

Measuring and Improving Sustainability in Mental Health System Redesign

Introduction & Background

Change that is not sustained is a *direct* waste of the resources invested and also has *indirect* costs related to missed opportunities and damage to an organization's ability to implement change in the future. VA Mental Health (MH) Service Lines have embarked on an ambitious effort of system redesign (SR), employing IHI-based, state-of-the-art change implementation techniques. However, it is not clear that long-term sustainable change is being measured or supported.

Lessons learned from other VA implementation projects have been that a strong evidence base for the practice is important, having clear targets and benchmarks for performance and addressing organizational factors in implementation are necessary for practice to change (QUERI Implementation Guide). Mills,¹ in a study of the VHA adoption of the Institute for Healthcare model, identified several factors that influence the outcome of quality improvement projects in the VHA setting: strong organizational support and leadership, team skills, as well as a focus on clinical outcomes and integrating quality improvement into the organizational strategic goals. Parker et al.² (in collaborating with JoAnn Kirchner from this proposal) have assessed — using a qualitative, case-based approach — practice organizational factors, practice behavioral factors, and general organizational characteristics that are important to the penetration of integration of MH into primary care using the VA QUERI TIDES approach. This study has defined, to the degree possible using this design, several important features predicting penetration (which might predict sustainability) in VA including: (1) no competing problems, (2) primary care (PC) had more “slack” resources than MH, (3) staff perceived that the program met a need, (4) the climate that encourages innovation exists, (5) constructive conflict exists, and (6) absence of resistance due to perceived threat. We intend to explore these dimensions in our qualitative investigations across a much larger range of change projects in this study.

External to the VA, five key principles of successful organizational change have been identified and successfully applied to behavioral health programs: (1) know and involve the customer, (2) fix key problems, (3) select a powerful change leader, (4) get ideas from outside the field, and (5) use rapid cycle testing.³ In a summary of lessons from research on quality collaboratives, Ovretveit and colleagues concluded that there is scarce evidence about whether improvements from collaboratives are sustained.⁴ In many cases, learning about, and planning for sustainability is doesn't occur in these initiatives.

The implementation of the VA Mental Health System Redesign Collaborative began in May, 2008 and will conclude June 23-25th, 2009, with its fourth face-to-face session. The purpose of the Collaborative was to: “launch, sustain and spread Systems Redesign improvements made in Inpatient and Outpatient processes throughout the care continuum.”^a This initiative was designed on the IHI Breakthrough Series model adopted by the VHA, and provided participants with foundational training in quality improvement techniques such as aim identification, PDSA cycles, change teams, managing resistance, data collection and interpretation, and process mapping. Each VAMC was instructed to conduct 4 projects focused on topics such as access; inpatient flow; clinical care (depression follow-up, homeless access, suicide monitoring, evidence based psychotherapy, etc.); and MH\ PC integration. They reported on their progress through monthly phone calls and quarterly in-person learning collaborative sessions where they received feedback and additional training. The learning collaborative model and tools taught during this process are all state-of-the-art, evidenced-based teaching methodologies for implementing process improvement.⁵

^a <http://srd.vssc.med.va.gov/Collaboratives/Active/MentalHealth/Pages/default.aspx>

However, little is known about how well those practices are sustained after they are implemented. The literature on change in general is not encouraging. Up to 70% of changes are not sustained.⁶ Krahn and Kirchner, leaders in the proposed project, know this from their experience working together as site leaders in the PRISM-E project on integration of MH into primary care geriatric clinics.⁷ While the PRISM-E project results were influential in providing an evidence base for integration of MH care, only a minority of clinics involved in the study continued their integrated service delivery system after the end of the study funding. This actually led Krahn to write a chapter on how to achieve sustainability in evidence-based practices for integrated MH care for elders⁸ and to an ongoing collaboration with the University of Wisconsin-Madison (UW) Industrial Engineering team.

Reasons for not sustaining improvement are multiple. Early research in continuous quality improvement recognized that the issues with starting up an improvement process are different from sustaining an improvement process. The issues identified that inhibited maintaining improvements were lack of commitment and lack of leadership beyond the initial change, not continuing to track improvement measures, and lack of systemic infrastructure to support the changes or making changes that do not fit within the culture of the adopting organization.^{9a-9b} Dale et al.¹⁰ identified five categories of barriers to sustainability: environment, management style, program policies, organizational structure, and the change process itself. Bateman¹¹ summarized the factors affecting sustainability from a number of studies: process issues, strategy issues, leadership issues, culture, and training issues. Sustaining change is often cited as more difficult than making change.¹²⁻¹⁴

Given the investment the VA has made in making improvements in access, engagement and use of evidenced-based practices in the mental health services offered to veterans, it would be desirable to identify the characteristics that sustain organizational change and use that knowledge to improve the likelihood that improvements are sustained over the long term. The importance of studying a challenging implementation research project that is not often addressed (sustainability) and the international reputation of the UW Industrial Engineering team led Mental Health QUERI leaders to agree with Dr. Krahn that a proposal from the Madison team in response to the QUERI Rapid Response Project (RRP) RFA would be appropriate.

This RRP proposal was therefore developed in close consultation with Mental Health QUERI leadership (see attached letters of support) and has received their full endorsement. The project addresses several goals set forth in Mental Health QUERI's Strategic Plan, and thus is highly responsive to a number of MH QUERI strategic priorities. Its aims (as described later under "Design and Methods") were developed in order to achieve two MH QUERI Implementation Science Goals: (1) Improve understanding of characteristics that influence readiness/capacity to sustain evidence-based practices (EBPs); and (2) Develop and/or validate diagnostic instruments that can aid in assessment of organizational readiness to adopt EBPs. In addition, the project will help address several clinical goals also listed in the MH QUERI Strategic Plan. These include: (1) Implement evidence-based depression care models in primary care; (2) Improve patient adherence to recommended treatments for depression and schizophrenia; and (3) Develop and test strategies to implement and enhance access to evidence-based psychotherapies. By enhancing the ability of MH QUERI teams to sustain change, the project will help them achieve these clinical goals.

Preliminary Work

This application proposes to utilize a tool created by the British National Health Service and the University of Wisconsin to identify the characteristics of VA facilities or clinics that support and hinder sustained improvement and to identify the overall cluster of characteristics that are associated with the greatest level of sustained change in VA mental health services. This information will lead to the development of a sustainability intervention to identify the

specific needs of participants and to develop strategies for addressing organizational characteristics that may inhibit sustained improvement.

The sustainability propensity is an organizational measure, not a measure of whether a single change was sustained. It will be measured using the British National Health Service Sustainability tool.¹⁵ More information about the tool can be found on the British National Health Service website.^b The model identifies ten factors in three domains that impact sustainability (Table 1). Within each factor, responders choose from a list of 4 statements that they feel best describes each factor. The model (minus scores for each “answer”) appears at the end of this grant proposal, following the letters of support. This tool was designed to specifically measure a healthcare organization’s ability to sustain process improvements and has not been normed for other types of change. To obtain a representative score, 5 to 8 people need to complete the sustainability index and rate how their facility or clinic performs across the ten important predictors of sustainability. The composite score is calculated using a multi-attribute utility algorithm estimating the likelihood that the organization’s current practices support sustained change.¹⁶ In a national, randomized control trial led by the staff at the University of Wisconsin, 1,377 addiction treatment staff completed the sustainability index prior to engaging in process improvement efforts to improve client access to and retention in treatment. Preliminary and early study results indicate that the British National Health Service’s Sustainability Index explains 50.5% of the variance related to the likelihood that an organization will sustain change and all ten items load into one factor with a Cronbach's alpha of 0.890.

Table 1: Sustainability Index Domains and Factors

Process: Benefits beyond helping patients
Process: Credibility of the benefits
Process: Adaptability of improved process
Process: Effectiveness of the system to monitor progress
Staff: Staff involvement & training to sustain the process
Staff: Staff attitudes toward sustaining the change
Staff: Senior leadership engagement
Staff: Clinical leadership engagement
Organization: Fit with organization’s strategic aims & culture
Organization: Infrastructure for sustainability

Using a mixed methods approach, we have three specific aims for the proposed RRP:

1. Characterize the short-term changes in VA MH SR nationally to serve as a baseline for follow-up assessments of sustained change.
2. Test the current 10-item sustainability index^b developed in conjunction with the British National Health Service, to predict sustained improvement in MH VA SR projects.
3. Identify (through qualitative interviews with staff in VISNs 2 and 12) the perceived VA-specific facilitators and barriers to sustaining improvement in VA SR.

Design & Methods

The objective of this Rapid Response Project is to identify the characteristics of VA facilities or clinics that support and hinder sustained improvement and to identify the overall cluster of characteristics that are associated with the greatest level of sustenance of change in VA mental health services. This section describes the methodological approach that will be used to address each specific aim.

^b http://www.institute.nhs.uk/sustainability_model/introduction/find_out_more_about_the_model.html

Aim 1

During the implementation of the Mental Health System Redesign initiative, the change teams: (1) developed two primary aims by selecting a potential change project from several categories of program performance (Access, Office Efficiency, Residential/Inpatient flow or Clinical Care); and (2) received intervention support through four learning sessions, external coaching, and monthly calls. In selecting their aims, the change teams were asked to consider the collaborative goals to (a) identify a value stream and (b) select a timeliness goal as well as link their aims with a VA performance measure. We will characterize the attributes of VA MH system redesign projects by reviewing each project implemented during the Mental Health System Redesign initiative. We will also collect information from each project such as the aim(s), change facilities or clinic attributes, the value stream, and specific measures used to measure change progress. We will also summarize information about each facility's or clinic's level of participation in and evaluation of the available intervention activities as well as organizational characteristics such as patient satisfaction score, ranking on VA measures, rural vs. urban, size, patient growth, or perceived quality of the change efforts about each participating VA facility or clinic. All of the information will be used to create a summary report about the implementation of the Mental Health System Redesign initiative and to establish baseline attributes that will then be incorporated into the statistical analysis for Aims 2 and 3.

Aim 2

To obtain a representative score for the facility or clinic, the sustainability index requires responses from 5 to 8 persons/facility to provide a cross representation of staff opinions of whether the change was successfully sustained. We feel confident – with the support of the SR Leadership (Schohn and Davies) – that we will be able to collect data from 5-8 people from each facility either at the MH Learning Collaborative or through SurveyMonkey. At the 4th learning collaborative for the Mental Health System Redesign initiative in June 2009, we will survey those individuals in attendance. To obtain the remaining survey responses, we will send an e-mail to the remaining facility or clinic change team members inviting them to complete a brief online survey using SurveyMonkey about the sustainability efforts in their facility or clinic. A similar approach has been used successfully to elicit staff responses in a National Institute of Drug Abuse randomized control trial currently underway. The brief survey would include the 10 questions from the Sustainability Index along with a minimal number of facility or clinic characteristics (e.g., Hines Inpatient Flow Team). It should take no more than 10 minutes to complete. The responses from each facility or clinic change team will be used to create the composite sustainability score. We will then use the results to predict whether the changes made will be sustained for at least six months.

To measure sustainability, researchers at the University of Wisconsin will analyze program data from the VA performance management system for sustained improvement on the most common redesign project outcomes, which are also VA metrics. These metrics, which will be continuously tracked, include mental health performance measures such as: wait times, 14-Day Follow-up Monitor, Inpatient 7-day Follow-up Monitor, continuity of care, etc. The data will be gathered at program completion covering the 18-month period from January 2008 through June 2009 and for the six months after the end of the intervention period (July through December 2009) for each organization. The analysis will compare baseline, maintenance of the change through the project/learning collaborative period, and maintenance of the change for six months post change project/learning collaborative period. These data will be combined with data collected from the administration of the sustainability index for provider and organizational characteristics (e.g., urban vs. rural, patient growth, structure of MH service lines and size) to determine accuracy of the predictions that changes made will be sustained for at least 6 months.

The SR projects are expected to generate self-sustaining quality improvement and maintenance procedures. Using available data, the analysis will calculate the monthly mean

value of the VA outcome metric(s) for each site (i.e., one data point per site per month per measure). A specific VA outcome metric such as wait times should improve during the intervention, and gains should remain or improve during the post-intervention follow-up period. In other words, one expects the graph of wait time versus month to decline during the intervention and then remain constant or continue to decline thereafter. The analysis will also be flexible enough to include individual change project data as long as it is tracked during the sustainability period. Hierarchical models are used to fit functions to the monthly wait time data and test the hypothesis. For example, a spline function is given by:

$$y(m) = a I(m) + b I(m) m + c [1 - I(m)] + d [1 - I(m)] m$$

where “y” is the wait time, “m” indexes the months after start of the intervention (with the initial month being set at zero), “a” is the intercept during the intervention (i.e., the wait time at start of the intervention), “b” is the slope during the intervention, “c” is the intercept pertaining to the time period after the end of the intervention (i.e., the expected wait time if the intervention had instantaneous impact), “d” is the slope following the end of the intervention, and “I(m)” is an indicator that is one during the intervention and zero thereafter. Polynomial regression models will test for trends within each site in the monthly rate data in conjunction with ARIMA (autoregressive integrated moving average) models to accommodate potential serial correlations. In most cases, the autocorrelation function (ACF) will be significant, which requires a time series approach to analyze longitudinal improvements of change efforts.

The research design will use a modified time series ABC design and apply to the continuous observations statistical process control techniques to explore changes in the primary outcome measures.¹⁷ The time series design will focus on three time periods associated with the change efforts – baseline (A), intervention (B), and sustainability (C). The specific approach will determine the stability in the baseline measures prior to the introduction of the intervention and then to statistically compare as the reference set to treatment performance for changes in slope (the rate or trend of change) and/or change in level (the incremental gain) related to the timing of intervention.¹⁸ For this project, we will compare, where available, changes in the slope from the baseline period (Dec 2007 to May 2008) to the intervention period (June 2008 to June 2009) to measure the impact of the intervention on the VHA outcome measure. To determine sustainability, we will measure the relative change in the slope from the intervention to the slope during the six months post change project/learning collaborative period. Depending on the measure being tracked, we will test the null hypothesis that there are no discernable differences in the slopes by fitting a linear or quadratic smoothing function to the data. For example, a measure of time to treatment would be expected to decrease over time as changes are introduced. Once the intervention ends, the slope may continue to decline, or it may hold steady ($m \leq 0$). If the hypothesis is not rejected, the change will be considered to have been sustained by the facility or clinic. The result will be coded into a dichotomous variable for sustainability (0 = change not sustained, 1 = change sustained). Across all organizations, we will compare the proportion of expected changes that were successfully sustained using the sustainability propensity score to the proportion of change actually sustained, and will test the hypothesis that the two proportions are equivalent. The new sustainability variable will also become the dependent variable in a logistic regression model that will fit predictors such as the sustainability propensity score; organizational characteristics (e.g., rural vs. urban, size); level of learning collaborative participation; and rate of improvement during the intervention period to determine what factors are associated with greater sustainability of change.

Aim 3

In VISNs 2 and 12, an additional analysis will use qualitative interviews to identify organizational characteristics that influence success and challenges to implementation and sustaining change. We will combined the information about the strength of change, maintenance of the change through the project/learning collaborative period, maintenance of the change for six months post change project/learning collaborative period with the data collected

from the administration of the sustainability index and the qualitative interviews to create a profile of each provider in VISNs 2 and 12 in terms of its ability to create and maintain improvement in organizational process based on its performance in the learning collaborative project and the outcome on the sustainability index. This profile will contain the facilitators and barriers to sustained change based on an objective set of criteria.

At three months post change project/learning collaborative, we will conduct qualitative analyses of structured interviews to identify organizational characteristics that influence success and challenges to sustaining change within the 12 VA Medical Centers from VISN 2 and VISN 12. Key themes regarding change processes, organizational sustainability, and other emergent factors identified through the analyses will be exported in binary or scalar form (when appropriate) from *Atlas.ti*. The latter is a qualitative data management and analysis software program that facilitates the coding of large data sets, allows for searching and quantifying codes, and exporting to SPSS for integration with other project data. Key themes will then be linked to quantitative data from each organization, and used in statistical analysis.

To collect an adequate sample, we will interview approximately 42-44 participants. We will conduct an interview with the Chief Medical Officer of VISN's 2 and 12 (n=2); interviews with the Chiefs of Staff from 2 to 3 of the participating VA medical centers at each VISN (n= 4-6); and interviews of three people from each change team, one of whom will be the change leader, for each of the 12 VA Medical Centers in VISN's 2 and 12 (n=36). This varied sample will allow us to examine the perspectives of key stakeholders on how hierarchical structures, management and leadership styles, data flow, and decision processes affect implementing and sustaining change project within their organization. Hilton¹⁹ stated the following in regards to staff as human subjects: "researchers need to be mindful that staff members, when acting as informants or as agents, are human subjects, too; and, as such, research procedures should be designed in a manner that minimizes their risk and conforms to sound ethical guidelines". By involving experts outside the VA, the interview responses may be more honest in their responses related to the success in sustaining their change efforts and ensuring that the research respects staff in their roles as a human subject.

We selected these networks (VISNs 2 and 12) based on their 1) diverse geographic (includes Chicago as well as near-frontier locations) and demographic (ranges from predominately African American to almost exclusively Caucasian) attributes, and 2) willingness to participate in the research study (support letters are included).

Data collection: The structured interview guide will ask questions about innovation and decision processes (knowledge, persuasion, decision, implementation, confirmation); key steps to implementing and sustaining organizational change identified from the British National Health Sustainability Index;¹⁵ and other factors facilitating or impeding organizational change identified by interviewed participants.

Interviews will be recorded and transcribed to create more accurate interview summaries, which will then be entered into *Atlas.ti*. Investigators will use an iterative process to develop a closed coding scheme that identifies multiple dimensions of facilitators and barriers to change. The process begins with open coding where individual investigators identify themes or possible codes in interview data that include descriptive data, a priori themes based on questions, subjective or interpretive perspectives, and patterns.²⁰⁻²² Investigators then meet regularly to discuss and define their codes and come to consensus to consolidate and refine the coding scheme series. Usually the process begins with descriptive codes (e.g., role in the process) and moves onto a priori codes based on responses to specific interview questions (e.g., impact of system change on workload), and then to the interpretive codes that capture more abstract concepts or subjective perspectives. The final step is developing pattern codes that link and explain relationships between the other types of codes. Group coding involves reading and sorting, combining and refining through consensus. The coding scheme will be tested (with two coders each on a varied subsample of the interviews), checked for inter-coder reliability, and revised as needed. Once the coding scheme is finalized, all interviews will be

coded; every third interview will be coded by two coders. New codes will be developed and added to the coding scheme if needed. Coder reliability will be determined through check-coding; all investigators and coders will independently code and jointly review a document weekly to assess and maintain consistency. Inconsistencies will be discussed and resolved, and coding definitions will be modified as needed. Common themes will be developed by reviewing text for specific and related codes.

Next Steps

Using survey data, project, and systems data combined with the sustainability index data, we will create a report for the VA that identifies both the traits needed to sustain improvement and some techniques to ensure that all system facilities and clinics have or can develop traits necessary for sustaining improvements. Future studies will be devoted to implementing and measuring effects of the sustainability plan for VA MH improvements. Specifically, we will leverage results from this rapid response pilot to work with VA collaborators to develop and submit a larger research project that focuses on testing intervention(s) designed to enhance the likelihood that changes implemented within VA will be successfully sustained. Other future research directions will include cost effectiveness & diffusion of SR in addition to sustainability.

Project Feasibility and Timeline

The assembled team is ready to quickly implement the work proposed as evidenced by the following: First, the PI has worked with all of the Co-Investigators in the past. Second, the team of MH SR national leadership, VISN Mental Health Directors at both study sites, quality improvement experts, and sustainability experts is well positioned to complete this work in a timely and high quality manner. Third, 3 of these investigators have intimate knowledge of the change processes in each of the 2 VISN sites where the research interviews will be conducted.

The specific project activities are:

Month 1: Administer the Sustainability Tool to five change team members at each VAMC.

Months 1–3: Develop the qualitative interview instrument, drawing on existing measures and relevant literature.

Months 2–4: Collect and summarize characteristics of change projects and intervention implementation.

Months 4–6: Schedule and conduct the qualitative interviews with VA staff in VISN’s 2 and 12.

Months 6–10: Collect data from the VA performance management system (data will be collected for the time period May 2008 – December 2009).

Months 7–10: Complete qualitative data coding and cleaning.

Months 7–12: Complete quantitative analysis.

Months 10–12: Finalize analysis and reports, and document the next steps in the VA.

Project Tasks	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Initial application of sustainability tool	█											
Qualitative interview development	█	█	█									
Collection & summary of project characteristics with analysis of data and identification of +/-		█	█	█								
Interview administration				█	█	█						
Collection of administrative data						█	█	█	█	█		
Qualitative interview coding							█	█	█	█		
Analysis of administrative data							█	█	█	█	█	█
Finalization of analysis and reports, & documentation of next steps in the VA										█	█	█

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