Descriptive Analysis of a Novel Health Care Approach: Reverse Colocation—Primary Care in a Community Mental Health "Home"

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ABSTRACT

Objective: Persons with serious mental illness have increased rates of chronic medical conditions, have limited access to primary care, and incur significant health care expenditures. Few studies have explored providing medical care for these patients in the ambulatory mental health setting. This study describes a real-world population of mental health patients receiving primary care services in a community mental health clinic to better understand how limited primary care resources are being utilized.

Method: Chart review was performed on patients receiving colocated primary care (colocation group, N = 143) and randomly chosen patients receiving mental health care only (mental-health group, N = 156) from January 2006 through June 2011. Demographic and mental and physical health variables were assessed.

Results: Compared to the mental-health group, the colocation patients had more psychiatric hospitalizations (mean = 1.07 vs 0.23, $P < .01$), were more likely to be homeless ($P < .01$), and were more likely to require intensive case management ($P < .01$). Interestingly, the colocation group was not more medically ill than the mental-health group on key metabolic measures, including mean body mass index (colocation = 27.8 vs mental-health = 28.7, $P = .392$), low-density liprotein (colocation = 110.0 vs mental-health = 104.4, $P = .480$), and glucose (colocation = 94.1 vs mental-health = 109.2, $P = .059$). The most common medical disorders in the colocation group were related to metabolic syndrome.

Conclusions: Colocated primary care services were allocated on the basis of severity of psychiatric impairment rather than severity of medical illness. This program serves as a model for other systems to employ for integrated primary and behavioral health services for patients with serious mental illness.

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As mandated with the passage of the Affordable Care Act (ACA), millions of uninsured patients with psychiatric disorders will soon be enrolled in government-provided health coverage. The already overtaxed safety-net systems providing services to people with Medicaid will absorb the bulk of these new enrollees, making efforts to improve quality and efficiency of care for this growing population a high priority.[1–4] Integration of mental health and primary care, as part of the larger medical home model, may help address this daunting problem.

Integration exists on a spectrum, varying on dimensions of both physical location and degree of communication. At the most basic level, 2 facilities might have a formalized partnership to facilitate flow of referrals between their geographically separate sites. "Colocation" can be described as an intermediate degree of integration where physical space is shared and communication is increased; however, the clinics themselves remain functionally and formally separated. Finally, a high level of integration involves the provision of coordinated care by primary care and mental health clinicians in a seamless fashion.[5]

In 2002, through the National Council for Community Behavioral Healthcare, Mauer put forth a report entitled "Behavioral Healthcare/Primary Care Integration: The Four Quadrant Model and Evidence-Based Practices" in which she adapted a mental health/substance abuse framework to help conceptualize how groups of patients may be best served by different types of primary care and mental health integration models.[6] Figure 1 demonstrates that patients who are relatively low in mental health need (Quadrants I and III) are likely well-served in an integrated primary care–based system. Conversely, Mauer suggests that patients with higher mental health need (Quadrants II and IV) may benefit from an integration model based out of the specialty mental health clinic. This intuitive hypothesis has not been rigorously tested.

Increasing access to primary care and improving health outcomes for people with severe mental illness (SMI, eg, schizophrenia, bipolar disorder) in Quadrants II (high mental health and low physical health needs) and IV (high mental health and high physical health needs) are major challenges.[7] Studies have demonstrated increased rates of serious chronic medical conditions, such as metabolic syndrome, in this group.[8] Indeed, persons with SMI die, on average, 25 years earlier than the general population from preventable illnesses, most often cardiovascular disease.[9] Furthermore, despite increased incidence of disease, the availability of primary care in community mental health centers is limited, and patients with SMI often have difficulty navigating referrals for primary care services.[10–12] Thus, patients with SMI are less likely to receive adequate care for medical conditions.[13] With this understanding, Mauer's proposal that people with SMI in Quadrants II and IV would benefit from integrated care delivered in a smaller and more structured mental health setting, such as can be provided

Clinical Points

- People with severe mental illness die, on average, 25 years earlier than the general public mostly from preventable diseases like cardiovascular disease.
- Colocation of primary care services in the community mental health clinic is a newer form of integration and not well characterized.
- Referral for colocated services appears to be based primarily on level of mental health rather than medical illness.
- The most common medical illnesses in this colocated clinic were related to metabolic syndrome.
- Further research is necessary to determine if reverse colocation is effective and, if so, for which group of patients does it best serve.

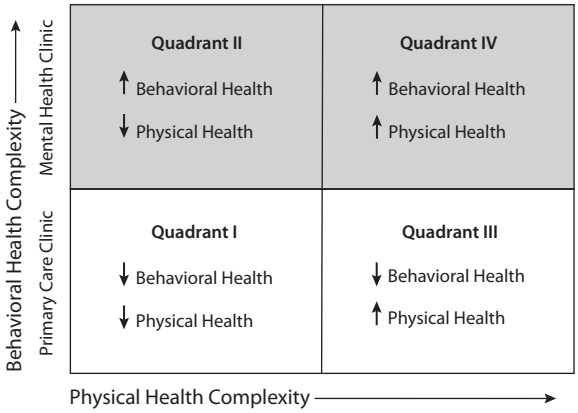
by a community mental health center, seems valid. This approach, in which the community mental health clinic is the "medical home" for people with SMI, may be termed *reverse colocation* or *reverse integration*.

Several groups have attempted to evaluate the efficacy of reverse colocation. In a landmark study in 2001, Druss and colleagues[14] examined the effects of integrated treatment in Veterans Affairs (VA) outpatient mental health clinics. A total of 120 patients were randomized to receive either primary care from a colocated team (medical nurse practioner, supervising medical doctor, nurse case manager, and administrative assistant) in the mental health clinic or routine care in the general medicine clinic. The integrated services included on-site primary care and case management emphasizing preventative care, client education, and collaboration with mental health providers. One year after randomization, individuals in the integrated care clinic had improved quality and outcomes of medical care including more primary care visits, more preventative care, and better health status.

More recently, Kilbourne and others[15] conducted a large nationwide retrospective review of preventive care and medical care outcomes in the SMI population. Specifically, they examined 10 VA mental health clinics with an existing colocated primary care clinic. They found that people in the colocated programs received higher quality of care in 4 of the 9 areas of focus: foot examinations, colorectal cancer screenings, and alcohol misuse screenings and also experienced good blood pressure control compared with those in routine care in the general medicine clinic. Conversely, colocated patients were less likely to have a glycosylated hemoglobin < 9%. These findings highlight the complexity of treating chronic illness in the SMI population.

Colocation of primary care providers in community mental health clinics has not been studied outside of the already integrated VA system. This article provides an initial descriptive analysis of people with SMI currently receiving services in this new model of integration of care in a real-world urban community mental health clinic.

Figure 1. The "4-Quadrant Model" Illustrates the Characteristics of Patients in Different Settings of Integration Based on Relative Needs of Behavioral and Physical Health[a,b]



[a]Adapted with permission from the National Council for Community Behavioral Healthcare.[6]
[b]Clients in Quadrants I and III are best served in a primary care clinic, while those in Quadrants II and IV are best served in mental health clinics.

METHOD

Clinical Setting

The study was performed in an outpatient community mental health clinic that provides psychiatric medication, psychotherapy, and case management services for approximately 1,300 mostly indigent patients residing in a large urban area. Since 2006, a colocated primary care clinic has been providing services to a subset of the mental health clinic's patients. The clinic operates 3 half-days a week and currently has a total of 216 patients. Two nurse practitioners and 1 family medicine physician staff the clinic. Referral into the primary care clinic consists of an informal system, whereby the referring mental health provider either places his or her client directly on the clinic schedule or first discusses referral with the primary care nurse liaison. There were no systematized criteria for referral at time of study. The goal was to capture those people with a chronic medical illness who, due to severity of psychiatric illness, were unable to navigate a traditional primary care setting.

Participants

A retrospective chart review was performed on all patients who were actively enrolled at the clinic and were currently receiving both primary care and mental health services (N = 143), the colocation group. A control group of 156 patients who were receiving only mental health services was then randomly chosen by selecting every sixth client from a master list of clinic patients.

Variables

Data were collected from the opening of the colocated primary care clinic to the present, from January 2006 through June 2011. Intake demographic and psychiatric

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Table 1. Sociodemographic, Psychiatric, and Medical Characteristics of Mental Health Clinic Patients[a]

Characteristic	Colocation With Primary Care Group (N = 143) N	%	Mental-Health Only Group (N = 156) N	%	Test Statistic	*df*	*P*
Gender							
Male	103	72.0	105	67.3			
Female	39	27.3	47	30.1	$\chi^2 = 1.28$	2	.527
Transgender male to female	1	0.7	3	1.9			
Age (y), mean ± SD	46.12 ± 10.04		45.48 ± 11.98		$t = 0.453$	245	.651
Race-ethnicity							
Whites	78	54.5	63	40.4			
Hispanic/Latino	10	7.0	12	7.7			
African American	27	18.9	37	23.7	$\chi^2 = 10.52$	4	.033
Asian/Pacific Islander	10	7.0	25	16.0			
Other	9	6.3	16	10.3			
Education							
< 8th grade	24	16.8	30	19.2			
8th to 12th grade	54	37.8	45	28.8	$\chi^2 = 3.91$	2	.141
> High school	26	18.2	40	25.6			
Homeless	56	39.2	35	22.4	$\chi^2 = 9.86$	1	.002
Intensive case-management team	63	44.1	0	0	$\chi^2 = 87.07$	1	< .001
Medical diagnoses[b]	76	55.9	77	55.8	$\chi^2 = 0.00$	1	.989
Psychiatric diagnoses							
Schizophrenia	79	55.2	52	33.3	$\chi^2 = 14.55$	1	< .001
Bipolar	11	7.7	14	9.0	$\chi^2 = 0.16$	1	.689
Other mood disorder	55	38.5	85	54.5	$\chi^2 = 7.70$	1	.006
Anxiety disorder	19	13.3	29	18.6	$\chi^2 = 1.56$	1	.212
Alcohol abuse	56	39.2	51	32.7	$\chi^2 = 1.36$	1	.240
Drug abuse	51	35.7	59	37.8	$\chi^2 = 0.15$	1	.699
History of intramuscular depot medication	42	29.4	8	5.1	$\chi^2 = 31.49$	1	< .001
Intake variables, mean ± SD							
Global Assessment of Functioning score	45.31 ± 7.69		49.99 ± 7.60		$t = -5.02$	267	< .001
Weight, lb	82.01 ± 47.75		188.16 ± 40.80		$t = -0.84$	150	.404
Body mass index[c]	27.83 ± 6.19		28.68 ± 4.98		$t = -0.86$	128	.392
Triglycerides, mg/dL	145.57 ± 117.36		42.13 ± 82.34		$t = 0.19$	120	.852
HDL, mg/dL	60.21 ± 39.91		51.90 ± 17.94		$t = 1.48$	121	.142
LDL, mg/dL	110.02 ± 43.67		104.40 ± 41.44		$t = 0.71$	113	.480
Glucose, mg/dL	94.05 ± 33.34		109.15 ± 60.00		$t = -1.90$	142	.059
No. of BP checks, mean ± SD	4.43 ± 3.54		3.00 ± 2.62		$t = 2.53$	132	.013
No. with systolic BP > 140 or diastolic BP > 90, mean ± SD	1.90 ± 2.61		0.98 ± 1.56		$t = 2.53$	131	.012
No. of SFGH psychiatric hospital admissions, mean ± SD	1.07 ± 2.15		0.23 ± 0.53		$t = 4.57$	158	< .001
No. of psychiatric emergency department visits, mean ± SD	10.13 ± 13.52		4.64 ± 5.79		$t = 3.48$	140	.001
No. of medical emergency department visits, mean ± SD	8.47 ± 14.86		3.14 ± 4.98		$t = 4.09$	171	< .001

[a]Values are represented as N (%) unless otherwise stated.
[b]Medical diagnoses information was incomplete on the intake forms. Therefore, the total N for the colocation group was 136 and for the mental-health group, 138.
[c]Body mass index calculated by measuring kg/m^2.
Abbreviations: BP = blood pressure, HDL = high-density lipoproteins, LDL = low-density lipoproteins, SD = standard deviation, SFGH = San Francisco General Hospital.

information were obtained from the client's paper mental health record as well as from the clinic's electronic medical record system. Medical diagnoses for the colocation group were extracted from the provider notes and problem list in the colocated primary care clinic record. Medical diagnoses were recorded by organ system as a measure of overall medical disease burden. Electronic medical record systems from the largest safety-net hospital in the city provided information about medical and psychiatric hospitalizations and emergency room visits. Both *t* tests and χ^2 tests were performed using SPSS statistical software (IBM Corporation, Armonk, NY) to compare the groups.

The study protocol was approved by the University of California San Francisco Institutional Review Board Committee (IRB 11-07570).

RESULTS

Table 1 shows that the colocation and mental-health groups were similar in terms of age, gender, and education. The mean ± SD age for both groups was 45 ± 11 years. Approximately 70% of the total sample was male. The largest proportion (33.1%) of participants had an educational level between 8th and 12th grade. There was a significant difference in racial makeup of the groups, with whites being overrepresented and Hispanic/Latinos underrepresented in the colocation group. People in the colocation cohort were also more likely to be homeless.

For psychiatric indicators, the people in the colocation group were more likely to have a primary diagnosis of schizophrenia and less likely to have a primary mood

Table 2. Medical Diagnosis by Organ System in the Colocation Group (N = 143)

Organ System	Most Common Diagnosis	N	Frequency (%)[a]
Cardiovascular	Hypertension	63	44
Endocrine	Hyperlipidemia	58	41
Musculoskeletal	Low back pain	44	31
Infectious disease	Hepatitis C	43	30
Respiratory	COPD	28	20
Ophthalmologic		3	2
Auditory/vestibular		1	1
Neoplasms		0	0
Immune/blood diseases		0	0

[a]Rounded to nearest whole number.
Abbreviation: COPD = chronic obstructive pulmonary disease.

disorder diagnosis. There was no difference in the prevalence of anxiety disorders, bipolar spectrum disorders, alcohol abuse/dependence, or drug abuse or dependence diagnoses. Additionally, the colocation group was more likely to have a history of receiving intramuscular depot antipsychotic medications. The people in the colocation group also had a lower mean intake Global Assessment of Functioning (GAF) scale score. Furthermore, colocation patients used more acute and intensive mental health services, having more psychiatric hospitalizations, more psychiatric and medical emergency service visits, and higher rates of intensive case-management team placement.

From a physical health perspective, the groups did not differ in the presence of a medical diagnosis at time of psychiatric intake. The colocation group had significantly more blood pressure measurements, as well as more elevated blood pressure measurements. Of note, the groups were not statistically different in key medical markers often measured in the mental health setting, including glucose, body mass index, weight, low- and high-density lipoproteins, and triglycerides. When medical diagnoses were examined within the colocation group, patients had diagnoses affecting between 0 and 5 of the 5 organ systems, with a mean of 2.27 organ systems affected. The most common medical diagnoses were related to the metabolic syndrome, primarily hypertension and dyslipidemia (Table 2).

DISCUSSION

The findings of this study indicate that, compared to patients receiving only mental health services, patients referred for colocated primary care services in a community mental health clinic share the following characteristics: (1) they are more psychiatrically ill, (2) they suffer predominately from diseases related to metabolic syndrome such as hypertension and dyslipidemia, and (3) they have a similar level of medical illness as it relates to metabolic syndrome diseases.

These results are consistent with previous findings demonstrating the relative importance of mental disorders in the impairment of patients with comorbid mental and physical conditions.[16–18] Researchers generally recognize barriers that persons with SMI face in accessing primary care, including factors such as a lack of insurance, functional impairment, inability to navigate the complex insurance system, lack of primary care providers, and stigma related to mental health diagnoses. Severity of medical illness is not as frequently discussed as a barrier. Thus, referring a client for colocated primary care based upon the severity of his or her psychiatric condition and overall level of functioning, rather than medical disease burden alone, may be appropriate. Conversely, a more effective and economical approach may be to preserve the limited primary medical resources for those who are both the most medically and psychiatrically ill (Quadrant IV, see Figure 1) at the expense of the less medically ill (Quadrant II) patients.

Perhaps surprisingly, there was no difference detected in medical illness between groups as it relates to the most common medical diagnoses for the population, namely, those involving the metabolic syndrome. The criteria for what distinguishes Quadrant II from Quadrant IV patients have not yet been clearly defined in the literature. Categorizing groups of patients, however arbitrary, may be useful in providing a foundation to study questions based on resource allocation in reverse colocation and other integration models. For example, if those with diagnoses involving 2 or fewer organ systems are classified as Quadrant II patients and those with 3 or more as Quadrant IV patients, then roughly half of the patients would be in each quadrant. Future studies should investigate whether prioritizing colocated primary care services for patients in either quadrant is more efficient and cost-effective.

Based on decades of research on integrating mental health services into primary care, one of the most effective approaches for treating patients with co-occurring mental and physical health conditions involves the "stepped-care" model.[19,20] In this model, patients' level of care can be increased or decreased depending on objectively measured need. It has repeatedly demonstrated improved outcomes in treatment of depression in primary care. The stepped-care model could be adapted and studied in the reverse colocation approach as a part of creating a mental health "home."

Given that integrated primary care services are a limited resource, it is important to make the most effective use of the clinicians' time as well as to have them practicing at the top of their skill sets. With this in mind, it is worth pointing out that the structure of the colocated primary care clinic in this study was organized in a way that could accommodate a stepped-care approach. For example, Quadrant II patients could, at least initially, be referred to and treated by a primary care nurse practitioner while patients with a higher level of clinical complexity could be referred directly to the primary care physician. If, upon initial referral, a Quadrant II patient's level of illness was underestimated or during the course of treatment their complexity increased, the patient's level of medical care could correspondingly be increased by changing him or her from the nurse practitioner to the primary care physician. Future studies may further examine this health care delivery design as a template for providing comprehensive mental health and primary care to both Quadrant II and Quadrant IV patients.

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The most common medical conditions within the colocation group, metabolic syndrome–related diagnoses, are known to have a high prevalence in this population.[8] This finding is not unexpected in a mental health clinic where many patients are on weight-promoting medications and have many other risk factors for obesity. This finding further underscores the essential need to perform regular metabolic screening and establish improved integration between primary care and mental health. Therefore, it seems appropriate that treatment for these particular medical conditions occurs in the mental health clinic; indeed, it may be a more natural setting than the current system of care.

Given that referral into the colocated clinic appeared to correlate with degree of mental health impairment, the colocated patients will inherently have more barriers and life challenges than a sample with less severe mental health issues. This disparity makes accurate evaluation of the clinic's effectiveness at providing care, compared to more traditional samples, a significant limitation.

This study has described the process of reverse colocation, whereby primary care services are colocated within a community mental health clinic. This newer model's effectiveness has yet to be determined. Combining this approach with a "stepped" model of care may represent the next step in the evolution of care in this area of medicine. Improving upon both the primary care training of psychiatry residents and the mental health training of primary care residents would seem a logical goal for improving care at the intersection of these 2 disciplines. Future studies with prestudy and poststudy data analyses are needed to examine the effectiveness of this approach as well as to address whether prioritizing the limited services to a specific group of patients results in improved outcomes.

Last, we recommend taking the following factors into consideration when referring a patient for colocated primary care services in a mental health clinic: (1) Can the patient successfully access primary care elsewhere in the community? This determination is meant to help preserve the limited resource. (2) How severe are the patient's current medical needs? Establishing a stepped-care structure would enable triage of patients to the appropriate level of care and facilitate administrators' efforts to utilize providers at the peak of their skill sets.

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