

Reducing Psychiatric Inpatient Readmissions Using an Organizational Change Model

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ABSTRACT

Introduction: Thirty-day hospital readmission rates have become a quality indicator for many regulators and payers, but published accounts of reducing these rates across a patient population are lacking.

Objective: This article describes and evaluates the Wisconsin Mental Health Readmissions Project, which aimed to reduce psychiatric inpatient 30-day readmission rates in Wisconsin.

Methods: Nineteen county human services boards representing 23 of Wisconsin's 72 counties and 61% of the state's residential admissions participated in a statewide quality improvement collaborative from January 1, 2010 to December 31, 2013. Participants applied a standardized organizational change model, called NIATx, in the context of a multicounty quality improvement collaborative to reduce 30-day readmission rates. Readmission rates were tracked through national and state databases, using 2009 as a baseline, and analyzed using a chi-square analysis to test the proportion of means. The study team compared readmission rates of Wisconsin counties that participated in the statewide collaborative with those that did not.

Results: Between 2009 and 2013, the 30-day readmission rates in Wisconsin declined significantly for counties that participated in the project when compared to those that did not (2009-2013) [$\chi^2(4) = 54.503, P < .001$], based on a 2.5% decline for participants vs a 0.7% decline for nonparticipants.

Conclusions: Reductions to behavioral health inpatient readmission rates beyond individual case examples have been difficult to document. This analysis evaluates a method that Wisconsin behavioral health providers applied as part of a multicounty program addressing readmission rates. The findings highlight quality improvement program design elements and interventions to consider in reducing inpatient behavioral health readmissions, as well as the need for further research on this complex systems issue.

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INTRODUCTION

Unplanned hospital readmissions have been set forth as a national¹ and international^{2,3} indication of poor quality of care. The Patient Protection and Affordable Care Act, the US Department of Health and Human Services, and the Centers for Medicare and Medicaid Services all list 30-day inpatient readmission rates as a quality measure.⁴

Evidence suggests that 9% to 48% of all inpatient readmissions are preventable.⁵ A troubling sign for the psychiatric field is that 40% to 50% of patients discharged for depression and schizophrenia are readmitted within a year of discharge.⁶ Patients with schizophrenia and other psychotic disorders also have the second highest 30-day inpatient readmission rate of all the major diseases, at 22.3%.⁷

Multiple factors contribute to psychiatric hospital inpatient readmission rates, and demographic and clinical characteristics alone have had limited efficacy in explaining readmission behavior.⁶ Several studies have suggested that poor organizational processes contribute to hospital

readmissions. These studies have identified poor processes for medication adherence management, patient education, and follow-up care after discharge as strong predictors of inpatient psychiatric admissions.^{8,9}

Even with knowledge of the processes that can reduce psychiatric readmission rates, implementing new processes can be difficult in health care.¹⁰ Attempts to prevent hospital readmissions, beyond individual organizational efforts, have had limited impact on readmission rates across a statewide network of providers.¹¹

One method for improving performance across a network of providers is through a quality improvement collaborative

that applies an evidence-based organizational change model.¹² The Wisconsin Mental Health Readmissions Project used this approach. The aim of this analysis is to evaluate the project's possible effects on 30-day readmission rates for mental health issues.

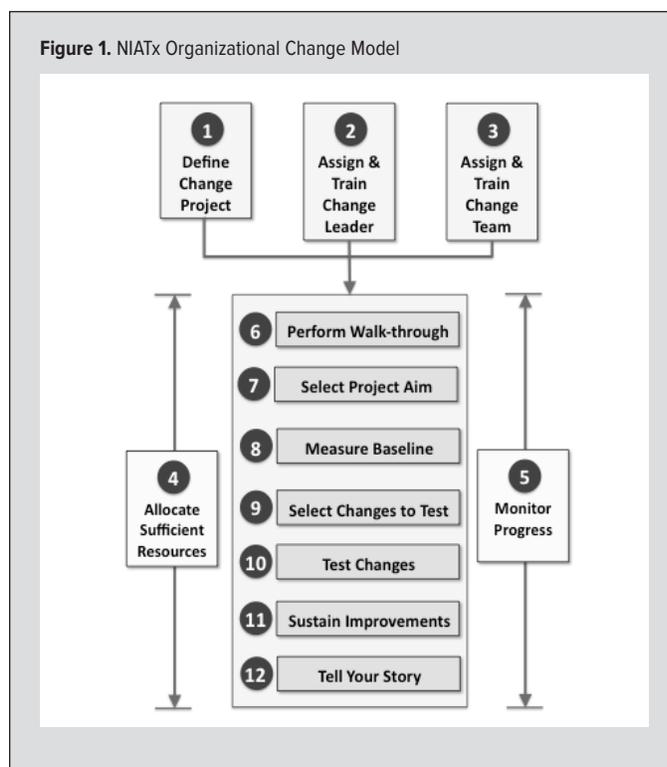
METHODS

This project was not submitted for institutional review board approval because it was designed as a quality improvement project. In the 30-day readmissions rates reported, no patient health information was used, no surveys were collected, and all data was reported using aggregate public health data.

The intervention consisted of creating a multiorganizational quality improvement collaborative to implement a standardized organizational change model. In Wisconsin, county human services boards provide community mental health services either directly or through contractual arrangements with providers. From 2010 to 2013, 19 county human services boards representing 23 of Wisconsin's 72 counties and 61% of the state's residential admissions participated in a statewide collaborative to reduce 30-day psychiatric inpatient admissions. A self-selection sampling strategy was used, with the Wisconsin Department of Health Services (DHS) inviting the county boards to participate in the project. Participation was voluntary with no admission fee, but counties with large populations or high readmission rates were encouraged to participate. The project's target patient population was psychiatric involuntary and voluntary inpatient admissions at risk of 30-day readmission upon discharge. The Center for Health Enhancement Systems Studies at the University of Wisconsin-Madison managed the collaborative and provided training and support for use of the NIATx (formerly the Network for the Improvement of Addiction Treatment) organizational change model.

The NIATx model was developed and tested at the Center for Health Enhancement Systems Studies in 2 large national trials (Figure 1).^{13,14} It is based on the following practices: (1) develop a measurable aim; (2) obtain executive sponsor support for the aim; (3) conduct a patient simulation (or walk-through) of the hospital discharge process; (4) seek encouragement and ideas from outside the organization; (5) select an influential internal change agent to lead the change project; and (6) conduct pilot tests or plan-do-study-act (PDSA) rapid cycles to try out changes until the aim objective is met. Comparing data before, during, and after the PDSA cycles validates the effectiveness of the changes tested.

Administrators and clinical service providers at the mental health services sites typically formed a change team that would meet every 1 to 2 weeks and used the NIATx model to implement new practices to impact psychiatric readmissions rates. Each site assigned a change leader, who was typically a clinical supervisor, to manage the project, and an executive sponsor, who typi-



cally was the director (or chief executive officer) of the organization, to oversee but not directly participate in the change process.

The Wisconsin Mental Health Readmissions Project used a multicounty quality improvement collaborative structure to provide education and support for implementing the NIATx organizational change model. The collaborative structure runs on an annual cycle that begins with an in-person kickoff meeting, continues with coaching support and peer networking while change teams conduct their projects, and concludes with a summation meeting. The kickoff meeting introduces the NIATx organizational change model and promising practices to test (Table 1). In initial years (2010-2011), the promising practices presented were evidence-based practices taken from the literature. In subsequent years, additional practices that counties had successfully used were added to this list.

After the kickoff meeting, the county change teams participate in monthly phone consultations with an expert coach, periodic face-to-face meetings with an expert coach, and monthly all-participant educational and networking calls. Coaches are individuals who have experience leading a change team using the NIATx model and who received a half-day of coach training. During coaching consultations, coaches help organizations think through key issues, provide technical assistance on using the NIATx model to test the changes being considered, and monitor the project's progress. The vast majority of the change team activity occurs independently within their organization.

The summation meeting at the end of the year is open to both participating and nonparticipating providers. The meeting

Table 1. Strategies to Prevent Psychiatric Hospital Readmissions

Treatment Phase	Practices
During Stay	Apply evidence-based practices to increase engagement (eg, motivational interviewing, contingency management). Develop a crisis plan. Use multidisciplinary case conferences to review high acute cases and determine post-discharge needs. Develop discharge objectives at admission.
Discharge Process	In the discharge session, patient meets with the social worker and nurse to review appointments, crisis plan, community resources, and medications. Warm hand-off to outpatient services.
Post-discharge	Case manager meets with patient 24 hours after discharge or phone follow-up within 48 hours of discharge. Reduce wait time to outpatient services.
Pre-readmission (For Patients Seeking Care)	Utilize sub-acute crisis beds for observation and assessment. Implement crisis line. Develop process where patients presenting to emergency department with mental health issues can be seen by mental health providers the next day. Give crisis response team member a smart phone to reduce the time needed to respond to police officer calls and to create a single point of entry.

provides a forum for the participating counties to exchange ideas with peers about their change projects' efforts to reduce 30-day readmission rates. The logic model of the described approach is that the NIATx model is used to implement new practices and the new practices are then supposed to affect readmission rates.

Data Sources

The DHS Mental Health Patient Utilization databases provided demographic information and 30-day readmission rates for each county board area by year for 2009-2013, with 2009 serving as the baseline year. These data track mental health services utilization trends in the state. They also provide the foundation for the National Outcome Measures data reported to external agencies such as the Substance Abuse and Mental Health Services Administration (SAMHSA). SAMHSA's Unified Reporting System for 2009-2013¹⁵ provided the most recently available US data, with Wisconsin data removed from the dataset.

Measures

The Unified Reporting System data definitions are applied to inpatient demographic statistics related to age, gender, and race/ethnicity. The performance measure of 30-day readmissions is based on inpatient admissions that occurred within 30 days of discharge divided by inpatient discharges. This measure includes the following publicly served patients: all voluntary and involuntary civil inpatient admissions, including emergency detentions (Chapter 51); inpatient admissions in local, county-owned or

contracted hospitals, as recorded in the Human Services Reporting System Mental Health module; and inpatient admissions to the 2 state mental health institutes (Mendota and Winnebago). Not included in the data are emergency department hospital admissions that did not lead to an inpatient psychiatric admission, and medically managed inpatient admissions. The inpatient admissions have been unduplicated within and across the Human Services Reporting and mental health institutes' data systems. If a patient has multiple readmissions within 30 days, all readmissions are counted in the rate.

Analysis

To clarify the effect of the NIATx organizational change model used in the context of a multiorganizational collaborative, we compared readmission rates for counties that participated in the Wisconsin Mental Health Readmissions Project with those that did not. All participating counties were part of the collaborative and received technical assistance regarding the NIATx model. A chi-square analysis evaluated changes in 30-day readmission rates in counties that participated in the collaborative and those that did not from 2009 to 2013.

The programmatic changes the counties made were documented using 2 sources: qualitative data collected by the technical assistance coaches during their monthly phone calls, and self-report data from summary reports the counties generated for this project at the end of each year of the collaborative. The Eisenhardt Iterative Process of Building Theory from Case Study Research¹⁶ was used to document the changes applied to reduce readmissions.

RESULTS

From 2009 through 2013, 45.7% of the state's psychiatric inpatient admissions were female (54.3% male). The breakdown by race was white=75.3%, black=16.7%, Hispanic 5.1%, American Indian=2.6%, Asian=.2%, and Pacific Islander=.1%. The average patient age for inpatient psychiatric admissions was 30. The breakdown by age was <18=16.5%, 18-25=21.5%, 26-35=19.8%, 36-49=22.7%, 50-69=16.5%, and ≥70,3.1%.

The decline in the 30-day readmission rates for the counties that participated in the project was 4.3% (decreasing from 12.4% to 8.1%) or a 34.8% change. For those counties not participating in the project, the percentage decline was .53% (decreasing from 7.53% to 7.0%) or a 7% change (Figure 2). The chi-square analysis found the proportion of readmissions from counties participating in the project compared to counties that did not participate changed significantly from 2009 through 2013 [$\chi^2(4) = 54.503$, $P < .001$]. In this analysis, the changes from 2011 to 2012 [$\chi^2(1) = 5.316$, $P = .021$] and 2012 to 2013 [$\chi^2(1) = 16.584$, $P < .001$] also were significant, while the changes to readmission rates from 2009 to 2010 and 2010 to 2011 were not. The average improvement in 30-day readmission rates of counties participating in the

project from baseline year to year 1 was -1.05%, from baseline year to year 2 was -1.53%, and from baseline year to year 3 was -3.14%.

The project sought to include larger counties. The 3 counties with the most discharges participating in the project were Brown (Green Bay) (n=517), Milwaukee (n=3694), and Waukesha (west Milwaukee suburbs) (n=737). From 2009 through 2013, these counties experienced decreases in 30-day readmission rates of 2.1%, 1.5%, and 1.8% respectively (Table 2). Key changes applied in 2 or more of these 3 counties included (1) implementing a discharge session where the patient meets with a social worker and nurse to review postdischarge appointments, crisis plan, community resources, and medications; (2) scheduling a patient meeting with a crisis manager postdischarge; (3) engaging patients in outpatient therapy postdischarge; (4) training police officers on how to manage crisis situations and whom to contact (in the case of admissions); and (5) providing short-term crisis beds to divert inpatient admissions. Over the course of the project, all county organizations adopted use of postdischarge services, and 17 of the 19 participating county organizations adopted crisis beds.

DISCUSSION

Counties participating in the quality improvement collaborative showed a greater reduction in their 30-day readmissions than those that did not. The NIATx organizational change model used by the counties has been associated with performance improvement in other multiorganizational change initiatives.^{13,14,17,18} This is the first effort, however, to report on use of the NIATx organizational change model to address psychiatric hospital readmissions. This demonstration project builds on the research demonstrating the use of state multiorganizational quality improvement collaboratives^{19,20} and describes how this method, combined with an evidence-based organizational change model, can be applied to address inpatient psychiatric readmissions. NIATx 200, another analysis of the use of the NIATx orga-

Figure 2. 30-Day Readmission Rates

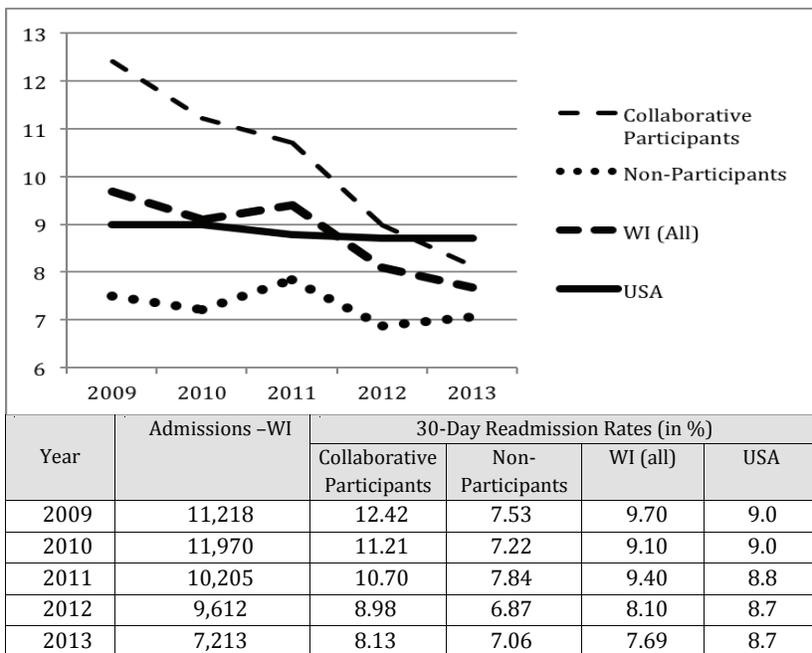


Table 2. County Human Services Board Statewide Collaborative Participants

County (City/Area)	Year Began	2013 Discharges	30-Day Readmission Rate		Change From Year Prior to Participation to 2013
			the Year Prior to Participation	2013 30-Day Readmission Rates	
Brown (Green Bay)	2012	782	13.7%	11.6%	-2.1%
Dodge	2010	96	12.5%	5.2%	-7.3%
Door	2012	18	10.3%	5.6%	-4.7%
Iowa/Grant	2010	44	8.0%	2.3%	-5.7%
Jefferson	2011	68	11.5%	5.9%	-4.6%
Lacrosse	2010	43	4.5%	2.3%	-2.2%
Lafayette	2012	14	4.8%	14.3%	+9.5%
Marathon/Lincoln/Langlade (Wausau)	2011	503	3.0%	2.8%	-.2%
Milwaukee	2010	889	13.9%	12.4%	-1.5%
Outagamie	2013	260	5.0%	6.9%	+1.9%
Rock	2011	211	8.4%	2.4%	-6.0%
Sauk	2013	36	6.3%	2.8%	-3.5%
Shawano	2013	9	5.5%	0%	-5.5%
Sheboygan	2012	96	11.6%	9.4%	-2.2%
St. Croix	2012	69	5.6%	1.4%	-4.2%
Washburn	2012	4	0%	0%	0%
Waukesha (West Milwaukee Suburbs)	2010	517	8.0%	6.2%	-1.8%
Winnebago	2012	266	8.4%	7.9%	-.5%
Wood (Stevens Point)	2010	481	10.3%	8.7%	-1.6%

nizational change model applied in a multiorganizational collaborative, tested which elements of the technical assistance had the greatest impact: coaching, learning sessions (in-person education sessions), or group conference calls.²¹ The study found coaching and learning sessions achieved significant effects, with coaching

having the greatest impact.¹³ The group conference calls were not found to be effective and should be considered optional in the replication of this approach.

In other studies, psychiatric readmission rates have been related to system characteristics associated with size of service agency, geographic proximity to inpatient services, and accessibility to treatment services.^{22,23} Within the collaborative, county population and poverty level, number of county psychiatric inpatient discharges, existence of an inpatient psychiatric hospital in the county, and whether or not the county directly provided treatment services was compared against the bivariate variable of whether a county's 2009-2013 30-day readmissions rate change was above or below the state average of -1.4%. In this logistic regression, none of these system characteristics had a significant effect on the change in 30-day readmission rates.

However, at baseline, the NIATx counties had nearly a 5% greater 30-day readmission rate than the non-NIATx counties (12.42% vs 7.53%). A pronounced difference in the 2 cohorts is the size of the population served. The NIATx counties had, on average, 232 hospital admissions/year as compared with the non-NIATx counties at 84 hospital admissions/year. The smaller patient volumes and typically tighter budgets of the non-NIATx counties produced an environment where practices that yielded lower readmission rates were already in place at baseline.

In the collaborative, the counties employed practices found to reduce readmission in other studies and demonstrations such as postinpatient stay follow-up services, communication between inpatient and outpatient services,²⁴ and adding crisis acuity beds to circumvent referral to inpatient services.²⁵ Postresidential care follow-up with low-intensity services and improved communication between residential and other health care providers also have affected readmission rates in general health care, underscoring the potential generalizability of the reported approach.²⁶ Two promising practices that most smaller counties used and larger counties tended to adopt as part of this project are described below.

*24-hour follow-up after inpatient discharge.*²⁷ The Shawano County inpatient team worked on changes to provide postdischarge services following inpatient stays. The evidence-based and case examples from previous projects supported use of postdischarge follow-up, and the project listed postdischarge follow-up as a promising practice to consider, but noted variation in the timing, delivery, and content of follow-up activities. The Shawano County change team used PDSA cycles to test the following approaches: follow-up within 24 hours vs no follow-up, face-to-face follow-up vs phone, and use of a set script for follow-up vs no script. Their teams conducted the PDSA cycles with 5 to 10 patients each to determine which changes seemed most effective within their local environment, then monitored

the effectiveness of the selected changes over time. The changes they settled on were scheduling a face-to-face meeting and using a specific script within 24 hours of discharge. The expanded follow-up for discharged patients increased units of continuing care services provided from 414 units in 2012, on 119 admissions (3.5 units per admission), to 834 units in 2013, on 146 admissions (5.7 units per admission).

In another example, the Milwaukee County change team reduced readmissions from 20% to 11% by having a team member make face-to-face contact with a patient within 24 hours of discharge. This change was so successful that it is now standard policy.

*Establish a diversion program for crisis patients that provides lower acuity, less costly alternatives to inpatient mental health care for clinically appropriate patients.*²⁵ A walk-through of the crisis line phone system and staffing helped the Rock County change team increase "mobile" responses to mental health emergencies. Assigning paraprofessionals to answer the phones freed crisis workers to respond to emergencies in the field. Providing an in-person assessment at the emergency scene allowed for earlier intervention and increased options that diverted patients from psychiatric hospitalization. This set of changes resulted in a 74% increase in response to mobile requests (from 42 to 73 requests a month), a 36% decrease in psychiatric admissions (from 50 to 32 a month), and improved relationships with local law enforcement and the hospital.

These changes are not new to the literature on reducing readmissions, but they had not been tested previously by many of the county participants. When applied in this context, these practices reduced readmissions in the specific counties. The structural aspects of the NIATx organizational change model that facilitated an environment conducive to change were establishing executive sponsor and change leader roles. The process elements the sites and coaches described as important were conducting an initial walk-through of the process being addressed and using PDSA change cycles. The promising practices shared with participants were standardized (eg, postdischarge follow-up); however, implementation of these practices was guided by the results of the iterative PDSA tests. Participating counties did face barriers in implementing these processes. Counties were constantly challenged to find the time for change teams to meet, implement the changes, and collect the data to evaluate the impact of changes made. Counties or other entities wanting to improve upon readmission rates could consider applying the practices described in this evaluation. With this approach they could test ways to improve their preadmission activities, discharge planning, and postdischarge services.

The summative effect of the NIATx program and other environmental conditions occurring in the state was that readmission

statewide rates began at 9.70% during 2009 (the program's baseline year) and declined to 7.69% in 2013. From 2009 through 2013, a chi-square analysis found the proportion of readmissions from all Wisconsin counties, as compared to other states, changed significantly from 2009 through 2013 [$\chi^2(4) = 14.480$, $P < .002$].

Limitations

Various issues can influence inpatient psychiatric readmission rates, and the effects of this project represent some of many factors influencing readmission rates in Wisconsin. The trial could not control for all factors that might affect these rates.

The self-selection sampling strategy could introduce bias into the sample. It should be noted that the non-NIATx group was below the NIATx and the national average at baseline. Hence, some of the improvements could be attributed to the "regression to the mean" effect.²⁸ Yet, this phenomenon is more likely to be present with single-point data, rather than the serial data that was used in this study.²⁹ To better understand the influence of self-selection, an analysis of the patient demographic characteristics at baseline (2009) showed that the Wisconsin Mental Health Readmissions patient sample was significantly younger (34.1 years in NIATx vs 36.5 years in non-NIATx), had a higher percentage of females (46.5% in NIATx vs 43.7% in non-NIATx), was less affluent (\$50,616 average household income in NIATx vs \$51,350 in non-NIATx), and was more diverse (30.0% non-white in NIATx vs 10.6% in non-NIATx). More ethnically diverse populations have demonstrated higher readmission rates,⁶ suggesting the county human services boards participating in the project had greater challenges in addressing readmissions rates based on demographic mix of that sample. All the same, self-selection is a major confounder in that if all Wisconsin counties were randomized to the non-NIATx and NIATx groups, with equal representation of high and low utilizers, the results may not have been as pronounced as reported in this analysis.

Also, the data are based on administrative datasets, which have been found in some instances to be inaccurate.³⁰ That is likely not the case here, since the Wisconsin dataset is a long-term dataset reviewed by external agencies, and the data definitions used in the dataset remained unchanged during the time period reported in the analysis. Lastly, data are not presented on how much each change practice listed in Table 1 affected readmission rates. This project was not intended to measure the changes made with that precision, but to determine if the overall approach had an effect. In addition, organizations were encouraged to choose and test the changes they thought would be most effective. This method of practice selection introduces selection bias in testing the individual practices and, coincidentally, puts the emphasis of testing the intervention effect on the change model vs the specific changes.

CONCLUSIONS

Reducing expensive psychiatric inpatient readmissions remains a persistent challenge in Wisconsin and other states. Readmissions represent declining patient health and can be burdensome for caregivers and families. Many local efforts over the years have worked to reduce unnecessary psychiatric inpatient readmission practices in other states, but examples demonstrating statewide reductions based on a method or policy have not been identified. The findings reported from the Wisconsin Mental Health Readmissions Project provide insights into how a quality improvement collaborative to implement a standardized change model can help county boards implement a series of improvements and achieve reductions in 30-day psychiatric readmission rates. For other states or provider networks, future applications of this approach should attempt to replicate these findings and achieve similar results over a shorter time frame.

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