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Understanding the cost of a new integration of care model for people with severe mental illness served in community mental health clinics

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Abstract

People with severe mental illness (SMI), such as schizophrenia and bipolar disorder, experience premature mortality, often from cardiovascular disease (CVD). Unfortunately, people with SMI are not screened or treated for CVD risk factors per national guideline recommendations. Access to primary preventive care in community mental health settings has the potential to reduce early mortality rates in people with SMI. The authors review best practices for developing an integration of care model for individuals with SMI by considering economic feasibility and sustainability from the perspective of a community mental health clinic. A process mapping approach was used to gather information on clinic costs (staff roles, responsibilities, time, and salary) in servicing 544 patients at one community mental health clinic. The estimated cost of the model was measurable and modest, with a $74 per-person annual cost, suggesting that this model may be financially feasible.

BACKGROUND

People with serious mental illness (SMI) lose 25 years of life expectancy, largely from premature cardiovascular disease (CVD) (1). While national guidelines recommend screening for CVD risk factors, adherence to these guidelines remains poor (2). Screening in the public healthcare system faces challenges that include separate silos for mental health and primary care (3). Since people with SMI often have complex medical and mental health needs, it is recognized that this population could benefit from integrated care (4).

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The Collaborative Care Model (CCM) is an evidence-based integrated care model in primary care comprised of four components: patient-centered team, population-based care, measurement-based treatment and evidence-based care (5). Substantial evidence supports the efficacy and cost-effectiveness of collaborative care in improving both mental health and primary care outcomes (6).

The evidence base is weaker for a variety of integration of care models that provide primary care to people with SMI in community mental health settings (6). Although a recent randomized trial on health homes for in behavioral health settings appears promising (7), a Cochrane meta-analysis was unable to recommend an evidence-based approach to provide comprehensive healthcare for people with SMI (8). Additionally, various integration models are costly: the Substance Abuse and Mental Health Services Administration-funded primary care and behavioral health care integration pilot programs were found to be fiscally unsustainable (9). Since most people with SMI are publicly insured (10), with routine contact mostly with mental health providers, an affordable and comprehensive integrated care model is needed.

A NEW INTEGRATION OF CARE MODEL

Although CVD risk factor screening could occur in primary care, people with SMI have significantly lower utilization of primary care than the general population (11). Nearly half of people with SMI regularly access community mental health services, thus making these settings the de-facto “health home” (12). Since the CCM has been shown to improve mental and physical health for people in primary care settings (6), we used a form of reverse engineering to develop a similar model that has all components of collaborative chronic care called CRANIUM (6). This new integration of care model—CRANIUM (**C**ardiometabolic **R**isk **A**ssessment and treatment through a **N**ovel **I**ntegration model for **U**nderserved populations with **M**ental illness)—was developed using behavioral theories (e.g., Behavior Change Wheel and Theory of Planned Behavior) to target underlying organizational and provider-level factors influencing preventive care in the community mental health setting. As with the CCM, CRANIUM is comprised of four components: *patient-centered team* (patient, psychiatrist, primary care consultant, case manager, peer navigator); *population-based care* (patient registry), *screening protocols* (stepped care approach); and *treatment protocols* (evidence-based treatment for CVD risk factors).

The pilot clinic was a specialty mental health clinic in San Francisco that uses intensive case management for approximately 700 publicly-insured adults with SMI (admission criteria includes multiple acute care psychiatry visits in the past year; many have extensive criminal justice history). This clinic has 7 part-time psychiatrists (total=5.9 FTE) and 31 full-time case managers (Total=31 FTE). For CRANIUM, a 0.20 FTE peer navigator, and a 0.10 FTE off-site primary care consultant was added to these pre-existing resources. The primary care provider was an e-Consultant, available to answer questions ranging from medication initiation, laboratory abnormalities, to connecting to primary care over a secure electronic server on issues. The e-Consultant provided all psychiatrists with one-time training on managing metabolic abnormalities and medication algorithms to treat diabetes, hypertension, and hyperlipidemia.

A peer navigator prepared lab slips, accompanied patients to lab facilities, and entered laboratory results into the EHR. The registry developed for CRANIUM included metabolic screening results from three separate, unlinked EHRs representing the mental health system, primary care system and laboratory contractor. Administrative staff extracted blood pressure and laboratory results monthly for patients who had annual treatment plans due, and compiled this information into the study registry for distribution to psychiatrists and case managers. Panel management was conducted quarterly to review the registry and discuss abnormal results, follow-up plans, and problem-solve about how to obtain labs for complex patients.

ESTIMATING COSTS FOR THIS NEW INTEGRATION OF CARE MODEL

The CRANIUM model was delivered from January 1, 2015 through December 31, 2015. Process mapping and time-driven activity based costing was used to estimate the costs of CRANIUM from the perspective of the mental health clinic. This approach involved identifying and quantifying the complete set of activities (or processes) involved in the delivering the CRANIUM intervention and their associated resources (or costs) within the current practice of the mental health clinic including population-based care, patient-centered team, screening protocols, and treatment protocols (13).This approach captured complete information regarding the steps in each process and their interactions with one another.

We first identified the roles and responsibilities of administrative and clinical staff who were involved in the intervention, and divided each process into step-by-step tasks, with staff-based estimates of approximate monthly person-hours for each task. We included efforts to manage metabolic abnormalities during panel management and follow-up. Using average salary and benefit rates for each staff position, and assuming 2,080 hours annually and that 80% of hours were spent on patient care, we divided the annual salaries by 1664 clinical hours to obtain a productive hourly rate. Finally, we multiplied the time for each procedure by the hourly rate to calculate the total monthly and yearly cost of CRANIUM. As described above, administrators populated and maintained the registry monthly. As a secondary analysis, we excluded the cost incurred during manual registry creation to estimate the cost of CRANIUM in a system with an automated registry.

Our cost analysis conducted only included costs for CRANIUM and not a comprehensive economic comparison of costs and consequences of alternative interventions or treatment as usual. We defined costs as the value of resources used to operate the intervention over a 12-month period from the perspective of a specialty mental health clinic (14). Costs exclude patient investments of time, money, or other resources, and laboratory processing and drugs, as Medicaid incurs these costs. We did not include research-related planning and development costs, instead assuming the analytic perspective of implementing a pre-existing intervention (14).

The CRANIUM intervention required approximately 45 hours staff time per month (Table 1). This was equal to about an hour of staff time per patient per year. The total annual cost of CRANIUM was $40,254, or $74/patient. Use of an automated registry would reduce staff time to 29 hours/ month, or about 37 minutes per patient annually, and costs would be

$31,680/ year, or $58/ patient. The largest share of costs was related to psychiatrist effort ($15,798; 39%), followed by administrative staff ($9,110; 23%), case manager ($7,767; 19%), nurse ($3,276; 8%), navigator ($2,559; 6%), and the primary care e-Consultant ($1,744; 4%).

LIMITATIONS

Prior evaluations of costs for integrated care services have used data from a claims or encounter system (9). As the current service would not be visible using claims data, we chose to utilize a process mapping approach. We adopted the perspective that costs must capture the full cycle of care for a patient's particular medical condition involving a multidisciplinary team within which each team member performs unique roles (5). Second, we assumed that all patients were insured by Medicaid, and did not include laboratory testing and drug treatment costs, which are typically incurred by the insurer. Third, this analysis focuses on the short-term costs related to screening and initial treatment of identified cardiovascular risk factors, rather than long term costs, benefits, or cost-effectiveness. CRANIUM's emphasis on preventive care may in fact reduce long-term costs. For example, early identification of diseases like diabetes or control of hypertension or hyperlipidemia would likely impact long-term costs from cardiometabolic disease. A comprehensive evaluation of the feasibility of the CRANIUM intervention is currently underway (K23MH093689).

CLINICAL AND POLICY RECOMMENDATIONS

In a safety net setting, CRANIUM appears to be a potentially fiscally sustainable model to reduce cardiometabolic risk among people with SMI. An efficient integration of care model like CRANIUM is especially timely given that integration is a national priority.

The low cost of this model is particularly notable when compared with the relatively costly SAMHSA pilot integration of care interventions (9). In addition, this low cost is also notable because costs associated with the complications of cardiometabolic diseases are much more expensive than the costs of preventing cardiometabolic diseases, especially in high prevalence populations (15). Given that an estimated 20% of US adults with SMI have diabetes, but 70% of them are not screened (2), failure to identify and treat diabetes early will generate very high downstream costs. In sum, CRANIUM appears to be a financially feasible model to improve cardiometabolic care in community mental health clinic.

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REFERENCES

1. Walker ER, McGee RE, Druss BG: Mortality in mental disorders and global disease burden implications: a systematic review and meta-analysis. JAMA psychiatry 72:334–41, 2015 [PubMed: 25671328]
2. Morrato EH, Newcomer JW, Kamat S, et al.: Metabolic screening after the American Diabetes Association's consensus statement on antipsychotic drugs and diabetes. Diabetes Care 32:1037–42, 2009 [PubMed: 19244091]
3. Newcomer JW, Hennekens CH: Severe mental illness and risk of cardiovascular disease. JAMA 298:1794–6, 2007 [PubMed: 17940236]
4. Kilbourne AM, Keyser D, Pincus HA: Challenges and opportunities in measuring the quality of mental health care. Can J Psychiatry 55:549–57, 2010 [PubMed: 20840802]
5. Unutzer J, Katon W, Callahan CM, et al.: Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial. JAMA 288:2836–45, 2002 [PubMed: 12472325]
6. Woltmann E, Grogan-Kaylor A, Perron B, et al.: Comparative effectiveness of collaborative chronic care models for mental health conditions across primary, specialty, and behavioral health care settings: systematic review and meta-analysis. Am J Psychiatry 169:790–804, 2012 [PubMed: 22772364]
7. Druss BG, von Esenwein SA, Glick GE, et al.: Randomized Trial of an Integrated Behavioral Health Home: The Health Outcomes Management and Evaluation (HOME) Study. American Journal of Psychiatry:appi. ajp. 2016.16050507, 2016
8. Reilly S, Planner C, Gask L, et al.: Collaborative care approaches for people with severe mental illness; in The Cochrane database of systematic reviews, 2013
9. Scharf DM EN, Hackbarth NS, Horvitz-Lennon M, Beckman R, Han B, Lovejoy SL, Pincus HA, Burnam MA: Evaluation of the SAMHSA Primary and Behavioral Health Care Integration (PBHCI) Grant Program: Final Report, 2013
10. Khaykin E, Eaton WW, Ford DE, et al.: Health insurance coverage among persons with schizophrenia in the United States. Psychiatric Services 61:830–4, 2010 [PubMed: 20675843]
11. Garcia ME, Schillinger D, Vittinghoff E, et al.: Nonpsychiatric Outpatient Care for Adults With Serious Mental Illness in California: Who Is Being Left Behind? Psychiatric Services:appi. ps. 201600284, 2017
12. Amiel JM, Pincus HA: The medical home model: new opportunities for psychiatric services in the United States. Curr Opin Psychiatry 24:562–8, 2011 [PubMed: 21918447]
13. Wagner TH, Engelstad LP, McPhee SJ, et al.: The Costs of an Outreach Intervention for Low-Income Women With Abnormal Pap Smears. Preventing chronic disease 4:A11, 2007 [PubMed: 17173719]
14. Meenan RT, Stevens VJ, Funk K, et al.: Development and implementation cost analysis of telephoneand Internet-based interventions for the maintenance of weight loss. Int J Technol Assess Health Care 25:400–10, 2009 [PubMed: 19619360]
15. Dall TM, Yang W, Halder P, et al.: The economic burden of elevated blood glucose levels in 2012: diagnosed and undiagnosed diabetes, gestational diabetes mellitus, and prediabetes. Diabetes Care 37:3172–9, 2014 [PubMed: 25414388]

Table 1:

Costs of the CRANIUM Model

Process	Task	Staff member	Salary/yr	Salary/hr	Hrs/task	Total cost/mo	Total cost/yr
Population-based care	Create Patient Registry	Admin Staff	$74,310	$44.66	16	$714.52	$5,487.48
Population-based care	Review Registry, Complete Lab Slips and Distribute	Navigator	$53,922	$32.41	4.58	$148.42	$1,139.88
Population-based care	Receive Registry with Lab Slips, Make Appointments	Psychiatrist	$276,705	$166.29	4	$665.16	$5,108.40
Screening protocols	Plan for Obtaining Labs	Psychiatrist	$276,705	$166.29	2	$332.58	$2,554.20
Screening protocols	Plan for Obtaining Labs	Case Manager	$106,425	$63.96	2	$127.91	$982.44
Screening protocols	Take Vitals	Psychiatrist	$276,705	$166.29	.25	$41.57	$1,041.36
Screening protocols	Transport to Nurse for Vitals	Case Manager	$106,425	$63.96	.12	$135.59	$2,096.52
Screening protocols	Take Vitals, Enter into EMR	Nurse	$214,269	$128.77	2.12	$272.99	$319.32
Screening protocols	Evaluation of Patients who Need Labs	Psychiatrist	$276,705	$166.29	.25	$41.57	$319.32
Screening protocols	Identify Patients needing Assistance to Lab	Case Manager	$106,425	$63.96	.5	$31.98	$245.64
Screening protocols	Patient Taken to LabCorp	Case Manager	$106,425	$63.96	5	$319.79	$2,455.92
Screening protocols	Patient Taken to LabCorp	Navigator	$53,922	$32.41	1	$32.41	$248.88
Population-based care	Lab Results to Clinicians	Admin Staff	$74,310	$44.66	1	$44.66	$353.64
Population-based care	Labs Entered into EMR	Navigator	$53,922	$32.41	1	$32.41	$248.88
Patient-centered team	Evaluate Lab Results and Decide Further Action	Psychiatrist	$276,705	$166.29	.75	$124.72	$957.84
Patient-centered team	Evaluate Lab Results and Decide Further Action	PCP eConsultant	$193,466	$116.27	.75	$87.20	$669.72
Patient-centered team	Panel for Complex Patients	Psychiatrist	$276,705	$166.29	.5	$83.14	$310.80
Patient-centered team	Panel for Complex Patients	PCP eConsultant	$193,466	$116.27	.5	$58.13	$303.12
Patient-centered team	Panel for Complex Patients	Case Manager	$106,425	$63.96	.5	$31.98	$295.44
Treatment protocols	Prescriptions for Patients	Psychiatrist	$276,705	$166.29	.167	$27.77	$295.44
TOTALS WITHOUT AUTOMATED REGISTRY					***44.99***	***$3,354.48***	***$40,253.75***
ESTIMATED TOTALS WITH AUTOMATED REGISTRY					***28.99***	***$2,639.96***	***$31,679.52***