

Measuring Safety: A New Perspective on Outcomes of a Long-term Intensive Case Management Program

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Abstract

Patient safety is a critical dimension of program effectiveness. Measuring patient safety in managed behavioral health care contexts presents challenges, partly due to the lack of well-defined safety measures. A new perspective on measuring patient safety within the context of a managed behavioral health care intensive case management (ICM) program serving a high-risk population from 16 States in the middle and western United States is presented.

Objectives: Investigate the usefulness of community tenure; inpatient utilization and length of stay; functional health status; and patient satisfaction as a constellation of patient safety indicators in an intensive case-management program. **Methods:** Claims and self-report data 12 months before entry into ICM were compared with matched data 12 months after discharge from ICM, and with comparison group data. Participants were safety-sensitive, with high suicide risk and psychiatric, substance use, and medical comorbidity. **Results:** Safety was enhanced for the ICM group as measured by 18 percent fewer inpatient days and 17 percent shorter length of stay; 21 percent longer community tenure between admissions, and improved functional health status. Total cost of care was lower for ICM than comparison group. **Conclusions:** The constellation of measures forms an acceptable indicator of patient safety; results support that ICM enhanced patient safety, preserved patient satisfaction, and reduced cost.

Introduction

Patient safety is a critical dimension of program effectiveness. Measuring patient safety in managed behavioral health care contexts presents challenges, partly due to the lack of well-defined safety measures. While there has been discussion regarding clinical, process, and economic outcomes associated with intensive case management (ICM),¹ there has been less analysis of associations among these measures and patient safety.²

The hypothesis of this paper is that in the absence of consensus- or evidence-based constructs with which to measure patient safety, measures such as inpatient utilization; average length of stay; improved physical and mental functioning; and increased tenure in the community form an appropriate constellation of measures with which to measure the impact of programs and services on the safety of a population receiving them.

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These measures are appropriate because by definition, patients who meet the criteria for medically necessary inpatient care exhibit symptoms or behaviors that pose a serious risk to themselves or others. This risk can include attempted suicide; threat of imminent violence toward others; deterioration of psychiatric and/or medical status; the inability to adequately care for self or minor dependents; and/or the inability to comply with and respond to treatment in the community. To reduce these behaviors also mitigates considerable safety risk.

While inpatient psychiatric hospitalization has an appropriate role in the continuum of care available to patients with serious and/or persistent mental illness, there is an additional, significant connection between reduced inpatient utilization and increased patient safety: hospitalization itself can present significant safety risks for patients. The Institute of Medicine, in its highly publicized report, *To Err Is Human*,³ estimated that 44,000 to 98,000 Americans die in hospitals each year as a result of medical errors. Since psychiatric hospitalizations accounted for 25.8 percent of all hospitalizations in 1998,³ risk of lethal harm in psychiatric hospitals (or other facilities providing inpatient psychiatric treatment) affects unacceptably high numbers of people each year. Furthermore, longer inpatient stays have been associated with increased occurrence of medication error⁴ and medication error has been estimated to account for 19 percent of injuries to psychiatric inpatients.⁵ In a combined retrospective chart and concurrent dispensing event review in a State psychiatric hospital, a study of 31 inpatient charts and 22,000 dispensing events yielded 2,194 medication errors. Of these errors, 58 percent were rated to have a high likelihood of causing an adverse drug reaction, diminishing the effectiveness of intended pharmacotherapy, or being potentially life-threatening.⁵

Even in the absence of medical error, the nature of inpatient psychiatric treatment may contribute to safety risk in several important ways. Inpatient treatment is an intervention used mainly in the face of a patient's imminent harm to self or others and, increasingly, few who do not present either of these risks are hospitalized.⁶ Given the severity of impairment on admission, it is not surprising that completed suicide, suicide attempts, and violent episodes are more likely to occur during the first week of inpatient treatment.⁷ Since patients in psychiatric units are generally ambulatory (as opposed to those in medical units who are bedridden), the chances of interacting with another patient are increased, thereby creating additional risk. Data from the sentinel events reports of the Joint Commission for Accreditation of Health Organizations indicate that between January 1995 and January 2004, there were 84 sentinel events related to assault, rape, or homicide in psychiatric units (3.4 percent of all sentinel events in the period).⁸

Psychiatric hospitalization may also impose more subtle, less immediate safety risks for patients. The American Psychiatric Association advises caution in the consideration of psychiatric hospitalization for patients at risk for suicide,⁹ citing concerns about hospitalization's potential to be humiliating or frightening, and to foster dependency in emotionally fragile patients with Axis II disorders.¹⁰ Yet because of the complex needs of the seriously mentally ill and the widespread

problem of fragmented care continuums, reducing the rate of inpatient utilization has posed an enormous challenge for those who finance, manage, and provide psychiatric treatment.

ICM is one strategy for reducing inpatient utilization. Although the features and effectiveness of ICM have been debated in the scientific literature, ICM is adapted to specific patient needs and strengths, offered over an extended period, and responsive to changes in patient status. It has emerged as a potentially effective model for providing care in the community setting for populations with severe and persistent mental illnesses.^{11–13} In one study, patients attending a single ambulatory follow-up visit had a 10 percent chance of being readmitted in the same year, while patients attending no follow-up visits had a 25 percent chance.¹ Given the substantial benefit of an ambulatory follow-up visit, managed care has focused efforts on encouraging patients to attend at least one such visit, and with good effect—patients are more likely to attend after-care appointments when they are closely managed than when providers are relied on to encourage attendance.¹⁴ Several studies have suggested that ICM reduces rehospitalization,^{12, 15, 16} while other studies have shown that ICM is associated with a marked decrease in inpatient bed-days; better engagement in and satisfaction with services; and improved relationships and social networks.¹⁷

ICM staff members are able to identify and manage reasons preventing attendance at after-care treatment, including transportation, financial, and social/familial barriers. This may be a factor contributing to ICM's positive impact. ICM is also perceived more favorably by recipients than standard case management.¹⁸

Nevertheless, little is known about ICM as a tool for enhancing patient safety in severely ill populations. In the absence of clear indicators that are applicable in a managed care context and a lack of consensus on appropriate reporting mechanisms for providers across the care continuum, the following constellation of indicators are used as measures of patient safety.

Community tenure

Community tenure, or days spent in the community between admissions or instead of hospitalization, is often used as a measure of clinical improvement.¹⁹ It also can be viewed as a measure of patient safety, because increasing total days in the community and lengthening the time in the community between readmissions can contribute to better linkages to community supports and increased functioning at work, school, or in social relationships. Increased functioning in relevant settings and higher perceived social support contribute to recovery from psychiatric illness¹⁷ with attendant reduction in symptoms and, therefore, risk.³

Inpatient utilization

A traditional measure of service effectiveness, inpatient utilization can also be a marker of patient safety, because when inpatient utilization is lower, the

population is at decreased exposure to morbidity or mortality due to medical error or other adverse events in inpatient settings.

Functional health status

Functional health status is frequently measured through normed functional health assessment scores, such as the Physical Component Summary (PCS-12) and Mental Component Summary (MCS-12) on the Short Form-12 Health Survey[®] (SF-12), a 12-question self-report instrument. The PCS-12 score addresses the ability to accomplish daily activities and limitations imposed by physical status, such as pain. The MCS-12 score addresses the amount of time a patient feels calm and peaceful; downhearted and blue; has a lot of energy; and avoids social activities because of physical or emotional problems.²⁰ These MCS-12 and PCS-12 scores can be measures of patient safety because improved functioning in these areas can make engagement in the treatment process more likely, increase patients' perceived social support, decrease isolation, and promote more engagement in occupational, school, and social settings. Patients who are more engaged in treatment and in work, school, and social settings are less likely to experience deterioration and the attendant risks of relapse and readmission.^{19,21}

Patient satisfaction

Patient satisfaction with received services as measured by patient self-report is the most common measure of program effectiveness described in the literature. Patient satisfaction can also be used as a measure of patient safety because it has been suggested that if services are perceived favorably, patients are more likely to be engaged in the treatment process and more compliant with treatment plans.¹⁸ Other studies have shown that significant, though weak, relationships exist between patient satisfaction and physical and mental health in some populations and settings.²² Patients who are more engaged in, and compliant with, treatment are more likely to realize and maintain gains in clinical status over time.¹¹ This reduces their risk of harm to self or others; decreases the likelihood of readmission to inpatient care; and increases their safety.

Cost of care

Cost of care, defined here as the cost of inpatient care (inpatient and residential) plus outpatient care (partial, intensive outpatient, in-home, and outpatient), is not proposed as a measure of patient safety. However, patient safety must be attained within financial constraints.

Cost of care is included as an adjunctive measure to aid in responsible program development and administration.

Methods

The sample was drawn from a TRICARE Service Region that encompassed the families of active duty military service members, military retirees, and their

families in 16 States in the Midwestern and Western United States. A total of 454 TRICARE beneficiaries participated; of these, 382 were in the intensive case management group (ICM) and 72 were in the comparison group. The study group (n = 382) included patients discharged from ICM because they had either achieved ICM plan goals, or they were engaged successfully in outpatient treatment, military-, or community-sponsored services and no longer required ICM services. The comparison group (n = 72) included patients discharged from ICM because they neither responded to multiple outreach attempts nor accepted the services and recommendations offered through the ICM program.

The groups were evenly matched. Women and adults aged 19–64 years were the two population categories with the highest representation in both groups. This distribution was consistent with the overall distribution of the clinical population in the service region.

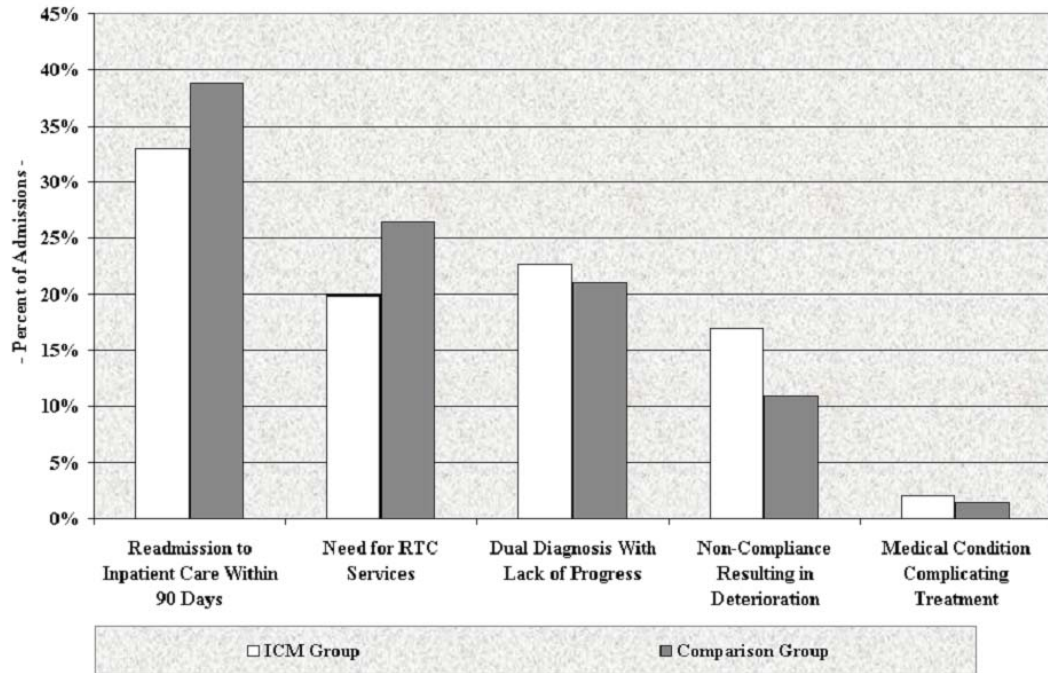
The groups were also evenly distributed along diagnostic categories. The ICM group's top three diagnoses were major depression/bipolar disorder (40 percent), attention deficit hyperactivity disorder (11 percent), and anxiety disorder (9 percent). The comparison group's top three diagnoses were major depression/bipolar disorder (39 percent), depressive disorder (11 percent), and anxiety disorder (11 percent).

Patients were referred for ICM services based on meeting at least one of the admission criteria. The top five admission criteria, accounting for 95.2 percent of admissions to the ICM program, were—

- (1) inpatient readmission within 90 days;
- (2) child/adolescent meeting medical necessity criteria for residential treatment;
- (3) dual/multiple diagnoses of substance abuse and mental health (SA/MH) with lack of treatment progress;
- (4) treatment non-compliance resulting in psychiatric deterioration; and
- (5) serious medical condition(s) complicating psychiatric treatment.

The other admission criteria, accounting for 4.8 percent of admissions, were high acuity cases, like highly lethal suicide attempt; self-defeating behavior patterns, like personality disorder complicating treatment; complex treatment regimen, like electroconvulsive therapy (ECT), or new technologies; discharge against medical advice from inpatient treatment; refractory to medication interventions; and need for therapy or psychiatric nursing in the home. While patients meeting the high acuity case criterion constituted 0.8 percent of the patients in the ICM group and none of the patients in the comparison group, they presented the highest imminent safety risk with most making recent highly lethal suicide attempts.

Figure 1. Admission to intensive case management: percent of cases meeting top five admission criteria



ICM intervention

The intervention period was 4.25 years (April 1998–June 2002) of the 7-year study period (April 1997–March 2004). The ICM intervention was considered to have occurred when a patient was admitted to the ICM program, agreed to participate, and received ICM services. Services were based on an individualized ICM plan formulated after review of the patient’s treatment record and with patient and provider involvement. The plan included goals appropriate to the patient’s needs and status, linked to a service protocol that addressed type, frequency and duration of treatment. Treatment included, residential, in-home, partial hospital, and intensive outpatient settings; individual, group, and family therapy; and chemical dependency services. Exceptions to benefit limits were granted as needed, per contract specifications. Military and community resources were incorporated into ICM plans when available. The ICM plan was reviewed and updated with the patient and providers at least monthly to check progress toward goals, review barriers, authorize additional needed resources, and determine when discharge goals/criteria had been met.

Measures

Community tenure

Community tenure was defined as (1) the difference between the average number of inpatient days in the 12 months before and in the 12 months after the ICM intervention, subtracted from 365 days; and (2) the average number of days

patients lived in the community between inpatient admissions in the 12 months before and in the 12 months after the ICM intervention.

Inpatient utilization

Inpatient utilization was defined as the difference between the average number of inpatient days used in the 12 months before and the 12 months after the ICM intervention.

Average length of stay

Average length of stay (ALOS) was defined as the total number of inpatient bed days used in the 12 months before and the 12 months after the ICM intervention divided by the total number of admissions in the respective time periods.

Functional health status

Patient functioning was defined through the Mental Component Summary (MCS-12) score and the Physical Component Summary (PCS-12) score, as measured by the SF-12 Health Survey (SF-12) administered at intake to the ICM program and at discharge.

Patient satisfaction

Patient satisfaction was defined as the percent of patients who indicated their overall satisfaction with the ICM program was either “satisfied” or “very satisfied” as measured by a five-item, Likert-scale questionnaire.

Cost of care

Cost of care was defined as the difference between the cost of direct inpatient (acute and residential care) and outpatient (partial hospital, intensive outpatient programs, in-home therapy services, outpatient therapy services) care in the 12 months before and the 12 months after the ICM intervention.

Data collection and analysis

Community tenure, inpatient days/365, ALOS

Paid behavioral health claims data from three periods were reviewed: (1) the 12 months prior to the date of acceptance into the ICM program; (2) the intervention period, during which the patient was receiving ICM; and (3) the 12 months after the date of discharge from ICM. Due to a 6-month lag for claims completion and the need for a 12-month period of data after discharge from ICM, review of post-ICM claims data took place 18 months after discharge. The data for each 12-month segment were examined for trends.

Patient functioning

The SF-12 was administered by telephone at intake and discharge from the ICM program. Data were analyzed for changes in MCS-12 and PCS-12 scores between the two data collection points. Use of the SF-12 began 4.5 years into the intervention period, when the TRICARE ICM program adopted the SF-12 as its standard measure of functional health assessment. Before then, a locally developed functional assessment instrument was used, and data collected with it are not included in the results.

Patient satisfaction

Patient satisfaction data were collected through a paper and pencil survey mailed to all patients one month after their acceptance into ICM.

Results

Results are summarized in Table 1.

Table 1. Community tenure, community stay, inpatient days, and inpatient average length of stay for ICM group pre- and post-ICM intervention and comparison group

	Average number of days in community per year		Average community stay between inpatient admissions		Inpatient days		Inpatient ALOS	
	Pre-ICM	Post-ICM	Pre-ICM	Post-ICM	Pre-ICM	Post-ICM	Pre-ICM	Post-ICM
ICM group	352.4	360.4	59	194	4,828	1,767	8.7	7.4
Comparison group	350.5	357.1	59	152	1,044	570	6.6	6.8

Community tenure

Both groups showed an increase in the average number of days in the community per year from pre- to post-intervention (ICM group pre/post = 352.4/360.4 with 2.3 percent increase; comparison group pre/post = 350.5/357.1 with 1.9 percent increase). After the intervention, the ICM group had an average of 3.3 more days in the community per year than the comparison group. The differential increase (ICM group = 2.3 percent, comparison group = 1.9 percent) resulted in 1.4 more days of community tenure per year for the ICM than the comparison group.

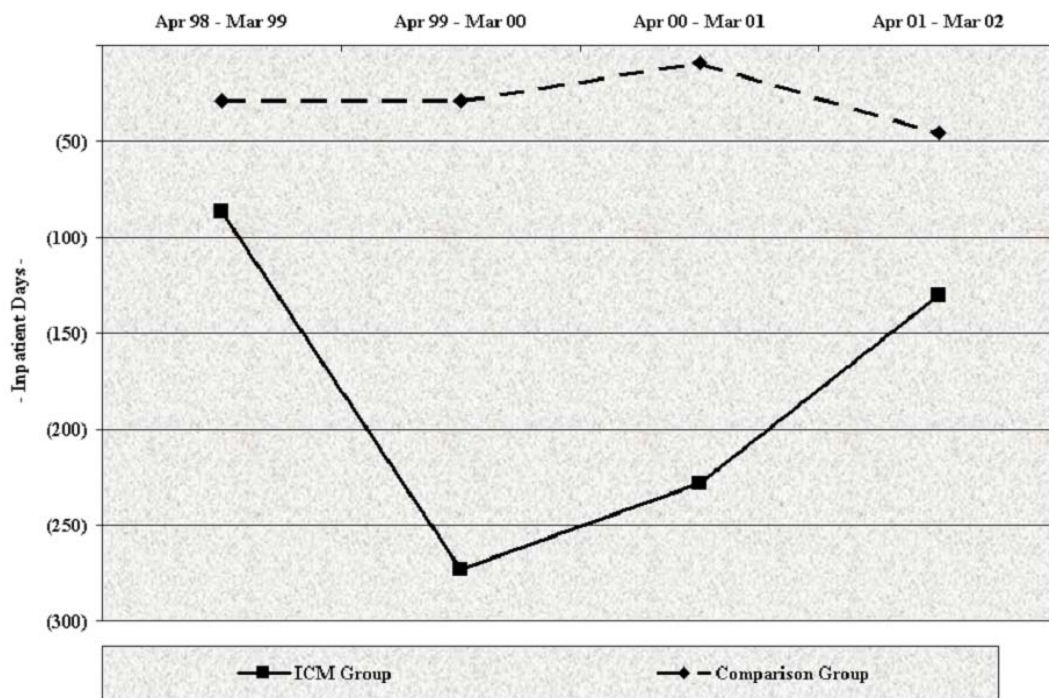
Similarly, both groups showed an increase in length of community tenure between inpatient admissions from pre- to post-ICM (ICM pre/post = 59/194; comparison pre/post = 59/152). The post ICM group had an average of 21.6 percent longer length of community stay between admissions than the post comparison group. In addition, the rate of increase in length of community stay between admissions from pre- to post-ICM was greater for the ICM group

(230 percent) than for the comparison group (159 percent). The post-ICM increase was statistically significant ($P < 0.05$, $\alpha = 0.05$).

Inpatient utilization

The ICM group had a 63.4 percent reduction in total inpatient days used (pre/post = 4,828 days/1,767 days) compared to a 45.4 percent drop for the comparison group (pre/post = 1,044 days/570 days). The post-ICM reduction was statistically significant ($P < 0.05$, $\alpha = 0.05$). The rate of reduction from pre- to post-ICM was 18 percent greater for the ICM group than the comparison group.

Figure 2. Utilization: average difference in inpatient days utilized 12 months pre- to 12 months post-ICM, by year discharged



Average length of stay

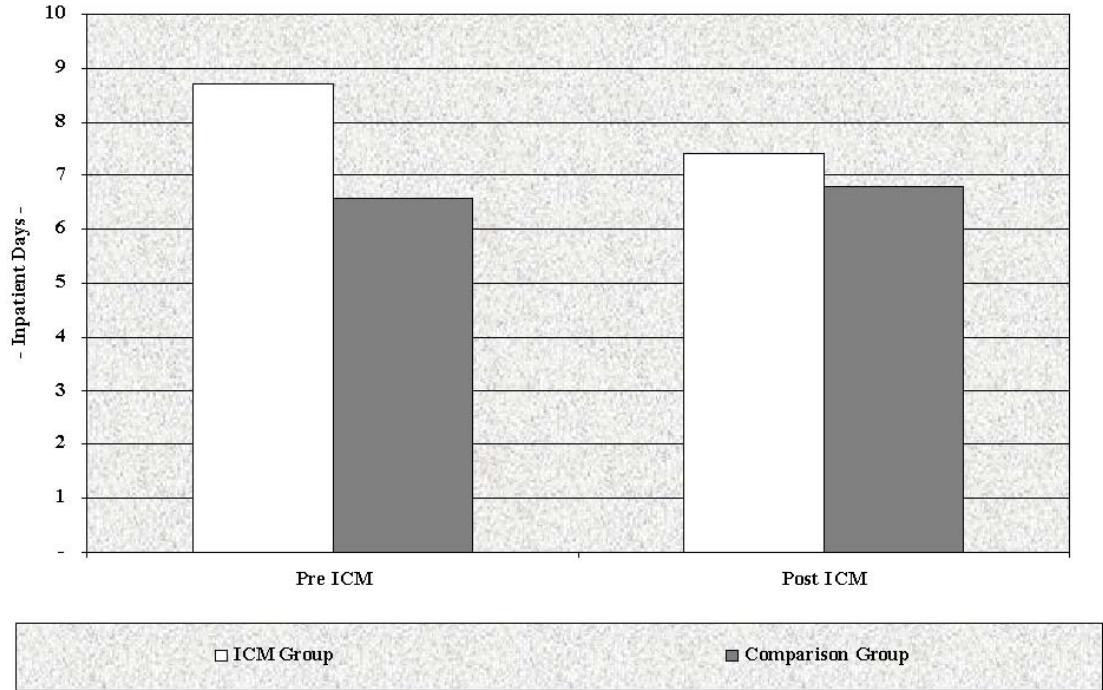
The ICM group had a 14 percent reduction in ALOS (8.7 pre/7.4 post), and the comparison group had a 3 percent increase in ALOS (6.6 pre/6.8 post), for a 17 percent improvement for ICM over comparison group in rate of reduction of ALOS from pre- to post-ICM.

Functional health status

The average MCS-12 score was 32.72 at intake to the ICM program and 43.02 at discharge. The average PCS-12 score was 37.19 at intake and 40.19 at discharge from ICM. The variance between pre-/post-ICM scores suggested a degree of improvement of 31.5 percent in mental functioning and 8.1 percent in physical functioning. The change in the mental health functioning was statistically significant ($P < 0.001$, $\alpha = 0.001$). The mean of the MCS-12 and PCS-12 scores of

the general U.S. population is 50, with a standard deviation of 10.²¹ The SF-12 was not administered to the comparison group.

Figure 3. Average length of stay: reduction in average length of stay for 12 months pre- to 12 months post-ICM, by year discharged



Patient satisfaction with ICM services

Surveys were mailed to 628 patients (all patients admitted to, accepting, and successfully completing the ICM program) during the study period. A total of 140 ICM patients completed and returned the survey for a response rate of 22 percent during the study period. Of the respondents, a total of 87 percent reported feeling “satisfied” or “very satisfied” with ICM services.

Cost of care

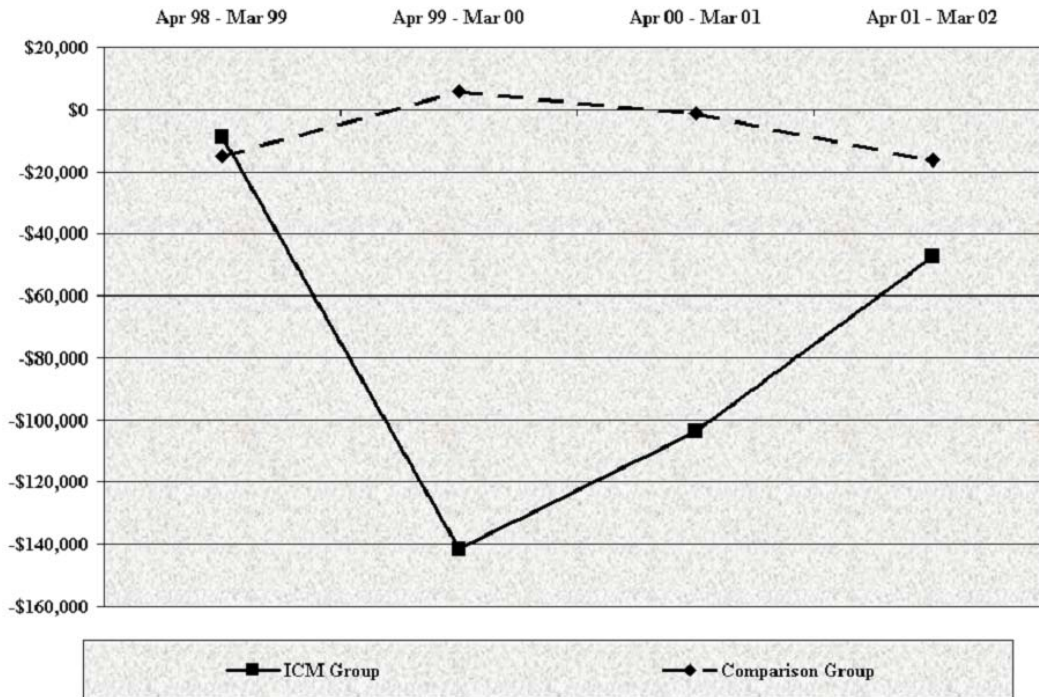
The ICM group had a 42 percent reduction of total cost of care compared to a 23 percent reduction for the comparison group from pre-/post-ICM. For the length of the study period, including the intervention period, the average cost per patient in the ICM group was \$22,120 and the average cost per patient in the comparison group was \$26,953, for a 17.9 percent reduction in total cost of care.

Discussion

This study set out to measure the safety impact of an ICM program using a constellation of measures traditionally used for process and functional assessment. The results support the hypothesis that the ICM intervention enhances patient safety, to the extent that the measures are an acceptable indicator of patient safety. The ICM intervention was associated with an average of 21 percent longer stays

in the community between inpatient admissions, 18 percent fewer days in acute inpatient settings and 17 percent lower ALOS in inpatient acute settings. In addition, for the ICM group, the ICM intervention was associated with improved mental and physical functioning, by 31.5 percent and 8.1 percent, respectively, and an average of 3.3 more days in the community per year instead of in acute inpatient care settings.

Figure 4. Cost of care: average change in total cost of care (all levels of care) 12 months pre- to 12 months post-ICM, by year discharged



In this study, patient safety was reflected by an improved community tenure measured two ways: (1) length of tenure in the community between discharge and subsequent admission to acute inpatient care; and (2) the average number of days per year spent in the community instead of in acute inpatient care settings. The first method yielded results that support previous findings, suggesting that ICM may help extend community tenure between inpatient admissions for patients with serious mental illness.²³ Within this perspective, the primary value of ICM is of supporting longer periods in the community between admissions, which, in turn, are suggestive of lengthier periods of psychiatric stability for the patient. The second measure took into account the average number of days that patients lived in the community in the course of a year versus in an acute care setting with its concomitant safety risks. The results from this measure supported part of the assumptions underlying the study, namely that ICM promotes patient safety through lengthening community tenure and decreasing inpatient care throughout the year.

These findings suggest that by coordinating a customized resource network in the community that is responsive to the patient’s individualized treatment needs,

ICM may help maintain functional gains and prevent clinical deterioration over longer periods. With 87 percent of the patients satisfied, and 42 percent reduction in total cost of care pre-/post-ICM, the ICM intervention yielded solid process and functional outcomes without sacrificing patient satisfaction or adding program cost.

Most importantly, the results of this study suggest that the patients in the ICM group were less likely to be exposed to the possibility of medical error and adverse incidents associated with inpatient settings, and more likely to be engaged in activities within the community that helped prolong stable functioning.

Limitations

There were several limitations to this study that affected the strength of the conclusions that were drawn from the findings. Foremost is the lack of direct measures of patient safety, such as suicide attempts, suicide completions, homicides, medication errors, and adverse events associated with the use of seclusion and restraint. Direct measures were not used because of the significant barriers associated with collecting this type of data, including lack of consensus on cutoffs and benchmarks; reticence in the provider community to volunteer information even when asked for it, and difficulty making sense of data from across the continuum of care in programs that are vastly different from each other. Given that measurement of, and accountability for, patient safety is evolving, direct measures are becoming more readily available. Future studies of ICM programs would benefit from use of an expanded constellation of measures.

Additional limitations included those associated with data collection for the functional assessment measures. The SF-12 instrument was administered only to the ICM group and not to the comparison group, because the comparison group by definition declined to participate in ICM either directly or by not responding to attempts at contact. In addition, the size of the subgroup that was administered the functional assessment measure at both admission and discharge from ICM was limited ($n = 14$). The most significant barrier to obtaining a larger subgroup was difficulty contacting beneficiaries after discharge from ICM. In addition, use of the SF-12 measure began four years into the study period. At that time, the TRICARE program, which began studying ICM outcomes in 1998, opted to use the SF-12 instead of continuing to use the locally developed functional assessment instrument, because the SF-12 had undergone extensive validation while the latter had not been subjected to either validity or reliability testing.²¹

In regard to patient satisfaction, the survey instrument did not request patient identification on the survey, so strict association of the responses to the study population was not possible. Additionally, the survey was conducted only with the ICM group, thereby preventing comparison to the comparison group.

Conclusions

Using a variety of traditionally used clinical measures, this study evaluated the impact of an ICM program on the safety of patients in a population of TRICARE beneficiaries in 16 States in the Western and Midwestern United States. The study analyzed differences between inpatient utilization, average length of stay, and community tenure in the 12 months preceding the intervention and in the 12 months following the intervention. In addition, this study measured self-reported physical and mental functioning and satisfaction with ICM services to approximate the status of the population with regard to symptomatology, ability to function, and engagement in treatment. Finally, the study assessed the cost of care provided to the study group before ICM intervention began and after discharge from the program.

One of the goals of the TRICARE contract was to contain behavioral health care costs by providing ICM to patients with serious behavioral health and comorbid disorders. This subgroup, which constituted approximately 15 percent of the recipients of clinical services, accounted for about 75 percent of behavioral health care expenditures. The assumption was that by developing and delivering a well-coordinated, individualized behavioral health care service plan with strong community underpinnings and support by multiple funding streams, patient safety would be maintained and/or enhanced, and financial efficiencies gained. The cost of care analysis indicated that patients who participated in ICM achieved improved outcomes for lower total costs than those who did not.

The findings of this study have implications for various groups, including purchasers, vendors, and managers of behavioral health care, as well as patient advocacy groups. These groups have legitimate interests in identifying and testing methodologies to deliver safe, high-quality behavioral health care that is cost-effective. These results suggest that ICM is one such methodology to afford patients with serious, complicated behavioral health disorders a greater measure of safety in their interface with the health care system and society.

While measures such as community tenure, inpatient utilization, average length of stay, and mental and physical health functioning are limited in their ability to describe the impact of programs such as ICM on patient safety, the strength of the association between these variables and patient safety remains a viable area for study.

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