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Changes in Hospital Utilization among Seriously Mentally Ill Patients Following Enrollment in an Integrated Primary and Behavioral Health Care Program

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Changes in Hospital Utilization among Seriously Mentally Ill
Patients Following Enrollment in an Integrated Primary and
Behavioral Health Care Program

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Changes in Hospital Utilization among Seriously Mentally Ill Patients Following Enrollment in an Integrated Primary and Behavioral Health Care Program

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Abstract

Persons diagnosed with serious mental illness (SMI) suffer from significant health disparities with respect to mortality, morbidity and health care access. The SMI population frequently over-utilizes hospital services, especially emergency department care, and often lacks adequate primary care. This retrospective longitudinal study investigated whether SMI patients changed their hospital utilization patterns when enrolled in an integrated primary care and behavioral health program and how these changes affected hospital costs. The study tracked the hospital utilization of 343 patients for up to 12 months before and after their enrollment. Results showed a significant decrease in total ED visits and the number of patients who over-utilized the ED, although the number and length of inpatient visits remained stable. The analysis of costs associated with changes in ED utilization indicated that integrated primary and behavioral health care can reduce Medicaid costs but may result in greater costs to hospitals under a fee-for-service model. These findings suggest that integrated care can effectively decrease ED utilization for the SMI population, as well as reduce Medicaid spending.

Introduction

According to data from the National Hospital Ambulatory Medical Care Survey (NHAMCS), emergency department (ED) utilization increased from 108 million visits in 2000 to 129.8 million visits in 2010.ⁱ Many attribute this increased ED volume to patients being seen for non-urgent care that could be addressed in a primary care setting.ⁱⁱ Lack of regular access to primary care has indeed been associated with inappropriate utilization of ED services.^{iii iv} The increased patient volume results in ED overcrowding, ambulance diversion, reduced physician productivity, staff burnout, and longer wait times for patient care.^v It has also been shown that those with Medicaid insurance disproportionately utilize ED services for primary care purposes compared to those with private insurance.^{vi} Reasons for increased ED utilization are sometimes attributed to convenience such as difficulties scheduling appointments with primary care provider (PCP) or the perception that the ED is more accessible at any time of the day.^{vii} Other factors can be attributed to not having established primary care or the general public's misunderstanding that the ED should be used for non-emergent medical issues. Inappropriate ED utilization can lead to increased medical costs along with decreased long-term quality of care for the patient.^{viii, ix}

Individuals with behavioral health problems, including both psychiatric and substance abuse diagnoses, are more likely to be frequent users of the ED.^x From 1992-2003, the number of ED visits for those with mental health issues increased 75% compared to a 23% increase in utilization in the general population.^{xi} Those with serious mental illness (SMI), including schizophrenia, bipolar disorders and chronic depressive disorder, have been identified as being some of the highest utilizers of ED services.^{xii} The 2008 and 2009 National Survey on Drug Use and Health found an increased ED utilization (47.6%

versus 30.5%) and inpatient admissions (20.4% versus 11.6%) for SMI patients compared to those without mental illness, respectively.^{xiii} Patients diagnosed with affective disorders have been found to utilize the ED more than the general population even when receiving adequate outpatient psychiatric services.^{xiv} Unfortunately, recurrent visits to the ED by those with SMI are linked to increased hospitalizations compared to those without serious mental illness.^{xv}

The Substance Abuse and Mental Health Services Administration (SAMHSA), an agency within the U.S. Department of Health and Human Services, has partnered with the Centers for Medicare and Medicaid Services to develop the Primary and Behavioral Health Care Integration (PBHCI) Program. The main objective of the PBHCI Program is to improve health care outcomes for the SMI population by funding health care agencies across the nation to start their own integrated health care models that focus on improved behavioral and primary care delivery. These unique integrated health care delivery models hopefully will improve the quality of health care of the SMI in addition to reducing costs to Medicaid and Medicare services. To date, no studies have definitively determined if integrated health care has led to a reduction in utilization of health care services or health care spending.

This retrospective, longitudinal study investigated whether SMI clients served by an integrated behavioral and primary health care program experienced a significant decrease in hospital utilization patterns by the SMI. All primary care, ED, inpatient medical and inpatient psychiatry visits for all clients enrolled up to a year before and after starting services were examined. The other aim of this study was to see how the changes in health

care utilization affected Medicaid spending and hospital profits. It is felt that integrated care will lead to more appropriate care along with reduced costs to Medicaid.

Background

A person is considered to have a SMI if they have a mental illness lasting at least 12 months that results in significant functional impairment affecting one or more activities of daily living.^{xvi} The most common conditions classified as serious mental illnesses are major depressive disorder (MDD), schizophrenia, posttraumatic stress disorder (PTSD) and bipolar disorder. The SMI population in the United States was estimated to be 10.4 million in 2012, which translates to approximately 1 in 30 individuals.^{xvii}

The SMI population is identified as a high risk population in need of improved health care delivery. Evidence shows that the SMI have an expected mortality of 25 years earlier than expected from the general population.^{xviii} A recent meta-analysis using 148 studies found that those with mental illness have a significantly higher relative risk of mortality compared to those without illness, with a median potential life loss of nearly 10 years.^{xix} The SMI population has been shown to have higher rates and severity of comorbid medical conditions compared to the general population, conditions such as diabetes, lung disease, HIV, hepatitis B, hepatitis C and other conditions of the liver.^{xx} ^{xxi} Those with mental illness are seven times more likely to have either an alcohol or drug problem compared to those without mental illness.^{xxii} SMI clients are also more likely to be current smokers (38.1-59.1%) compared to those without mental illness (18.3%).^{xxiii} Higher morbidity among the SMI costs the United States an estimated \$193.2 billion dollars annually.^{xxiv}

A majority of the health care for SMI clients is paid for by Medicaid or by those patients who are not insured. Approximately 49% of all Medicaid beneficiaries suffer from mental illness, a percentage that is nearly twice the prevalence rate of the general U.S. population (28%), but almost identical to the uninsured population (51%).^{xxv xxvi} The increased prevalence of mental illness in this population has placed a substantial financial burden on Medicaid, especially with many states expanding their qualifications for Medicaid eligibility under the Affordable Care Act (ACA).

There is also a question whether SMI Medicaid clients are not getting the appropriate quality care under the current health care delivery system. Although the 1994 National Health Interview Survey found that those with mental illness were as likely to have Medicaid insurance and to have a PCP as those without psychiatric disorder, it also found that they were less likely to have access to certain types of care providers and receive the same quality of care. This same study found that persons diagnosed with mental illness were twice as likely to report delayed medical care due to costs and being unable to obtain care when needed compared to those without mental health problems.^{xxvii} Certain subgroups with SMI may be especially vulnerable to inadequate care. In one study patients with psychotic and bipolar disorders were less likely to have a PCP compared to those without mental illness, resulting in poorer health outcomes.^{xxviii}

With recent implementation of the ACA, experts have argued for more emphasis on the Triple Aim Approach to improving care for this population. The Triple Aim Model is centered on improving access and patient satisfaction to care, improved quality and delivery of health care, and finally, reducing health care expenditure.^{xxix} As stated in the introduction, SAMHSA and the Centers for Medicaid and Medicare Services (CMS) have

provided funding to local community-based organizations to improve the delivery of health care for the SMI through integrated health care programs, such as the Primary and Behavioral Health Care Integration (PBHCI) program. Integrated care is the active collaboration of psychiatric, primary care and other health care professionals to improve the delivery of health care for a population. This model has been shown to improve both access and the effectiveness of care for comorbid medical conditions.^{xxx} The goal of the SAMHSA PBHCI program is to see if communities can develop their own health care delivery model that addresses the Triple Aim Model as stated above.

The CMS have not only addressed the Triple Aim Approach through new health care service models, but through new payment models as well. The CMS is also researching Accountable Care Organization (ACO) models that will hopefully reduce the financial burden of health care expenses.^{xxxi} Currently, Medicaid and Medicare operate under a fee-for-service model. Under the traditional fee-for-service model, practitioners are paid based on the services they provide. It has been debated that this payment model may have the potential to drive up health care costs because it can encourage practitioners to maximize their profits through offering the maximum amount of medical services.^{xxxii} This may also encourage some health care providers to push patients towards or away from certain medical services due to potential profits, not overall health benefit.

ACOs proposed by CMS that are now being tested in the Medicare system will use a capitation model where hospitals will receive a bundled payment for a population for whom they are responsible.^{xxxiii} Section 3022 of the ACA would allow health care systems to share the savings in cost under ACO models if they deliver both higher quality of care and reduce cost for Medicare patients.^{xxxiv} These measures can be, but are not limited to

items such as what percent of patients receive appropriate preventative services, how well controlled a patient's comorbid conditions are, to how often people are hospitalized. As one can imagine, an ACO model caps the amount of money spent by Medicare, thus putting the financial burden on the provider to provide high quality care. There is already considerable discussion to include behavioral health services as a priority of the Medicaid and Medicare ACO movements.^{xxxv} It is conceivable that these ACO models may eventually extend to Medicaid. As a result, hospitals and other health care systems may need to find new delivery of care methods that will target high risk populations, such as the SMI, and find ways to reduce their health care expenditure while improving their long term health.

Another major question that has been raised is how the ACA affects health care utilization. A recent analysis found that the same increase in ED inpatient and outpatient services occurred after the implementation of Massachusetts Health Care Reform laws requiring its citizens to have health care insurance when compared to other states without such regulations.^{xxxvi} If so, similar outcomes might occur once the ACA becomes fully effective. New health care delivery models that complement ACA reform may be needed to help reduce ED utilization for this subset of the population, models such as integrated health care models emphasizing primary and behavioral health care. Whether integrated care will affect patterns of hospital utilization and their impact on health care spending has not been addressed in the literature.

The present study seeks to utilize both hospital and behavioral health data collected from participants in the Options to Health (O2H) Program, an integrated primary care and behavioral health program serving SMI clients. The purpose of the study is to determine if

integrated health care is associated with changes in hospital utilization and with health care spending. This single group pre-post design study investigated whether participants in O2H changed their use of hospital services after enrolling in the integrated care program. This population was especially vulnerable because these clients did not have an established PCP before entering the O2H program. It was hypothesized that SMI patients would have fewer ED and inpatient hospital visits, including length of stay, after enrolling in the integrated care program compared to their utilization before enrollment. The study also examined whether particular client characteristics were associated with patterns of hospital utilization. The final objective of this study was to investigate how any changes in hospital utilization associated with the integrated health care program might affect Medicaid spending and hospital costs. Finally, the discussion will briefly touch on how each of these spending changes would impact these findings have on Medicaid spending hospitals profits under a fee-for-service and the new ACO models.

Intervention

In 2010, Community Mental Health Affiliates (CMHA), a non-profit corporation providing psychiatric services, and The Hospital of Central Connecticut (THOCC) in New Britain, CT collaborated to implement O2H. The objectives of this program are to provide improved health care to SMI patients that are consistent with the Triple Aims Approach discussed previously. This 4-year pilot program was funded through the SAMHSA's PBHCI initiative in order to test different models of integrated care and their impacts on the health and well-being of SMI patients. Primary care is provided by O2H staff through the outpatient clinic at THOCC, a 414-bed hospital located within two blocks of CMHA.

Most patients are residents of New Britain, a city of 73,206 people, or from the immediate surrounding area.^{xxxvii}

The objective of the O2H program is to create an integrated health care system that allows for optimal health and quality of life of SMI patients. All CMHA patients over the age of 18 without an established primary care provider who are classified as having a SMI are eligible for this program. All participants who agree to enroll in the program are seen in the medical clinic by an advanced practice registered nurse (APRN) with experience treating behavioral health patients with supervision from an attending physician. A full history and physical is performed and as needed, referrals for appropriate medical services are made to other specialty care, including a smoking cessation program, exercise physiologists, dietitians and other care centered on promoting overall wellness and health. The APRN provides education to patients on various medical topics pertaining to their personal health and provides continued care to meet their ongoing medical needs.

In addition to the APRN, the O2H team included a dedicated case manager who supports patients' access to care by helping them schedule and receive transportation to both medical and behavioral health appointments, as well as triages any concerns they may have about their health. She ensures that all health and behavioral health providers are kept up to date on the health of each patient. Patient information is also shared across the two providers' electronic health records systems. The patients sign privacy statements for both institutions so that information can be shared. **Figure 1** provides a visual overview of the O2H program.

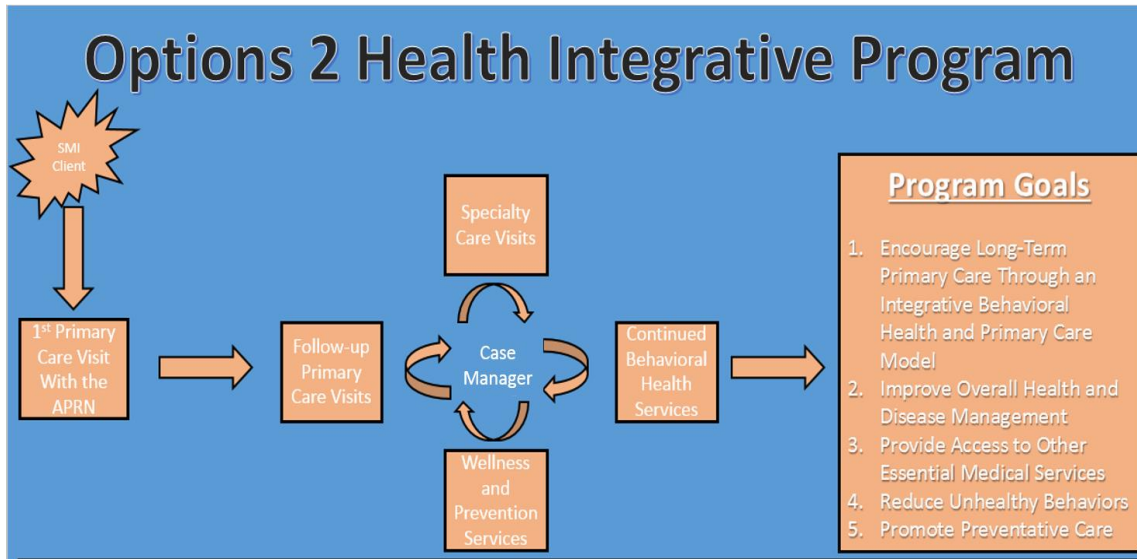


Figure 1: Options to Health: An Integrated Primary and Behavioral Health Care Program

Study Design

A retrospective, longitudinal review of hospital records was conducted of all patients enrolled in the O2H program in order to determine their use of hospital services for up to 12 months before and after enrolling in the integrated care program. The pre-post period was adjusted for the amount of time the patient had been in the O2H program. If the patient was not enrolled in the program for one year, the pre-intervention period was adjusted to match the patient's time in the program. All patients who enrolled in the program and had at least the initial primary care visit were included in the study. No other exclusion criteria were used. The Institutional Review Boards of both the University of Connecticut School of Medicine and THOCC approved this study.

The database was constructed by abstracting information from the medical record for all hospital visits by O2H patients between April 2010 through January 2014, including

the patient medical record number, type of medical service rendered, admission date, discharge date, primary diagnosis for each visit (ICD-9 code) and up to ten secondary diagnoses for each visit. These hospital data were linked to data collected by CMHA from patients at enrollment in the O2H program, including age, gender, race, ethnicity, insurance coverage, level of care (residential or outpatient), self-reported health status, and psychiatric and substance abuse diagnoses. Race and ethnicity was coded as either being part of or not part of that particular group. This allowed for easier data analysis for those who belonged to multiple ethnic backgrounds. Once data matching was completed, the final database was de-identified for data analysis.

The dependent variables for this study were (1) the frequency of ED visits, (2) the number of visits to the ED that had an ICD-9 substance abuse diagnosis, (3) inpatient psychiatric and hospital medical admissions and (4) length of stay before and after starting the integrated program. All inpatient admissions were non-scheduled and were seen first in the emergency room before being admitted to either medical or psychiatric units. The ED visit was labeled as involving a substance abuse problem when the visit had a primary or secondary active ICD-9 diagnosis indicating substance abuse. The hospital utilization patterns of O2H patients were analyzed to determine if they varied by demographic and health characteristics of patients including age, gender, race, ethnicity, insurance, substance use disorders, psychiatric diagnosis, self-reported health at baseline and residential status. This study also looked to see if those who excessively utilized the ED changed before and after enrollment. This study used the most accepted definition of overutilization is four or more ED visits within a year.^{xxxviii} Finally, the average length of stay per person was calculated for all inpatient visits by taking the total number of days admitted for any given

service and dividing it by the total number of visits of O2H clients during that period of time.

THOCC provided all financial data, in a de-identified format, for all health care services rendered by their Medicaid population during the 2013 fiscal year. The data included average payment by Medicaid for each health care service in addition to the net profit or loss for each visit or day stayed in the hospital. These averages were then used to determine if there was any change in reimbursements by Medicaid for each service in addition to the net profit or loss that the hospital experienced from that change in health care utilization. Net profits or losses by the hospital were calculated as the total payment given to THOCC minus all associated costs for the visit in addition to all the expenses necessary to run a hospital system, with this sum being multiplied by the changes in utilization during the program for each individual type of service. These expenses included all inpatient and clinic fees in addition to ancillary services and other expenses such as utilities. The difference in money paid by Medicaid to THOCC was calculated using the change in health care utilization over the course of the program multiplied by the average cost per service.

Descriptive statistics were used to characterize the sample based on age, gender, race, ethnicity and psychiatric diagnoses. Repeated-measures ANOVA was used to determine significant utilization changes by the variables listed above. Fisher's exact test was used to determine if there was a change in the number of high utilizers in the ED before and after O2H enrollment. Statistical significance was set at a p-value less than or equal to 0.05. Statistical analyses were performed using SAS/STAT software version 9.3 (SAS Institute Inc., 2012).

Results

Approximately, a third of CMHA clients aged 18 or older were found eligible to receive integrated behavioral health and primary care services from O2H from April 2011 through January 2014 because they did not have a regular source of primary care. Three hundred forty-three patients enrolled in the O2H program between April 2011 and January 2014. The study group's average length of time in O2H was 292 days, with 54.5% of the patients enrolled for at least one year. At the time of O2H enrollment, 64 (18.7%) of the clients were in a residential treatment program, and 279 (81.3%) were receiving outpatient behavioral health treatment. As shown in Table 1, the average age of the patient population was 43.4 years, 55.4% were male, and their racial/ethnic profile was diverse, including Caucasian (55.7%), Hispanic (30.9%) and African American (14.9%) patients. Two-thirds of the O2H participants had only Medicaid for health insurance, 105 (30.5%) were eligible for both Medicare and Medicaid, and 4 (1.17%) was covered by Medicare only. The most common psychiatric diagnoses in this patient population were schizophrenia (30.9%), major depressive disorder (26.5%), and bipolar disorder (26.2%). One in five O2H participants were diagnosed with generalized anxiety disorder and/or post-traumatic stress disorder (PTSD). Substance use problems were common in this population of SMI clients: 67 (19.5%) had opioid or other drug dependency, 63 (18.4%) abused or were dependent on alcohol, and almost two-thirds (61.5%) were tobacco dependent with daily smoking habits.

Table 1: Demographic and Health Characteristics of O2H Patients (n=343)

	Mean	SD
Age	43.0 yrs.	12.04 yrs.
Sex	Number	Percent
Male	190	55.4%
Female	147	42.9%
Transgender	4	1.17%
Race/Ethnicity*		
Caucasian	191	55.7%
African American	51	14.9%
Hispanic	106	30.9%
Insurance Status		
Medicaid Only	225	65.6%
Medicare Only	4	1.17%
Medicare and Medicaid Dual Eligible	105	30.6%
Private Insurance	9	2.62%
Self-reported Health		
Excellent	14	4.08%
Very Good	27	7.87%
Good	95	27.7%
Fair	101	29.4%
Poor	55	16.0%
Psychiatric Diagnosis*		
Schizophrenia	106	30.9%
Bipolar Disorder	90	26.2%
Generalized Anxiety Disorder	64	18.7%
Major Depressive Disorder	91	26.5%
Obsessive Compulsive Disorder	5	1.46%
Posttraumatic Stress Disorder	64	18.7%
Substance Use Disorder		
Drug Use Disorder	67	19.5%
Alcohol Use Disorder	63	18.4%
Tobacco Use Dependency	211	61.5%

* Categories for race/ethnicity, psychiatric diagnosis and substance use disorder are not mutually exclusive and patients may fall into more than one category.

Prior to enrolling in O2H, 71.1% of the CMHA clients had one or more visits to the THOCC ED, 11.4% had an inpatient medicine stay, and 15.5% were admitted to the THOCC psychiatric inpatient unit. 17.8% of the O2H patients had only one ED visit in the year before enrolling in the program, 14.6% had two visits, 7.00% had three visits, and 21.6% had four or more visits. When bivariate analyses were conducted to determine if any patient characteristics (age, gender, race/ethnicity, self-reported health status, and psychiatric or substance use disorder diagnosis) was associated with ED utilization prior to enrolling in O2H, only Hispanic ethnicity was found to predict ED utilization. Hispanic ethnicity was associated with higher use of the THOCC ED prior to O2H enrollment; 74% of those who were identified as Hispanic had one or more ED visits compared to 55% of non-Hispanic clients ($p < .001$). The results of the bivariate analyses of patient characteristics and ED utilization was true whether ED use was measured as dichotomous variable (any visit or not), the mean number of visits, or high utilization (four or more visits) in the period before O2H enrollment.

After enrolling in O2H, the percentage of patients with ED visits to THOCC dropped to 60.9%, including 16.3% who had four or more visits. 42.0% of all clients had a least one visit both before and after enrollment. The analysis of change in O2H clients' use of THOCC services (Table 2) showed that there was a significant decrease in ED visits from a mean of 2.39 visits per person before enrollment to 1.88 visits per person after enrollment ($p = 0.009$). There was a statistically significant decrease in ED utilization among patients with substance abuse diagnoses who had an average of 0.40 visits before enrollment and 0.20 visits after enrollment ($p = 0.011$). There was no significant difference in either inpatient psychiatry or inpatient medicine visits or length of stays from pre to post

enrollment in the program. The average length of stay per visit for inpatient medicine went from 3.30 days/visit before enrollment to 3.22 days/visit after enrollment. Likewise, inpatient psychiatry average length of stay per visit data went from 14.4 days/visit before enrollment to 11.5 days/visit after enrollment.

The use of the O2H primary care services, however, was evident. There were 1306 visits, averaging 3.81 visits per person, to the O2H primary care clinic following enrollment in the integrated care program.

Table 2: Mean Utilization Rates of Hospital Services for SMI Patients Before and After O2H Enrollment*

	Before	After	P-value
ED Visits (Visits per person)	2.39	1.88	0.009
Substance Abuse Visits to ED (Visits per person)	0.40	0.20	0.011
Psychiatry Admissions (Admissions per person)	0.14	0.12	0.49
Psychiatric Length of Stay (Days per admission)	1.97	1.33	0.30
Inpatient Admissions (Admissions per person)	0.067	0.093	0.20
Inpatient Length of Stay (Days per admission)	0.22	0.30	0.35

*Values are not adjusted to a full year.

Consistent with the analysis of the mean number of visits, there was a statistically significant decrease in the number of patients who over-utilized the ED (i.e., four or more visits in the pre- or post-study period) after enrollment ($p = <0.001$). Seventy-four patients (21.6%) had four or more visits to the ED before O2H enrollment compared to 56 patients (16.3%) who did so after enrollment. Of this population, 34 patients (9.91%) over-utilized ED services both before and after O2H enrollment.

Subgroup analysis showed that there were no statistically significant differences over time in ED utilization patterns according to client gender, race, ethnicity, age, level of psychiatric care, insurance, self-reported health status, mental health diagnosis, and drug, alcohol, or tobacco dependency diagnosis (Table 3). Interestingly, being Hispanic or not did not make a difference in the level of change in ED utilization even though it was associated with higher utilization prior to O2H enrollment.

Table 3: Change in Mean Number of Emergency Department Visits Before and After O2H Enrollment by Patient Characteristics

	ED Utilization		
Client Demographics	Before O2H Enrollment	After O2H Enrollment	p value
Gender			0.65
Male	1.89	1.31	
Female	3.06	2.66	
Age			0.25
18-25	3.08	2.52	
26-35	2.77	1.95	
36-45	2.80	1.46	
46-55	1.89	1.83	
56-65	2.20	2.33	
66 or Older	1.13	0.63	
Race/Ethnicity			
Caucasian	2.10	1.70	0.51
Black	2.00	1.28	0.65
Hispanic	2.94	2.35	0.78
Self-reported Health			0.30
Excellent	1.50	2.93	
Very good	1.70	1.33	
Good	2.86	1.94	
Fair	2.40	1.82	
Poor	2.87	2.51	
Level of Care			0.19
Residential	2.08	2.09	
Outpatient	2.47	1.83	
Insurance			0.58
Medicaid Only	2.54	1.95	
Medicare with/without Medicaid	2.12	1.75	

Mental Health Diagnosis			
Schizophrenia	2.33	1.97	0.87
Bipolar Disorder	2.31	1.88	0.81
Generalized Anxiety Disorder	2.39	1.89	0.80
Major Depressive Disorder	2.61	1.84	0.44
Obsessive Compulsive Disorder	1.20	0.80	0.94
Post-Traumatic Stress Disorder	3.08	2.64	0.85
Tobacco Dependency			0.67
Tobacco Dependent	2.60	2.02	
Not Dependent	2.06	1.65	
Alcohol Dependence			0.38
Alcohol Dependent	2.54	1.67	
Not Alcohol Dependent	2.36	1.93	

**Mental health and race were examined as those with or without that specific characteristic.*

As shown in Table 4, the three most common primary diagnoses for SMI patients seen in the ED were back pain (4.6%), disorders of the joints (4.2%), and generalized limb pain (3.7%). The ten most common primary diagnoses made up 30.0% of cases before enrollment and 35.7% cases after enrollment. Behavioral health diagnoses were also among the most frequent primary diagnoses given to O2H patients when seen in the ED, both before and after enrolling in the integrated care program. Schizophrenia, depression without acute distress, neurotic disorders and non-dependent alcohol abuse were ranked fourth, fifth, sixth and seventh respectively among the most frequent ICD-9 diagnoses given to O2H patients either before or after enrolling in the integrated care program.

Table 4: The Ten Most Common Primary Diagnoses Seen in the ED for O2H Clients Reported First by Total Number of Primary Diagnoses Along with Percent of All ED Visits

Rank	Diagnosis ICD Code(s)	Total Number and Percent of Visits		
		During Entire Study (n=1446)	Before O2H Program (n=821)	After O2H Program (n=645)
1	<i>Back Pain</i> 724.2-724.8	67 (4.6%)	29 (3.5%)	38 (5.9%)
2	<i>Disorders of Joints</i> 719.0-719.99	61 (4.2%)	37 (4.5%)	24 (3.7%)
3	<i>Limb Pain</i> 729.5	54 (3.7%)	29 (3.5%)	25 (3.9%)
4	<i>Schizophrenia</i> 295-295.99	53 (3.7%)	28 (3.4%)	25 (3.9%)
5	<i>Depression No Acute Distress</i> 311	53 (3.7%)	30 (3.7%)	23 (3.6%)
6	<i>Neurotic Disorders (ex GAD)</i> 300-300.9	46 (3.2%)	25 (3.1%)	21 (3.3%)
7	<i>Non-dependent alcohol abuse</i> 305,305.03	43 (3.0%)	20 (2.4%)	23 (3.6%)
8	<i>Injuries with intact skin</i> 920-924	37 (2.6%)	24 (2.9%)	13 (2.0%)
9	<i>All Diagnoses of COPD</i> 466, 490, 491.21, 492.0, 492.8	33 (2.3%)	17 (2.1%)	16 (2.5%)
10	<i>Abdominal pain</i> 789	29 (2.0%)	7 (0.9%)	22 (3.4%)
TOTALS		476 (32.9%)	246 (30.0%)	230 (35.7%)

Finally, the estimated expenses paid by Medicaid and the net profit margins for THOCC were calculated using the yearly adjusted totals for health care utilization changes over a year. Under a fee-for-service model, it is estimated that Medicaid would pay \$232,326.38 less in reimbursements to THOCC for the 331 patients enrolled in the program. This equates to \$701.89 saved per patient, with the majority of the costs savings

coming from the reduced psychiatric visits. Unfortunately, the savings realized for Medicaid, the primary payer for health care for these patients, does not translate into financial advantage for the hospital. From the data provided by the THOCC financial office, the hospital would run a \$325,020.06 loss for the same 331 patients, or an estimated \$981.93 per patient enrolled annually. It appears that the increased cost comes from the additional primary care visits where the hospital loses approximately \$135.26 once other associated costs are factored in. Figure 5 summarizes the cost analysis data in greater detail for all hospital services.

Figure 5: Cost Analysis for Medicaid Spending and Hospital Profit Margins (n=331)

Type of Medical Service	Net Total Change in Annualized Difference in Total Visits After O2H Enrollment	Net Revenue from Medicaid per Visit or Days Admitted	Change in Revenue Reimbursement by Medicaid *	Profit Margin per Visit After O2H Enrollment	Estimated Total Net Profit or Loss**
<i>Outpatient Services</i>					
<i>Primary Care Visit</i>	+1601	\$119.18	+\$190,836.98	-\$135.34	- \$216,713.18
<i>Emergency Department Visit</i>	-235	\$295.30	-\$69,395.50	-\$47.07	+\$11,061.45
<i>Inpatient Services</i>					
<i>Inpatient Medicine</i>	+33	\$1,402.09	+45,567.93	-\$844.85	-\$27,495.13
<i>Inpatient Psychiatry</i>	-291	\$1,371.11	-\$399,335.79	\$329.59	-\$91,873.21
<i>Total (Inpatient + Outpatient Services)</i>	----	----	-\$232,326.38	----	- \$325,020.06

* Positive and negative value signifies more money paid or money saved by Medicaid, respectively.

** Positive and negative value signifies money gained or lost in profit for THOCC, respectively.

***All yearly totals were adjusted to account for the average enrollment time of 0.8 years.

Discussion

This study showed that SMI clients who were enrolled in an integrated primary and behavioral health care program experienced a statistically significant reduction in emergency room visits following their enrollment. Before integration, only Hispanic ethnicity was associated with higher utilization of the ED compared to non-Hispanic clients. None of the patient demographic or health characteristics examined in this study (gender, age, race/ethnicity, insurance coverage, level of care, self-reported health status, mental health or substance use diagnosis) were found to be related to the change in ED utilization with enrollment. These findings suggest that the program effect was consistent across different subgroups of the patient population. When extrapolated to a year, clients enrolled in O2H had a yearly average of 4.75 visits to a PCP, had 0.64 fewer ED visits per client and 0.25 less substance abuse visits to the ED. There was also a statistically significant decrease in the number of patients who over-utilized the ED following enrollment in the O2H program. It was hypothesized that the integrated care program, by improving SMI clients' access to primary care services, would reduce their reliance on hospital-based ED services. The findings of this study are consistent with the conclusion that integrated health care can reduce the overutilization of ED services. The study did not find a significant change in hospital utilization, however, for either inpatient medicine or psychiatric admissions or overall length of stay per visit as stated above.

The most promising implication of the study is that integrated primary and behavioral health care can reduce utilization of the ED by improving access to services for SMI clients. This is a finding that was not observed after Massachusetts mandated health care insurance for its population and did not see a change in ED utilization.^{xxxix} These

findings together suggest that integrated care, along with access to health insurance, does appear to reduce ED utilization as compared to just having health care insurance alone. One explanation for these findings is that these clients were given primary care providers and other health care services to address their non-urgent, chronic care instead of the ED. The true explanation for the decrease in ED visits is most likely multifactorial and a combination of additional factors such as the nurse case coordinator, behavioral health services, or the integration process itself.

It is important to point out that Hispanic SMI clients were found to utilize the ED more frequently than non-Hispanic clients even before enrolling in integrated health care services. The reason for this increased utilization of ED services is unknown at this time, but most likely represents a multifactorial explanation related to numerous barriers to care such as problems establishing PCP, language barriers with providers, cultural differences in obtaining health care and willingness to see a health care provider compared to other ethnic groups. Future research efforts should try and determine which barriers to care may exist and find ways that can ultimately reduce ED utilization in the Hispanic community.

One unexpected finding was the increased number of admissions to the inpatient medicine services for clients enrolled in the O2H program with no change in length of stay. One potential explanation of this finding is that the primary care practice at the hospital allowed the PCP to identify patients in need of medical treatment who might not understand that their health needs to be addressed in the inpatient setting. This is further supported by the length of stay not changing before and after enrollment (3.30 days to 3.22 days respectively). Finally, this finding may reflect the limitation that it takes time to stabilize and prevent hospitalization from comorbid medical conditions. It will be interesting to see

if all inpatient admissions significantly decrease over a longer period once integrated delivery models are more established and their client's health problems are addressed at an earlier stage in the disease.

The top primary diagnoses seen in the ED over the course of the study were not surprising but are at slightly different frequencies than national reported data for entire US population. When compared to the National Health Science Statistical Report, it appears SMI clients are seen more often for back pain (4.6% SMI visits vs 2.8% all U.S. ED visits) and injuries with intact skin (2.6% SMI visits vs 1.5% all U.S. ED visits) compared to abdominal pain (2.0% SMI visits vs 6.8% all U.S. ED visits).^{x1} Of the psychiatric diagnoses listed, there appears to be only a slight decrease in these conditions being seen in the ED which is consistent with our findings that there were no significant changes in inpatient psychiatry utilization after enrollment. It is unclear at this time why these differences exist and more research is needed to understand these relationships.

What was alarming is 16.4% of the top 10 diagnoses ED were associated with pain or injury, in particular back pain, disorders of the joint and limb pain. The two disorders specific to pain (back pain and abdominal pain) showed the largest increase of visits to the ED after enrollment in integrated services. It is possible that patients with pain felt that the treatment provided by their new PCP was not as adequate, resulting in more admissions to the ED. This finding is less likely because one would expect similar ED visits, not more over the course of a year. Additionally, these patients could also have secondary motives such as opioid addiction or narcotic trafficking that could also explain these patterns. It is possible that there were clients in the program who did in fact have an opioid addiction that were not labelled as such by a psychiatrist treating them.

Another promising finding was that the changes in health care services that occurred after enrollment into integrated health care reduced Medicaid spending. However, the evidence from this study suggests that integrated care may significantly hurt a hospital's net profit under the fee-for-service model, especially when the hospital runs a PCP clinic. Cost analysis also shows that Medicaid saves \$701.89 per client enrolled; while the hospital loses \$981.93 per client annually from these associated utilization changes. A majority of the net losses comes from the associated costs to run the primary care clinic within the hospital. These data suggest that hospitals may not want to take on primary care practices for Medicaid patients within the hospital itself and may benefit from partnering with outside institutions such as private offices or Federally Qualified Health Centers (FQHC), who receive higher reimbursement rates. Private offices and community-based FQHCs may not have the same expenses and overhead as a hospital. Furthermore, Medicaid provides free malpractice insurance and cost-based reimbursement for the FQHC which further reduces costs.^{xli} This reduced overhead, along with potential higher reimbursement rates, may encourage hospitals to collaborate with FQHCs to encourage collaboration.

Under the current fee-for-service reimbursement system, hospitals would still run at a net loss due to changes in inpatient and emergency room services. This may change, however, once Medicaid adopts an ACO reimbursement care model. As stated before, ACO reimbursement models work by paying a hospital a lump sum of money to take care of a population of patients under their network. Instead of making money based on the services the hospital provides, the hospital must use the money given to them in the bundled payment for all services for that patient. It is much less expensive to the hospital to pay for

a primary care visit verses an ED visit or inpatient stay and should help offset losses by the hospital. The study supports this notion since integrated care led to a few hundred less ED visits and days admitted to inpatient psychiatry with minimal change in days admitted to inpatient medical services. In addition, the hospital would share some of the savings for Medicare patients under an ACO model as outlined in section 3022 of the ACA. This is another sizable profit that the hospital would incur since 31.8% of the SMI clients in the O2H program have Medicare insurance. Finally, this may also encourage hospitals to put more money into their own primary care programs to encourage more efficient health care promoting long-term health and prevention.

The literature strongly supports the idea that primary care promotes improved disease management of comorbid conditions which should in turn lead to fewer hospitalizations, complications and reduced medical costs. Integrated care for the SMI will emphasize the major quality measures assessed under the ACO model such as higher compliance of preventative services. Furthermore, primary care should promote preventative services that lead to treatment of diseases at earlier and less costly stages in addition to avoidance of illness in its entirety. Future efforts should try to follow patients enrolled in these programs to determine if individual and group health improves over the course of the program.

Limitations

The major limitation of this study is that it lacked a control group that would indicate that it was the integrated primary and behavioral health care program that affected the change in health care utilization. It is possible that participation in CMHA's mental

health services accounted for the decreased visits by clients. Many of the patients, however, were enrolled in behavioral health services before starting the O2H program. There were no patients in this study who reported receiving primary care services prior to O2H enrollment. As a result, it is difficult to know if the outcomes observed during this study were the effect of receiving only mental health or integrated primary care and behavioral health services. Likewise, it is not necessarily possible to assume that similar effects would not be observed with a patient population receiving both mental health and primary care services in a non-integrated setting. It is believed, however, that the success of the program is a result of a program model that combines a PCP who has experience working with SMI patients with a case manager who facilitates patients' access to care as well as ensures the coordination of care across the medical and behavioral health care systems.

Another limitation of this study is it was not able to be determined if the changes in utilization were associated with improved health of the clients. It was a requirement of PBHCI grant that all clients have assessments completed at baseline and every six months that covered information such as demographic data, psychosocial status and physical health indicators, including laboratory data. Although the researchers had access to baseline data such as HgA1C levels, blood pressures and BMI, there were limited follow-up data to accurately measure changes in health indicators for O2H clients over the course of the program. These patients would need to be followed longer to determine if the shift in care leads to decreased morbidity, improved disease management and longer life expectancies.

Another limitation of the study was the lack of a consistent definition for discharging patients and the degree to which clients received sufficient doses of primary care. Following a protocol, patients were discharged from the O2H program if they were

not seen by the PCP for three months. This stringent definition led to many examples of clients who were technically discharged based on the data collection system defined by the PBHCI Program but who were actually still part of the program. Ultimately, this made it impossible to determine if a patient not seen for three months was still anticipated to follow-up with primary care at the appropriate time or was truly not part of the program anymore.

The analysis of hospital care was limited only to THOCC visits, such that the study did not capture visits to other EDs or other hospitals in the geographic area. It is possible that O2H patients went to other facilities during the study period, although this is unlikely, especially since they were then receiving primary care services from THOCC providers. Another limitation of the study is some patients did not provide baseline data for their initial primary care visit. Twenty-four clients (7%) did not complete the baseline survey. Analysis of the data, however, showed similar utilization for those who did not answer the baseline questionnaire relative to those who did respond to it, suggesting that the missing data most likely did not affect the final results.

Future Directions

Future research should follow SMI patients participating in integrated care programs long-term to see if there are any morbidity and mortality benefits from the access to an integrated care model. Future studies can determine if physical health indicators such as BMI, cholesterol levels, blood pressure and diabetes control improve while enrolled in the program. The study can also look at other outcomes such as measuring hospital

admission for diabetes or HgA1C levels or overall population trends such as morbidity and average age of mortality.

In order to assess the generalizability of the findings from the O2H program, research needs to be repeated in other settings, such as a larger urban setting or rural settings, as well as with other behavioral health populations, such as primary substance abuse treatment populations. Larger hospital systems that have more people in their health care network may allow for higher enrollments and better statistical analysis. Other integrated delivery care models can also be tested in other communities to see if similar findings are discovered. It might be possible that the outcomes seen were dependent not only on the program but on the staff involved with the program. Furthermore, repeating the study with another SMI population will provide corroboration that other demographic groups, regardless of their geographic location, could benefit from the program.

The final research implications of this study is to see if this integrated model would in fact save money under the new ACO models being piloted for the CMMS if they were expanded to the Medicaid population. Although it appears that this health care delivery model is promising, time will only tell if integrated delivery care models acts as the best complement to align with the objectives set out by the ACA.

Conclusion

An integrated primary and behavioral health care program targeting SMI clients may be the best means to address the Triple Aim Approach. The first aim of this model is addressed through access to essential health care services such as primary care, behavioral

health, wellness services and nurse case managers who oversee any obstacles to care. The second aim associated with improved quality and reduction of unnecessary care was demonstrated by the reduction in utilization of ED services along with a reduction in the number of over-utilizers of the ED. Finally, the changes in health care services led to a reduction in Medicaid spending, thus addressing the final aim of this model. The shift from ED to integrated primary and behavioral health care is promising and reflects better holistic approach to health care for the SMI population. Most importantly, it promotes health care equity to a population that has not received the health care they need. Long-term studies will hopefully subsequently demonstrate improved health care outcomes and reduced inpatient admissions.

Financially, this study suggests that Medicaid may reduce its expenditures while hospitals might be predicted to lose significant income under a fee-for-service model. The significant financial loss may lead to hospitals choosing not to adopt these integrated care models for their SMI patient population. The answer to this problem may lie in transition from fee-for-service models promoting expensive, high volume health care to ACO models that promote quality care and cost savings. The ACO bundled payment model places the onus on hospitals and other health care entities to reduce expensive services while promoting quality care for its patient population. The change in payment may lead hospitals and other health care providers to implement integrated behavioral health and primary care models to reduce need for expensive services while promoting long-term health care.

The next few years are promising for improved health care. Both an integrated health care delivery system and the new ACA models may be a perfect combination to improve the SMI population's future health care. Together these systems will hopefully

achieve the goal that one day SMI clients will have the same long-term health benefits as the general population.

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