, and estimates may be misstated. Two models were conducted. The first model excluded employee ratings on attitudes, norms, and perceived behavioral control. We regressed the individual and facility level variables described above on participation activities. In the second model, we included the three predictor variables along with the control variables. We tested it this way to examine how much additional variance the predictor variables of interested added above the control variables.

Full-time status, clinic tenure, managerial responsibility, occupation, and job satisfaction were also included as individual level covariates. Teaching affiliation and size were entered as fixed effects. The clinic was included as a random effects variable to account for the clustering of respondents by clinic. We used Optimal Design Software to compute power analysis for our regression model and found our study had power greater than 0.80 to detect small effect sizes of 0.20 with an average of 25 respondents per group and 82 groups [29]. Missing values were deleted list-wise, so that all observations had complete data for the analysis. Due to missing values, our total sample size was 2,201.

In a second set of analyses, we examined overall level of participation at the clinic level. We created three groups (top 25%; middle 50%; and bottom 25%) based on the average clinic score for each of the three key predictors that we tested. We then ran analysis of covariance (ANCOVA) tests to examine if different overall levels of attitudes, perceived group norms, and behavior control influenced level of clinic participation. To provide more stable estimates at the

clinic level, we only used groups that had at least ten responses. We used 82 clinics for this portion of the analysis.

Results

Sample characteristics

The majority of the sample (84%) reported working full-time in the clinic. The majority of the sample (85%) reported having been in the clinic for at least one year or longer. Most of the sample (74%) reported not having any managerial authority, 16% indicated they were team leaders, 5% reported being a first line supervisor, and 5% reported being a manager. For profession, 20% of the sample reported being a medical officer, 12% were nurse practitioners, 20% were nurses, and 21% reported themselves as program support assistants. Although there is variation in how clinics are structured with personnel, these percentages represent approximate distributions in VHA clinics on a nationwide basis, suggesting no profession is more represented than would be expected.

The average level of individual participation was 4.65 (SD = 3.05), which indicated that respondents typically engaged in just under half of the change behaviors. Attitudes about practice, perceived group norms and perceived behavioral control all correlated significantly with participation rate, with the correlations ranging from $\underline{r} = 0.24$ to 0.32, $\underline{p} < 0.001$. We examined the normality of these variables before running regression models. We found that for all cases, the variables were normally distributed with skewness and kurtosis not larger than |1|.

Next, we conducted analysis using the hierarchical linear mixed model. All variables were standardized to allow for reporting of standardized coefficients. We computed the intraclass correlation to assess how much variation occurred between clinics [30]. This indicated

approximately 4% of the variance was accounted for between clinics that would have been considered as error variance in an ordinary least squares model not taking into account the nesting of employees in clinics.

For the model without the three predictor variables, our model accounted for 17% of the variance based on the pseudo r-square. We found the second regression model with the additional predictor variables had a larger pseudo r-square, indicating that 23% of the variance was accounted for in the model. This suggests that adding the variables does add to the overall explanatory power that individual and facility level variables did not account for earlier.

For the second model with the three predictor variables, we found perceived group norms had the strongest association ($\underline{\beta} = 0.23$, $\underline{p} < 0.01$), while attitude about the behavior ($\underline{\beta} = 0.07$, $\underline{p} < 0.01$) was less strongly associated, but still significant. Perceived behavioral control, however, was not significant. This partially supports our proposed findings on two of the three dimensions tested.

Additionally, several covariates were significant as well: clinic tenure of at least one year ($\underline{\beta} = 0.15$, $\underline{p} < 0.01$); being a physician ($\underline{\beta} = 0.05$, $\underline{p} < 0.05$); being a nurse practitioner ($\underline{\beta} = 0.12$, $\underline{p} < 0.01$); and being a registered nurse ($\underline{\beta} = 0.09$, $\underline{p} < 0.01$). The three variables coded to indicate supervisory level were all significant compared to individuals without supervisory status, and evidenced increasingly larger parameter estimates as supervisory level increased: team leader ($\underline{\beta} = 0.13$, $\underline{p} < 0.01$); first line supervisor ($\underline{\beta} = 0.14$, $\underline{p} < 0.01$) and manager ($\underline{\beta} = 0.21$, $\underline{p} < 0.01$).

Individual characteristics that were not significant in the model were: full-time status, job satisfaction, and being a program support assistant. We found that neither team size nor academic affiliation were significant predictors of participation. Means and standard deviation of

the study variables and standardized coefficient estimates from the regression model to predict participation appear in Table 2.

We next examined aggregated clinic scores for total participation against attitudes about the behavior, perceived group norms and perceived behavioral control. The average level of participation among the clinics was 4.47 with a range of 2.08 to 6.46. We analyzed results with an ANCOVA controlling for size of the clinic and teaching affiliation. Results of the ANCOVA for perceived group norms were significant, $F(5,76) = 5.10$, $p<0.001$. Post-hoc Tukey analysis indicated the bottom quartile of clinics on perceived group norms had significantly lower scores than any comparison group, with the difference between the highest and lowest quartile groups for implementation was 1.13, $d = 0.29$. ANCOVA results for attitudes about the behavior were also significant, $F(5,76) = 4.70$, $p <0.001$, as were results for behavioral control, $F(5,76) = 4.89$, $p <0.001$. The bottom quartile of clinics on attitudes about the behavior and behavioral control also had scores that were significantly lower than the other comparison groups ($d = 0.28$ and 0.22 respectively). Table 3 displays the results for each cohort used.

Discussion

In the present study, we explored the relationship between variables guided by TPB. We examined how similar constructs could explain employee participation in a workplace program designed to improve patient access to care. We predicted that each component would be related to participation, with perceived group norms being especially important.

We found partial support for the hypothesized model. We found perceived group norms and attitudes about the program were associated with greater individual participation in the ACA program. Managers who aim to increase perceived group norms may find this to be an effective

way to facilitate employee participation. This could be achieved by making any type of implementation effort well-publicized and discussed in meetings by managers and coworkers. We also found attitudes about the program to be a significant predictor. This suggests that believing the program will be useful may be an incentive to participate. A manager could emphasize the benefits of the program by stressing the goals of the process, and how meeting the objectives can lead to better personal and customer care outcomes. The third key predictor, perceived behavioral control, was not significant in the overall model, suggesting that how much control employees feel they have over the program, and being able to adapt it to their clinic, was not a relevant factor in overall participation in this study.

For the control variables we modeled, we found the effect for level of supervisory responsibility had a large effect on participation. This is consistent with the findings and theoretical research suggesting management plays a key role implementing change programs [5, 31]. The effect appeared to increase as level of responsibility increased. We also note the possibility that perceived group norms may be strengthened by participation of senior leaders in a clinic area.

Of the individual characteristics tested in the model, employees who have been in the clinic for at least a year were more likely to participate in the program. This may reflect a positive impact of time spent on clinic orientation and adjusting to clinic operations, as well as greater identification with the clinic aims and program implementation goals. Significant effects were also found for occupation level, with nurse practitioners, registered nurses, and physicians participating in a greater number of activities compared to other clinical employees. We did not asses the possibility that all types of professions could participate in all ten of the programs

equally. Some individuals in those professions may have thought that participating in certain activities were not in the scope of their job duties. This could limit findings.

Job satisfaction was not significant in the model. This finding was in contrast to what has generally been found in research. We subsequently tested a hierarchical linear mixed model that included an interaction term between job attitudes and the three key predictors of the theory. We found none of the interaction terms were significant. We take this finding to suggest that employee job satisfaction may not operate in the same way in a clinical setting as in other settings.

In the analysis at the clinic-level, we found that total participation did increase, based on perceived group level scores for attitudes about the behavior and perceived behavioral control. The top quartile group had significantly higher scores than the middle half of facilities and the bottom quartile of facilities. This suggests a linear effect for these variables at a clinic level. For perceived group norms, the difference between the top quartile and middle half was not significantly different. The top quartile and middle clinics were both significantly higher compared to the bottom quartile clinics. We take this finding to suggest that a moderate amount of perceived group norms may be sufficient to lead to the higher participation by employees. Interventions at a clinic or group level designed to increase perceived group norms for participating in the program may lead to greater employee involvement in the proposed implementation program.

Limitations

The study was a field research project and has the common set of limitations as with other studies. A primary concern is a lack of experimental control, so any causal inference needs to be

examined with caution. We obtained the data from the same source. Questions about individual participation on each of the ten activities were scored dichotomously, as were demographic questions. Employees rated job satisfaction and the three components of the theory on a Likert-type scale. The difference in response options may have helped to reduce the effect common method variance.

A total of 40% of the sample responded to the survey, raising concerns of non-response bias. Individuals that did not respond to the survey may have had less experience or involvement with the ACA program. We did, however, find 12% of the survey respondents indicated that no participation in any of the ACA practices. We interpret this finding to mean that some of the individuals who did not participate in the ACA program did complete the survey, so the results are not based solely on the group who participated in activities. This finding partially addresses some concerns over non-response bias.

Future Research

The findings on perceived group norms raise questions this predictor variable effect would be found in specialty clinic areas using the same program as well as outpatient clinics trying to implement different types of clinical design programs or other innovations, such as electronic health record systems. We did not find job satisfaction to be related to participation as would be expected. Future research should examine if job satisfaction is related to other implementation activities, or if the effects of perceived group norms, attitudes, and behavioral control are more important variables and worth additional study.

We found variables based around concepts of TPB to be important predictors of participation. We would advocate a more complete test of the theory in the future as it relates to

implementation programs in a team setting. Questions on the components to fully assess the sub-components and beliefs underlying each of the three predictors we used in our study as proxy measures for the constructs. Most research has examined only individual level aspects of TPB, but looking at the theory in the work setting may also lead to interesting findings and extension of prior findings. The setting of the study and type of service being implemented could also be studied. The program we selected focuses on clinical operations, but it is possible that different types of change programs may be less influenced by perceived group norms and more influenced by attitudes or perceived behavioral control.

Summary

Our findings indicate perceived group norms and attitudes as being related to participation; however, perceived behavioral control was not found to be significant of overall participation. This provided partial support to our hypothesized findings. Supervisory level also played a role in the participation. Individuals with greater managerial authority appeared to be more involved in the program. The implication would suggest that a climate where all team members recognize their colleagues are participating in the program, discussing the program at meetings, and having visible team leaders may enhance participation in operational change programs.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

DCM conceived this manuscript, and led the writing and analyses. CVL and MMM participated in the conceptualization and drafting of this manuscript. All authors read and approved the final manuscript.

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References

1. Jha AK, Ferris TG, Donelan K, DesRoches C, Shields A, Rosenbaum S, D B: **How common are electronic health records in the United States? A summary of the evidence**. *Health Affairs* 2006, **25**:469-507.
2. Young GJ, White B, Burgess JF Jr, Berlowitz D, Meterko M, Guldin M, BG B: **Conceptual issues in the design and implementation of pay-for-quality programs**. *American Journal of Medical Quality* 2005, **20**:144-150.
3. Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A: **Improving chronic illness care: Translating evidence into action**. *Health Affairs* 2001, **20**:64-78.
4. Helfrich C, Savitz L, Swiger K, B W: **Adoption and implementation of mandated diabetes registries by community health centers**. *American Journal of Preventive Medicine* 2007, **33**:S50-S65.
5. Klein KJ, Buhl Conn A, Speer Sorra J: **Implementing computerized technology: An organizational analysis**. *Journal of Applied Psychology* 2001, **86**:811-824.
6. Ajzen I: **From intentions to actions: a theory of planned behavior**. In: *Action-control: from cognition to behavior.* Edited by Beckmann JKJ: Heidelberg: Springer; 1985.
7. Ajzen I: **The theory of planned behavior**. *Organizational Behavior and Human Decision Processes* 1991, **50**:179-211.
8. Blair B, Mark C: **Veterans Affairs Department: balancing budget crunch with patients' needs at VA**. *Federal Times* 2002, **October 14**:18.
9. Schall MW, Duffy T, Krishnamurthy A, Levesque O, Mehta P, Murray M: **Improving patient access to the Veterans Health Administration's primary care and specialty care clinics.** *Joint Commission Journal of Quality and Safety* 2004, **30**(8):415-423.
10. Nolan K, Schall MW, Erb F, Nolan T: **Using a framework for spread: the case of patient access in the Veterans Health Administration**. *Journal on Quality and Patient Safety* 2005, **31**:339-347.
11. Murray M, Tantau C: **Same-day appointments: exploding the access paradigm.** *Family Practice Medicine* 2000, **7**(8):45-50.
12. Murray M, Bodenheimer T, Rittenhouse D, Grubmach K: **Improving timely access to primary care: case studies of the advanced access model**. *JAMA* 2003, **289**(8):1042-1046.
13. Murray M, Berwick DM: **Advanced access: reducing waiting and delays in primary care**. *JAMA* 2003, **289**(8):1035-1040.
14. Murray M, Tantau C: **Redefining open access to primary care**. *Managed Care Quarterly* 1999, **7**:44-55.
15. Aiello K: **Open access appointments in army primary care clinics**. *Military Medicine* 2005, **170**:370-374.
16. O'Hare CD, Corlett J: **The outcomes of open-access scheduling**. *Family Practice Management* 2004:35-38.
17. Kennedy JG, Hsu JT: **Implementation of an open access scheduling system in a residency training program**. *Practice Management* 2003, **35**(9):666-670.
18. Carlson B: **Same-day appointments promise increased productivity**. *Managed Care* 2002, **11**(12):43-44.

19. VanDeusen Lukas C, Meterko M, Mohr D, Nealon Seibert M: **Implementation of a clinical innovation: the diffusion of Advanced Clinic Access in VA**. In: *Health Care Organizations Conference: 2005; Virginia Commonwealth University*; 2005.
20. VanDeusen Lukas C, Meterko M, Mohr D, Nealon Seibert M, Parlier R, Levesque O, Petzel RA: **Implementation of a clinical innovation: The case of Advanced Clinic Access in the Department of Veterans Affairs**. *J Ambulatory Care Manage* 2008, **31**:94-108.
21. Hausenblas HA, Carron AV, Mack DE: **Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis**. *Journal of Sport and Exercise Psychology* 1997, **19**:36-51.
22. Taylor VM, Montano DE, Koepsell T: **Use of screening mammography by general internists**. *Cancer Detection and Prevention* 1994, **18**:455-462.
23. Millstein SG: **Utility of the theories of reasoned action and planned behavior for predicting physician behavior: a prospective analysis**. *Health Psychology* 1996, **15**(5):398-402.
24. Norman P, Conner M, Bell R: **The theory of planned behavior and smoking cessation**. *Health Psychology* 1999, **18**(1):89-94.
25. Sheeran P, Conner M, Norman P: **Can the theory of planned behavior explain patterns of health behavior change?** *Health Psychology* 2001, **20**(1):12-19.
26. Van Breukelen W, Van der Vlist R, Steensma H: **Voluntary employee turnover: combining variables from the traditional turnover literature with the theory of planned behavior**. *Journal of Organizational Behavior* 2004, **25**:839-914.
27. Spector PE: **Job satisfaction: application, assessment, causes and consequences**. Thousand Oaks, CA: Sage Publications; 1997.
28. Griffeth RW: **Moderation of the affects of job enrichment by participation: A longitudinal field experiment.** *Organizational Behavior and Human Decision Processes* 1985, **35**:73-93.
29. Liu X, Spybrook J, Congdon R, Martinez A, Raudenbush S: **Optimal design for multi-level and longitudinal research**. In., 1.77 edn: HLM Software; 2006.
30. Singer JD: **Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models**. *Journal of Educational and Behavioral Statistics* 1998, **24**(4):323-355.
31. Kilman RH, Covin TJ: **Corporate transformation**. San Francisco: Jossey-Bass; 1988.

Table 1. Ten key principles of ACA as assessed on the survey.

Item	Percent of Employees Reporting Involvement
Work down the backlog (for example, by adding extra overbook slots to schedules, extending clinic hours, adding clinic sessions, reviewing wait list to see if medical needs could be met by phone call or other means)	53
Reduce demand (for example, by extending reappointment intervals, creating alternatives to face-to-face visits, and using referral guidelines)	51
Understand supply and demand (for example, by knowing how many appointment slots a clinic has, knowing what the provider panel size cap is, knowing how many patients come in, call in, or are scheduled each day for the clinic)	52
Reduce appointment types (for example, by reducing the number of separate clinic profiles, standardizing the length of appointments)	27
Plan for contingencies (for example, by anticipating and planning for situations like provider leaves and the annual flu vaccination season)	40
Manage the constraint (for example, by figuring out where the 'logjams' occur in your patient care process and figuring out actions to deal with them)	29
Optimize the care team (for example, by using standard protocols, matching patient needs to skills of appropriate team members, not necessarily always a physician)	46
Synchronize patient, provider and information (for example, by starting clinic on time, checking charts for completeness, accuracy and presence at appointment)	51
Predict and anticipate patient needs at the time of the appointment (for example, by using regular clinic team 'huddles' to communicate and deal with possible situations that may arise, using clinical reminders to get as much done in each visit as possible)	47
Optimize rooms and equipment (for example, by having the same supplies available in each exam room, making sure supplies are continuously stocked, using 'open' rooming)	48

* A total of 2,242 employees provided responses. The question stem appears below. Which if any of these efforts to improve veterans' access to care have **you been directly involved in**? *You may check more than one. You should check all changes that you were involved in regardless of whether the change was successful or not.*

Table 2. Hierarchical Linear Mixed Model Regression Predicting Participation.

			Model 1		Model 2	
	Mean	SD	β	95% CI	β	95% CI
Intercept	--	--	.05	.00-.11	.05	.00-.11
Full-time status (1=yes)	0.84	--	.01	-.03-.06	.02	-.02-.06
Clinic tenure greater than one year	0.85	--	.14**	.10-.18	.15**	.11-.19
Team leader (ref = no)	0.16	--	.14**	.10-.18	.13**	.09-.17
First line supervisor (ref = no)	0.05	--	.15**	.11-.19	.14**	.11-.18
Manager (ref = no)	0.06	--	.24**	.20-.27	.21**	.17-.25
Physician	0.21	--	.05*	.00-.10	.05*	.00-.09
Nurse Practitioner	0.12	--	.12**	.07-.16	.12**	.07-.16
Registered Nurse	0.20	--	.08**	.03-.13	.09**	.04-.14
Program Support Assistant	0.20	--	-.04	-.09-.01	-.03	-.07-.02
Job satisfaction	3.79	1.22	.18**	.14-.22	.02	-.02-.07
Size of Primary Care clinic	77.45	45.67	.01	-.06-.08	.00	-.07-.06
Academic Affiliation (1=yes)	0.49	--	-.02	-.09-.04	-.01	-.08-.04
Step 2						
Attitudes about ACA	3.47	0.69			.07**	.02-.12
Perceived group norms	3.63	0.73			.23**	.18-.29
Perceived behavioral control	3.13	1.04			.05	.00-.10
Pseudo R^2			.17		.23	

Note: Model 1 includes only control variables while Model 2 includes the three additional predictor variables to examine the additional variance explained above the control variables.

Note: Standardized parameter estimates and standard error reported in table along with means (percentages) and standard deviations for study variables. A total of 2,201 participants in 92 clinic areas were used in the analysis. * $p < 0.05$; ** $p < 0.01$.

Table 3. Clinic adjusted mean and standard deviation based on ANCOVA results.

	Attitudes about the program		Perceived Group norms		Perceived behavioral control	
	Mean	SD	Mean	SD	Mean	SD
Top 25%	5.21	.78	4.68	.89	5.11	.78
Middle 50%	4.37	.88	4.77	.93	4.51	.89
Bottom 25%	3.89	.97	3.55	.71	3.72	.95

Note: Analysis controls for academic affiliation and number of employees in clinic.