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Research paper

An evaluation of proactive psychiatric consults on general medical units

Patrick Triplett*, C. Patrick Carroll, Ted Avi Gerstenblith, O. Joseph Bienvenu

Johns Hopkins University School of Medicine, United States of America

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ABSTRACT

Objective: Recent studies have shown an association between proactive psychiatric consultation on medical units and shorter length of stay. The aim of this study was to assess the impact of implementing a proactive psychiatric consult service on general medical units in an urban teaching hospital on length of stay and qualitative measurement of satisfaction of adequacy of psychiatric services.

Methods: Bivariate and multivariate analyses of demographic, clinical and outcome data were performed comparing patients seen by the proactive psychiatric consult team, patients seen contemporaneously on other general medical units by a traditional, reactive consult team and patients seen the prior year on the proactive intervention units by the reactive consult team. Length of stay was the primary outcome examined. Regression modeling was performed to assess further the relationship of length of stay with the three groups. Nursing and physician staff were queried before and after intervention regarding satisfaction with psychiatric resources on the intervention units.

Results: Patients seen by the proactive team had shorter length of stay than those seen by contemporaneous reactive consult team ($p = 0.005$) or the prior year by the reactive team on the intervention units ($p = 0.005$). There was no significant difference between the latter two groups. Time to consult was also shorter for patients seen through the proactive model than the reactive model on other units at the same time (0.01) or the preceding year (< 0.001). Nursing and physician satisfaction with psychiatric help increased significantly in three of four measures.

Conclusions: Proactive psychiatric consultation in our study correlated with shorter time to consult, shorter length of stay, and improved staff satisfaction compared to a reactive consult model.

1. Introduction

Recent trends in reimbursement models for health care, including formation of accountable care organizations and use of alternative payment mechanisms, have brought renewed attention to the disproportionately negative effects that psychiatric conditions can have on patient outcomes. General medical illnesses and psychiatric illnesses are strongly associated [1,2] and psychiatric conditions are common on general medical floors [3–5]. General hospital admissions for patients with psychiatric conditions also involve higher costs [4,5] and correlate with worse outcomes for patients [6,7].

Lack of access to needed care in inpatient and outpatient settings has likely contributed to increases in demand for psychiatric care in emergency departments and on hospital wards [8]. Traditional fee-for-service reimbursement, with low rates for psychiatric care, has been a constraining factor in attempting to meet increases in demand [8,9]. New approaches to providing needed psychiatric care must account for changes in funding priorities in health care, particularly opportunities to align efforts that are able to improve patient care and outcomes with newer, population-health based incentives or penalties.

Patients with psychiatric co-morbidities on medical or surgical units are known to have longer lengths of stay than patients without psychiatric disorders [10]. There is growing evidence that use of a proactive psychiatric consult model can have a significant impact on lowering length of stay for patients with psychiatric conditions [11–13]. Proactive psychiatric consultation differs from the traditional or "reactive" consult model in having a screening process to detect psychiatric issues near the time of admission instead of waiting for a patient's primary team to request a psychiatric consult. A proactive approach would ideally allow for psychiatric intervention before crises emerge and could help cut down on unnecessary consults while providing needed care for patients.

Yale-New Haven Hospital adopted a multidisciplinary approach to proactive psychiatric consults [14]. A psychiatrist, advance practice psychiatric nurse and social worker were the initial team members covering three medical floors. In addition to positive effects on length of

* Corresponding author at: 600 N. Wolfe Street/Meyer 4-119, Baltimore, MD 21287, United States of America.
E-mail address: ptriple@jhmi.edu (P. Triplett).

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stay and return on investment, the experience was noted to have a beneficial effect on culture. Medical staff satisfaction is an important metric for hospitals [15] and programs that allow staff to focus on what they do best should have a positive impact on staff satisfaction. We present the results of the initiation of a proactive psychiatric consult model on medical units with high demand for psychiatric consults, including effects on length of stay, time to consult, readmission rates, transfers to inpatient psychiatry, and staff satisfaction with psychiatric resources.

2. Methods

2.1. Setting

The site for this study was a tertiary care academic medical center located in Baltimore, Maryland. General medical units of the hospital include hospitalist-supervised services, and teaching services (firms) supervised by junior attending physicians taking breaks in fellowships. Both types of service include residents-in-training and medical students. The hospital also has 88 adult inpatient psychiatric beds on the campus.

All general medical units (8 units, 173 beds) received psychiatric support via a reactive consult service until the implementation of the proactive model on April 4, 2016; the present analysis compared outcomes through April 3, 2017. After implementation, the PHIPPS team (Proactive Hospital-based Intervention to Provide Psychiatric Services) covered three general medical units with 23 beds each. These units were chosen for proactive services because of high psychiatry consult request volumes from preceding years. The remainder (104 beds) continued under the reactive consult model. We measured time to consult as time from day of admission to the day of the consult. Two of the non-intervention units moved locations during the study period due to renovations, though their mission of general medical admissions and bed count remained the same.

2.2. Intervention

The proactive psychiatric consult service includes a half-time attending psychiatrist, a full-time psychiatric nurse practitioner (NP), and a full-time psychiatric social worker. The proactive team operated during normal working hours, 8 a.m.–5 p.m., Monday through Friday. The NP and social worker screened all admissions to the intervention medical units each weekday morning. Screening involved reading admission H&Ps and reviewing medication lists for psychotropic medications. There were three tiers of screening acuity. The highest acuity level included patients admitted after suicide attempts and/or with suicidal ideation, patients with a schizophrenia diagnosis, and patients with behavioral alerts for histories of violence in the hospital. The second tier included a broad array of symptoms and diagnoses, such as depressive or anxiety symptoms, depressive or bipolar disorder diagnoses, and others. The third tier was for patients with what appeared to be substance use disorders without active psychiatric conditions. The psychiatrist and NP would usually see the highest tier patients on the day of detection. Patient contact ran a spectrum from checking in with nurses or physicians, “curbside” consults with or without documentation, brief face-to-face interactions, all the way up to a full consult. We defined full consults as documented collection of comprehensive history plus examination and formulation with treatment recommendations. In the current study, we compared full consults by the proactive team physician or nurse practitioner with full consults in the reactive model, as other proactive service contacts were not comparable in complexity or level of service, and informal and “curbside” consults to the reactive service were not well tracked or recorded. Prior to implementation, we introduced and explained the proactive model to nursing staff, resident physicians, and attending physicians.

The reactive consult service included an attending psychiatrist and two to three psychiatry residents, as well as an occasional neurology resident-in-training. The reactive consult service covered medical units not covered by the proactive service, as well as surgical, neurology, oncology, obstetrics/gynecology, and critical care units, but not the emergency department. The traditional consult team also operated during weekday hours, but would also field consult requests by phone or pager on evenings and weekends.

2.3. Patient and admission characteristics

We collected hospital administrative information, patient demographics, and clinical data from the electronic health record (EHR) and from institutional administrative data collection systems. Patient income was estimated using median household income in the patient's home address ZIP code, derived from the United States Census Bureau's 2017 American Community Survey [16]. Clinical variables included primary diagnoses and whether or not an ICU stay was part of the episode of care.

2.4. Outcomes

We sought to determine whether the proactive model affected length of stay, compared to the reactive model. We first compared length of stay for patients seen by the proactive team to those seen contemporaneously by the reactive team on other general medical units. In order to account for any differences between the intervention and comparison units, we also compared length of stay for patients seen by the proactive team to that of patients seen the preceding year on the same units by the reactive team.

We extracted length of stay and time to consult data from the EHR. Time to consult was a measure of time of admission to time of documentation of consult (note that a patient stepped down to an intervention unit from an intensive care unit or transferred from another service would have a longer time to proactive consult, but not reactive consult). We extracted readmission data from a state database that links admissions to subsequent admissions to any hospital in the state within 30 days.

We assessed nursing and physician satisfaction with psychiatric resources on the intervention units using a section of a validated tool developed for providers in the emergency setting, the Behavioral Health Care Competency Survey [17]. We sent nurses working on the intervention units a 23-question survey electronically. However, since a number of the questions focused on topics beyond the scope of our intervention, we administered a shorter version of the survey to physicians. We distributed the pre-test surveys in the weeks prior to the proactive service implementation and again 90 days later.

2.5. Data sources

We tracked completed consults for the proactive intervention via an online, secure web application linking the EHR and a hospital database. This web application stored information from the EHR and hospital database, combined with information regarding assessments and interventions entered by members of the proactive consult team. We collected data for the simultaneous and prior year reactive consult comparison groups. We merged these three data sources into a single database for analysis.

The Johns Hopkins Institutional Review Board acknowledged this study as a Not-Human-Subjects-Research (NHSR)/Quality Improvement effort.

2.6. Data analysis

We first summarized descriptive demographic, administrative, clinical and outcome data. We report continuous data as means (with standard deviations) and proportions as percentages. We defined statistical significance a priori as alpha = 0.05. As length of stay (LOS) was

not normally distributed, we log-transformed this variable for most analyses.

We compared the length of stay for patients with proactive consults to patients with standard, reactive consults both during the intervention period (on the units not covered by the proactive service, a contemporary analysis) and in the prior year on those units that were later covered by the proactive service (a pre/post analysis). We performed chi-square tests for categorical data and *t*-tests, ANOVAs or linear regressions for dimensional data, with log transformation for LOS.

We analyzed Likert scale survey results regarding perceived psychiatric resources using Mann-Whitney-Wilcoxon tests [18].

We performed statistical analyses using R statistical software, version 3.5.1.

3. Results

During the intervention year, 1792 out of the 4303 admissions (42%) screened "positive" on the three proactive service units. During the intervention year, the proactive team performed 311 full consults (7.2% of all admissions), while the reactive service performed 224 consults on five other general medical units, which had 6908 admissions (3.2% of total admissions). During the preceding year, the reactive consult team performed 163 consults on the three intervention units, which had 4805 admissions (3.4%).

Baseline (pre-intervention) length of stay was longer on the intervention units than on the comparison units (5.86 vs. 5.57 days, $p = 0.04$). Compared to the baseline year, during the intervention year overall length of stay increased for admissions to both the proactive units (5.86 to 6.10 days, $p = 0.17$) and the comparison units (5.57 to 5.78 days, $p = 0.16$). Though length of stay remained longer on the intervention units during the intervention year, the difference was no longer statistically significant.

3.1. Bivariate contemporary analysis (Table 1)

Patients seen by the proactive consult team were over four years older on average than those seen by the reactive service during the intervention period and were less likely to be white ($p = 0.02$). There was no group difference in income by zip code. Proactive consult patients were more likely to have Medicare as their primary medical insurance ($p < 0.001$). There was no difference between the groups in whether or not the episode of care involved an ICU stay. Proactive consult admissions were more likely to have primary circulatory diagnoses ($X^2 = 9.66$, df = 1, $p = 0.002$) or diseases of blood and blood-forming organs ($X^2 = 4.25$, df = 1, $p = 0.04$); otherwise, there were no significant differences in primary diagnoses. Time to consult was shorter for proactive consults, 2.23 versus 2.90 days, as was LOS (6.68 versus 8.20 days). There were no significant differences in hospital

Table 1
Bivariate contemporary analysis.

	Reactive $n = 224$	Proactive $n = 311$	TS, (d.f.), p value
Demographics			
Age (s.d.)	49.37 (16.83)	53.82 (17.46)	T = −2.97, (490.63), 0.003
Female	57%	53%	$X^2 = 0.70$, (1), 0.40
Race			
Black	43%	51%	
White	53%	42%	
Other	4%	6%	$X^2 = 6.78$, (2), 0.03
Mean income by zip code	$61,501.99	$59,551.14	$T = 0.59$, (518), 0.55
Administrative			
Insurance			
Commercial	20%	14%	
Medicaid	41%	34%	
Medicare	34%	50%	
Self-pay/other	4%	2%	$X^2 = 13.83$, (3), 0.003
Complexity			
ICU stay	12%	7%	$X^2 = 2.78$, (1), 0.10
Principal diagnoses			
Infectious disease	11%	9%	
Neoplasms	1%	2%	
Diseases of blood & blood-forming organs	<1%	3%	
Endocrine, nutritional & metabolic diseases	10%	11%	
Mental, behavioral & neurodevelopmental disorders	12%	9%	
Nervous system diseases	5%	2%	
Circulatory system diseases	8%	17%	
Respiratory system diseases	8%	7%	
Digestive system diseases	12%	10%	
Diseases of skin & subcutaneous tissue	2%	2%	
Diseases of musculoskeletal system, connective tissue	4%	3%	
Genitourinary disease	4%	5%	
Symptoms, signs, ill-defined	7%	8%	
Injury and poisoning	16%	13%	
Other	<1%	<1%	$X^2 = 22.82$, (14), $p = 0.06$
Hospital course			
Days to consult	2.90 (3.16)	2.23 (2.83)	T = −2.54, (448.34), 0.01
Length of stay (days)	8.20	6.68	T = −2.79, (439.88), 0.005
log length of stay	1.81	1.55	T = −3.59, (507.44), <0.001
30-day readmission	20%	18%	$X^2 = 0.37$, (1), 0.54
Disposition			
Inpatient psychiatry	17%	13%	$X^2 = 1.89$, (1), 0.17

Caption: T.S. = test statistic, d.f. = degrees of freedom, T = ANOVA T value, X^2 = chi squared.

Table 2
Bivariate analysis pre/post analysis.

	Prior year	Current year	TS, (d.f.), p value
	Reactive	Proactive	
	n = 163	n = 319	
Demographics			
Age (s.d.)	52.18 (17.55)	53.82 (17.46)	T = −0.97, (327.98), 0.33
Female	58%	53%	X^2 = 0.92, (1), 0.34
Race			
Black	46%	51%	
White	47%	42%	
Other	7%	6%	X^2 = 1.27, (2), 0.53
Geographic SES	$56,218.48	$59,551.14	T = −1.05, (456.77), 0.29
Administrative			
Insurance			
Commercial	17%	14%	
Medicaid	41%	34%	
Medicare	34%	50%	
Self-pay/other	8%	2%	X^2 = 18.51, (3), <0.001
Complexity			
ICU stay	13%	7%	X^2 = 3.82, (1), 0.05
Principal diagnoses			
Infectious disease	7%	9%	
Neoplasms	0%	2%	
Diseases of blood & blood-forming organs	2%	3%	
Endocrine, nutritional & metabolic diseases	7%	11%	
Mental, behavioral & neurodevelopmental disorders	17%	9%	
Nervous system diseases	6%	2%	
Circulatory system diseases	9%	17%	
Respiratory system diseases	4%	7%	
Digestive system diseases	10%	10%	
Diseases of skin & subcutaneous tissue	2%	2%	
Diseases of musculoskeletal system, connective tissue	2%	3%	
Genitourinary disease	5%	5%	
Symptoms, signs, ill-defined	4%	8%	
Injury and poisoning	24%	13%	
Other	1%	<1%	X^2 = 32.12, (14), 0.004
Hospital course			
Days to consult	3.38 (3.68)	2.23 (2.83)	T = −3.49, (264.75), <0.001
Length of stay (days)	8.54	6.68	T = −2.84, (269.88), 0.005
log length of stay	1.77	1.55	T = −2.54, (310.43), 0.01
30-day readmission	15%	18%	X^2 = 0.54, (1), 0.46
Disposition			
Inpatient psychiatry	21%	13%	X^2 = 4.73, (1), 0.03

Caption: T.S. = test statistic, d.f. = degrees of freedom, T = ANOVA T value, X^2 = chi squared.

readmissions within 30 days or admissions to inpatient psychiatry.

3.2. Bivariate pre-/post analysis (Table 2)

There were no significant demographic differences between patients with full consults by the proactive team and those seen by the reactive consult team the preceding year on the three intervention units, though patients seen by the proactive team were more likely to have Medicare (X^2 = 13.12, df = 1, p < 0.001) and less likely to be self-pay (X^2 = 10.16, df = 1, p < 0.001) during the proactive intervention year. The reactive consult team saw a higher percentage of patients with an ICU stay as part of the admission, though proactive team providers saw a greater absolute number of patients with ICU stays (23 versus 21). Patients were more likely to have an injury or poisoning diagnosis (X^2 = 8.80, df = 1, p = 0.003) or mental health diagnosis (X^2 = 6.58, df = 1, p = 0.01) as their primary diagnosis during the preceding year, though the absolute numbers of patients in these diagnostic groups were similar across years. Primary circulatory diagnoses (X^2 = 4.98, df = 1, p = 0.03) were more common during the intervention year.

Time to consult was shorter for the proactive service (2.23 days versus 3.38 days) and length of stay was shorter for the proactive service (6.68 versus 8.54 days). The latter remained statistically significant after log conversion. The proactive service had a smaller percentage of admissions transferred to inpatient psychiatry (13% vs. 21%, p = 0.03), though the total number of patient transfers to psychiatry was higher in the intervention year (41 vs. 34).

3.3. Predictors of LOS

To clarify the relationship of LOS (log transformed) with consult group (proactive, reactive, prior year), we performed a multivariable linear regression followed by automated stepwise model simplification (using R function step). In addition to consult group, the initial model included the following predictors: age, sex, race, socioeconomic status, insurance type, primary diagnosis, and whether an ICU stay was part of the admission. Because Medicare eligibility is primarily dependent upon age, we added an interaction term for insurance type by age to the model a priori. Similarly, we added an interaction term for insurance type by socioeconomic status. The final simplified model included consult group, age, insurance type, ICU stay, primary diagnosis and socioeconomic status. As predicted by this model, relative to consults

seen by the reactive team contemporaneously and during the preceding year, patients seen by the proactive team had shorter lengths of stay (antilog Beta = 0.77 days, 95% CI = 0.67–0.89 days, $p < 0.001$), and LOS for the reactive group was statistically indistinguishable from the proactive units during the prior year group ($p = 0.78$). Increasing age predicted longer LOS (antilog Beta = 1.04 days, 95% CI = 1.00–1.09, $p = 0.05$), as did ICU stays (antilog Beta = 2.07 days, 95% CI = 1.68–2.55 days, $p < 0.001$) and socioeconomic status (antilog Beta = 1.03 days, 95% CI = 1.01–1.04 days, $p = 0.005$). According to this model, each decade of age added 1.04 days to length of stay and each additional $10,000 in income by zip code correlated with an extra 1.03 days in the hospital. Diagnostic category was retained in the final model, though differences in LOS for individual categories were only at a trend level except for three diagnostic categories which predicted shorter stays: "Symptoms, Signs, and Ill-defined Conditions," (antilog Beta = 0.51 days, 95% CI = 0.31–0.83 days, $p = 0.008$), Nervous conditions (antilog Beta = 0.57 days, 95% CI = 0.34–0.98 days, $p = 0.04$) and Injury/Poisoning (antilog Beta = 0.61 days, 95% CI = 0.39–0.98 days, p = 0.04).

3.4. Staff satisfaction

3.4.1. Nursing satisfaction (Fig. 1)

The nursing participation rate with surveys was consistent pre- and post-implementation (43% pre- and 39% post-). Prior to implementation, 61% of respondents somewhat agreed or strongly agreed with the statement "Help is available to me when I need assistance with patients who have co-morbid behavioral or psychiatric issues." This proportion rose to 80% after the implementation. Agreement with the statement in the post-period was statistically significantly higher than the pre-period by Mann-Whitney-Wilcoxon rank-sum test.

At implementation, 70% somewhat agreed or strongly agreed "Hospital resources are available to me when I need assistance with behavioral health, or psychiatric issues, or substance abuse issues," and this increased to 82% ninety days later. Though there was greater agreement with this statement after the proactive service began, the difference was not statistically significant ($p = 0.12$).

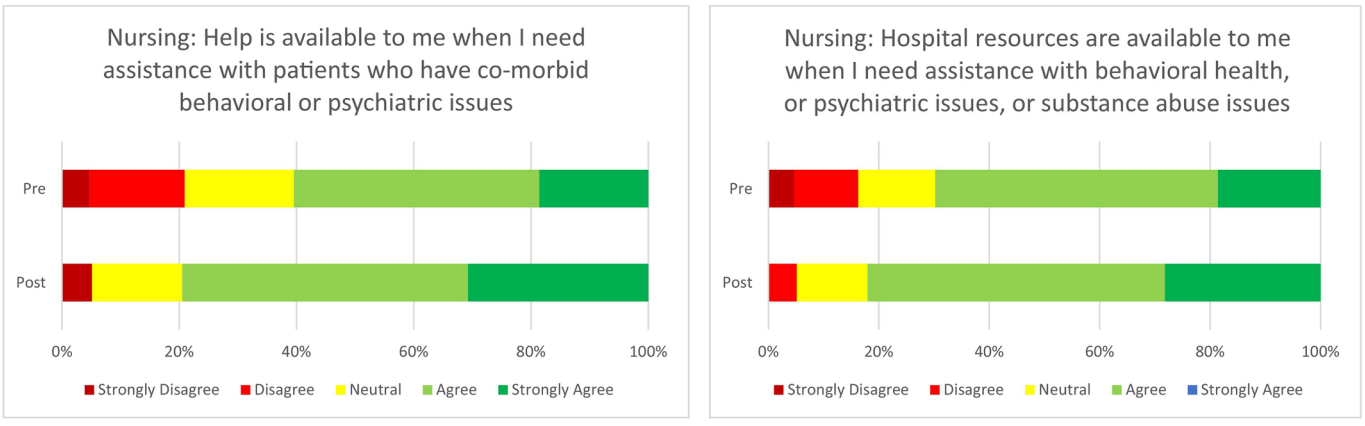
3.4.2. Physician satisfaction (Fig. 2)

The participation rate for physicians was high for the pre-survey (78%, 14/18) and 90 days after (89%, 16/18) in the post-implementation survey. For the statement "Help is available to me when I need assistance with patients who have co-morbid behavioral or psychiatric issues," 21% either strongly agreed or somewhat agreed, and this rose to 87% of responding physicians after the intervention began. This change was statistically significant.

For the statement "Hospital resources are available to me when I need assistance with behavioral health, or psychiatric issues, or substance abuse issues," 36% somewhat agreed or strongly agreed pre-implementation, and 94% somewhat agreed or strongly agreed post-implementation, when only one respondent somewhat disagreed (no physician strongly disagreed). The improvement in perceptions of availability of psychiatric resources was statistically significant. Of note, the physician who marked "somewhat disagree" added comments that the program had been beneficial, but that weekend coverage and expansion of services beyond the target units were needed. Other comments added to surveys were unanimously positive about the intervention.

4. Discussion

Increased demand for psychiatric services in non-psychiatric care settings has prompted hospitals to explore new approaches to delivering needed care [19,20]. Beneficial effects on length of stay for patients with psychiatric morbidity might represent a feasible cost offset for new consultation programs in under-resourced settings. In our study, patients in need of psychiatric consults had shorter lengths of stay in the hospital using the proactive approach than using the traditional, reactive consult model, offering a potential model to fill a gap in needed psychiatric care. In fact, patients seen by the proactive team were significantly older when compared to the contemporaneous reactive consults cohort, and greater age correlated with longer stays, yet patients seen by proactive consultants stayed less time. The length of stay improvement for these patients did not affect the overall length of stay for all admissions to the proactive consult units, unlike the study reported by Sledge and colleagues [12]. We can, however, estimate cost savings for the PHIPPS cohort based on shorter LOS. The unit rate for a night on a medical/surgical acute unit at the hospital for the study period was $1996.77 (1/4 the rate for fiscal year 2016, 3/4 the rate for fiscal year 2017; rates changed for the year beginning July 1). Just looking at the study period, this cost amount × 311 patients × 1.52 days shorter LOS would represent $943,913.11. Compared to the prior year, using the same cost, same number of patients and shorter LOS by 1.86 days, the savings would be $1,155,051.57. By either measurement, this more than covers the cost of the program, which was $477,207 in salary and benefits. One could speculate that there may be more actual savings involved, as these consults represent only a small fraction of the total number of patients seen by the team,



Wilcoxon rank sum test with continuity correction
W = 1042, p-value = 0.05

Wilcoxon rank sum test with continuity correction
W = 992, p-value = 0.12

Fig. 1. Nursing satisfaction.

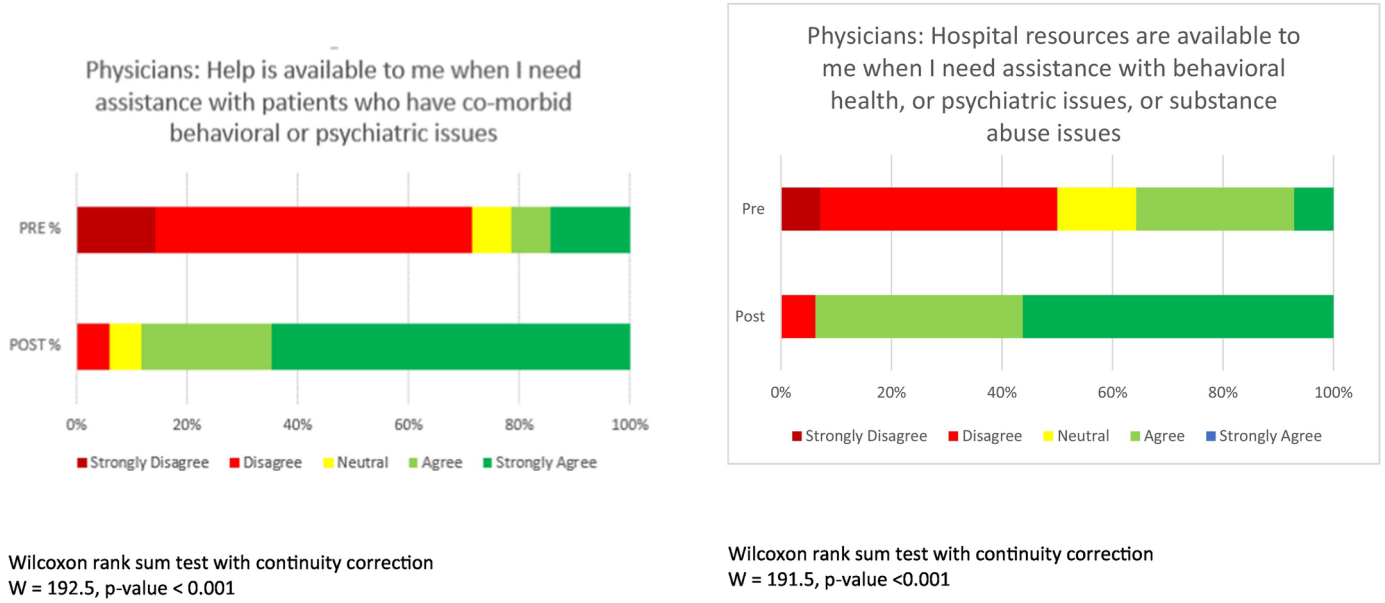


Fig. 2. Physician satisfaction.

though this would require a different study design. Length of stay improvement, even in places where it may not necessarily mean direct cost savings, can be a useful indicator for hospitals that patients who need acute care can access needed services. Shorter time in the hospital for patients with psychiatric morbidity means more availability of beds for patients in EDs in need of acute medical care. Boarding of medical patients in EDs continues to be a problem throughout the U.S. and a focus of quality and safety improvement efforts [21,22].

The proactive consult rate was higher than the reactive consult rate. Thus, one might wonder whether the proactive team performed consults on less psychiatrically ill patients, with shorter LOS, than the reactive team. We know of no reliable indices of overall psychiatric acuity on general medical floors. Notably, however, the proactive team transferred a larger number of patients to inpatient psychiatry units than the reactive team. This suggests either that the proactive screening process was more effective in recognizing need for psychiatric care than the reactive model, or that for unclear reasons the intervention units had higher psychiatric acuity during the study period. In fact, this greater number of psychiatric admissions from the proactive team came from fewer hospital beds (69 proactive, 104 reactive).

Time to consult was shorter using the proactive approach compared to the traditional, reactive model. A primary advantage of the proactive model is that the psychiatry team is aware of patients with psychiatric issues nearer the time of admission and able to intervene early, rather than waiting for a consult request from the teams. Shorter time-to-consult on the proactive consult units may account for at least part of the shorter overall length of stay.

There were no significant changes in readmission rates with the intervention. We did not anticipate that the readmission rate would change with the intervention, as many factors that contribute to readmissions were not within the scope of the project, beyond acute psychiatric care and triaging. Increasingly, readmission rate is being questioned as a marker of quality of care [23,24], though this remains a variable by which many hospitals' performance is currently assessed.

During our preparations to put together a proactive psychiatry consult service, we heard anecdotally that the proactive approach, using a team including psychiatric nursing and social work, had a positive impact on culture. There are a number of intangibles involved in expansion of psychiatric consults, including with a proactive approach using a multidisciplinary team. Capturing a positive cultural change can be a challenge. Nonetheless, nursing and physician satisfaction with adequacy of psychiatric resources after the implementation improved considerably, when compared to perceptions prior to implementation. We appreciated a qualitative change, but further development of useful metrics to capture these effects is needed. Longer-term study of nursing turnover and nursing and physician wellness/burnout, perceptions of safety, observer use, etc. would be useful additions.

4.1. Limitations

We did not randomize patients in this study. Given the nature of the intervention, this was impracticable. We attempted to statistically control for potentially relevant variables and employed two comparison groups to address cohort (time) and unit (staffing) effects, but we cannot rule out unmeasured confounding. There were differences between patients seen by our proactive team and those seen contemporaneously by our reactive service, but these differences should have lengthened stays on our proactive units (the patients were older and more likely to have Medicare). We cannot explain why a greater percentage of patients who received a psychiatry consult on the same floors had Medicare from one year to the next. There was no change in the fundamental missions or staffing of the floors.

General medical admissions without psychiatric co-morbidities generally have shorter lengths of stay than those with psychiatric co-morbidities [10]. Lowering the threshold for psychiatric interventions might mean that proactive consultants evaluated patients with less acuity and shorter lengths of stay. However, we handled lower psychiatric acuity cases with brief notes, even “curbsides,” and such interventions were not the focus of the current study. Unfortunately, there are few reliable metrics of psychiatric acuity. The commonly used diagnosis related groups (DRG) system does a poor job of accounting for variance in cost for psychiatric admissions [25,26] and thus is likely an inadequate marker of the impact of active psychiatric conditions on length of stay and cost on medical units. Acts of violence and other aggression in healthcare settings are underreported [27,28] and would not capture the much broader array of psychiatric needs on medical units. We do not have reliable data on restraint use. Our hospital changed from one EHR to another during the intervention year and we could not reliably query the available data. Further study to identify reliable measures of psychiatric acuity and complexity is needed. It is worth noting that the number of patients transferred to inpatient psychiatry (a possible marker of acuity and psychiatric need) increased

21% from the prior year with our intervention, raising the possibility of under-detection of cases with the reactive consult model.

Nurses, for the most part, worked primarily on a single unit, though some occasionally work shifts on other units. Physicians, particularly residents, covered a number of different medical units. It is difficult to assess with certainty any carryover effects this might have had on outcomes. Patient management or problem-solving experience gleaned from interactions with the proactive, multidisciplinary approach would likely be a boon to patient care and might have diluted the impact of the proactive approach. Physicians were more likely to work on both proactive and reactive model units concurrently or sequentially, and this likely positively affected satisfaction; we observed anecdotally that physicians with patients on other units complained about not having access to the proactive team on those units.

Though we measured length of stay in days/h/min, we could only measure time to consult in days, due to shortcomings in data collection. The impact this may have had on time to consult is unknown, though this affected all of the groups we studied.

While we have reliable data on principle diagnoses related to the patients' episodes of care, we do not have data on psychiatric diagnoses or complaints for either reactive or proactive consults. The study involved a time period straddling the use of two different electronic health record systems, and unfortunately we had no practical way to extract psychiatric diagnostic information reliably.

The nursing survey response rate was low. We asked the medicine nurses to fill out a much longer survey than the physicians, and this likely negatively affected participation. It is difficult to say what bias this may have introduced. In addition, the discrepancy between nurses' and physicians' perceptions of psychiatric resources before the proactive team implementation is notable. Pre-testing of nursing satisfaction with psychiatric resources was likely influenced by prior experience with the psychiatric NP formerly tasked with reactive consults throughout the Department of Medicine. This was the same NP recruited to the proactive team, creating a potentially awkward question for nursing staff: was the NP doing an adequate job before the implementation, despite covering more units with less support? In retrospect, we should have considered a more nuanced question to account for the NP's prior relationship with the medical unit nurses. Finally, the improvement in staff satisfaction may be due more to providing additional psychiatric resources than to qualities implicit in the proactive program itself. We do not have data on the number of follow up visits for patients during an episode of care, though suspect this may play a role in provider satisfaction, as the physician, NP and social worker adopted a practice of following patients with active psychiatric issues until discharge or transfer. Future studies should address any benefits of earlier consultation, shorter stays and any specific benefits of using a multidisciplinary team. We suspect that the multidisciplinary team does make a difference, possibly on both length of stay and consultee satisfaction. However, we have no way to test this hypothesis with our study design. We can say, from experience, that having multiple disciplines does affect how consults develop and are handled. For example, the psychiatrist consultant typically will be steered towards more medically complex patients, the psychiatric nurse practitioner towards patients who need more medical nursing behavioral interventions, and the psychiatric social worker towards patients suffering with grief and demoralization. However, morning rounds are multidisciplinary, and team members frequently reach out to each other to weigh in, go and see patients/medical teams, and help with disposition/follow-up.

4.2. Conclusions

Proactive psychiatric consults can have a beneficial impact on length of stay for patients with psychiatric needs on general medical units. Reimbursement models are evolving, which affect incentives tied to some metrics including length of stay, but there is still value in providing timely consults, and the qualitative and quantitative effects of the approach merit further study. Both nursing and physician satisfaction with adequacy of psychiatric resources improved considerably with our intervention. Further work should focus on other benefits to hospital staff and patients, including measures of safety and psychiatric outcomes.

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