

Understanding the Cost of a New Integrated Care Model to Serve CMHC Patients Who Have Serious Mental Illness

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People with serious mental illness, such as schizophrenia and bipolar disorder, experience premature mortality, often from cardiovascular disease (CVD). Unfortunately, people with serious mental illness typically are not screened or treated for CVD risk factors despite national guideline recommendations. Access to primary preventive care in community mental health settings has the potential to reduce early mortality rates in this population. The authors review best practices for developing an integrated care model for people with serious mental illness by considering

economic feasibility and sustainability from the perspective of a community mental health clinic (CMHC). A process-mapping approach was used to gather information on clinic costs (staff roles, responsibilities, time, and salary) of serving 544 patients at one CMHC. The estimated annual cost of the model was measurable and modest, at \$74 per person, suggesting that this model may be financially feasible.

Psychiatric Services 2017; 68:990–993; doi: 10.1176/appi.ps.201700199

People with serious mental illness lose 25 years of life expectancy compared with the general population, largely from premature cardiovascular disease (CVD) (1). Although national guidelines recommend screening for CVD risk factors, adherence to these guidelines remains poor (2). Screening in the public health care system is challenged by the divide between mental health care and primary care (3). People with serious mental illness often have complex health needs and could benefit from integrated care (4).

The collaborative care model (CCM) is an evidence-based integrated care model in primary care, with 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 integrated care models that provide primary care to people with serious mental illness in community mental health settings (6). Although a recent randomized trial on health homes in behavioral health settings appears promising (7), a Cochrane meta-analysis was unable to recommend an evidence-based approach to provide comprehensive health care for people with serious mental illness (8). Also, various integration models are costly: behavioral health care–primary care integration pilot programs funded by the Substance Abuse and Mental Health Services Administration (SAMHSA) were found to be fiscally unsustainable (9). Because most people

with serious mental illness are publicly insured (10), with routine contact mostly with mental health providers, an affordable and comprehensive integrated care model is needed.

A New Integrated Care Model

Although screening for CVD risk factors could occur in primary care, people with serious mental illness use primary care far less than the general population (11). Nearly half of people with serious mental illness regularly access community mental health services, thus making these settings their de-facto “health home” (12). Because the CCM has been shown to improve mental and general health for people in primary care settings (6), we used a form of reverse engineering to develop a similar model, called CRANIUM, that has all the components of collaborative chronic care (6). CRANIUM (cardiometabolic risk assessment and treatment through a novel integration model for underserved populations with mental illness)—was developed by using behavioral theories (behavior change wheel and the 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 has four components: patient-centered team (patient, psychiatrist, primary care consultant, case manager, and 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 community mental health clinic (CMHC) in San Francisco that uses intensive case management for approximately 700 publicly insured adults with serious mental illness (admission criteria include multiple acute care psychiatry visits in the past year; many patients also have extensive criminal justice history). For this pilot study, we delivered the intervention to a subset of patients who received care in the main clinic (544/700)—as opposed to in-home care or at a supportive housing site. This CMHC has seven part-time psychiatrists (5.9 full-time equivalents [FTEs]) and 31 full-time case managers. For CRANIUM, a .20 FTE peer navigator and a .10 FTE off-site primary care consultant were added to these pre-existing resources. The primary care provider was an “e-consultant,” who connected with the clinic over an electronic server to advise on primary care matters, including medication initiation, laboratory abnormalities, and establishing a connection with outpatient primary care providers if necessary. The e-consultant provided all psychiatrists with one-time, one-hour training on managing metabolic abnormalities and medication algorithms to treat diabetes, hypertension, and hyperlipidemia.

A peer navigator prepared lab slips, accompanied patients to laboratory facilities, and entered laboratory results into the electronic health record (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. All registry patients are organized by provider so that the team can review a provider's panel of patients. A panel management meeting was conducted quarterly to review the registry and discuss abnormal results and follow-up plans, including how to obtain lab tests for patients with complex needs.

Estimating Costs of This New Integrated 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 CMHC.

This approach involved identifying and quantifying the complete set of activities (or processes) involved in delivering CRANIUM and their associated resources (or costs) within the current practice of the CMHC, including population-based care, a patient-centered team, screening protocols, and treatment protocols (13). This approach captured complete information on 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 later 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 1,664 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 included only costs for CRANIUM and was 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 CMHC (14). Costs exclude patient investments of time, money, or other resources and laboratory processing and drugs, because Medicaid incurs these costs. We did not include research-related planning and development costs, instead assuming the analytic perspective of implementing a preexisting intervention (14).

The CRANIUM intervention required approximately 45 hours of 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 per patient. Use of an automated registry would reduce staff time to 29 hours per month, or about 37 minutes per patient annually, and costs would be \$31,680 per year, or \$58 per 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%), peer 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). Because the current service would not be visible in claims data, we chose to use 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 a unique role (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 focused 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 affect long-term costs from cardiometabolic disease. A comprehensive evaluation of the feasibility of the CRANIUM intervention is currently under way.

TABLE 1. Costs of the CRANIUM model to serve 544 patients at a community mental health clinic^a

Process and task	Staff member	Annual salary	Salary per hour	Hours per task	Cost per month	Cost per year
Population-based care						
Create patient registry	Administrative staff	\$74,310	\$44.66	16.00	\$714.52	\$8,574.23
Review registry; complete lab slips and distribute	Peer navigator	\$53,922	\$32.41	4.58	\$148.42	\$1,780.98
Receive registry with lab slips; make appointments	Psychiatrist	\$276,705	\$166.29	4.00	\$665.16	\$7,981.88
Send lab results to clinicians	Administrative staff	\$74,310	\$44.66	1.00	\$44.66	\$535.89
Enter lab results into EHR	Navigator	\$53,922	\$32.41	1.00	\$32.41	\$388.86
Screening protocols						
Plan for obtaining labs	Psychiatrist	\$276,705	\$166.29	2.00	\$332.58	\$3,990.94
Plan for obtaining labs	Case manager	\$106,425	\$63.96	2.00	\$127.91	\$1,534.98
Take vitals	Psychiatrist	\$276,705	\$166.29	.25	\$41.57	\$498.87
Transport to nurse for vitals	Case manager	\$106,425	\$63.96	.12	\$135.59	\$1,627.07
Take vitals, enter into EHR	Nurse	\$214,269	\$128.77	2.12	\$272.99	\$3,275.84
Evaluate patients who need labs	Psychiatrist	\$276,705	\$166.29	.25	\$41.57	\$498.87
Identify patients needing assistance to lab	Case manager	\$106,425	\$63.96	.50	\$31.98	\$383.74
Take patient to lab	Case manager	\$106,425	\$63.96	5.00	\$319.79	\$3,837.44
Take patient to lab	Peer navigator	\$53,922	\$32.41	1.00	\$32.41	\$388.86
Patient-centered team						
Evaluate lab results and decide further action	Psychiatrist	\$276,705	\$166.29	.75	\$124.72	\$1,496.60
Evaluate lab results and decide further action	PCP e-consultant	\$193,466	\$116.27	.75	\$87.20	\$1,046.39
Review panel of complex patients	Psychiatrist	\$276,705	\$166.29	.50	\$83.14	\$997.73
Review panel of complex patients	PCP e-consultant	\$193,466	\$116.27	.50	\$58.13	\$697.59
Review panel of complex patients	Case manager	\$106,425	\$63.96	.50	\$31.98	\$383.74
Treatment protocol						
Write prescriptions for patients	Psychiatrist	\$276,705	\$166.29	.17	\$27.77	\$333.24
Total without automated registry				44.99	\$3,354.48	\$40,253.75
Estimated total with automated registry				28.99	\$2,639.96	\$31,679.52

^a CRANIUM, cardiometabolic risk assessment and treatment through a novel integration model for underserved populations with mental illness; EHR, electronic health record; PCP e-consultant, offsite consultant providing primary care consultation

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 serious mental illness. An efficient integrated care model such as CRANIUM is especially timely given that integration is a national priority.

The low cost of this model is particularly notable compared with the relatively costly integrated care interventions piloted by SAMHSA (9). This low cost is also notable because costs associated with the complications of cardiometabolic diseases are much higher than the costs of preventing cardiometabolic diseases, especially in high-prevalence populations (15). Given that an estimated 20% of U.S. adults with serious mental illness have diabetes but 70% of them are not screened (2), failure to identify and treat diabetes early will generate very high downstream costs. CRANIUM appears to be a financially feasible model to improve cardiometabolic care in CMHCs.

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Dr. Mangurian was supported by National Institute of Mental Health (NIMH) grant K23MH093689 and National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) grant P30 DK092924. Dr. Niu was supported by a National Institutes of Health (NIH) Ruth L. Kirschstein National Research Service Award (T32MH018261) and by consulting fees from the University of Washington AIMS Center. Dr. Schillinger was supported by NIDDK grant P30DK092924 and NIMH grant P60MD006902. Dr. Newcomer has grant support from NIH.

Dr. Newcomer has received grant support from Otsuka America Pharmaceutical and consulting fees from Sunovion, and he serves on a data safety monitoring board for Amgen. The other authors report no financial relationships with commercial interests.

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