Connected Care: Improving Outcomes for Adults With Serious Mental Illness

James M. Schuster, MD, MBA; Suzanne M. Kinsky, MPH, PhD; Jung Y. Kim, MPH; Jane N. Kogan, PhD; Allison Hamblin, MSPH; Cara Nikolajski, MPH; and John Lovelace, MS

ABSTRACT

OBJECTIVES: To evaluate the effectiveness of Connected Care—a care coordination effort of physical and behavioral health managed care partners in Pennsylvania—on acute service use among adult Medicaid beneficiaries with serious mental illness (SMI).

STUDY DESIGN: We examined changes in service utilization using a difference-in-differences model, comparing study group with a comparison group, and conducted key informant interviews to better understand aspects of program implementation.

METHODS: We compared the difference in service use rates between baseline year and 2-year intervention period for the Connected Care group (n = 8633) with the difference in rates for the comparison group (n = 10,514), confirming results using a regression adjustment.

RESULTS: Mental health hospitalizations (per 1000 members per month) decreased for the Connected Care group from 41.1 to 39.6, while increasing for the comparison group from 33.8 to 37.2 (P = .04). All-cause readmissions within 30 days decreased nearly 10% for Connected Care while increasing slightly for the comparison group (P <.01), with a similar pattern observed for 60- and 90-day all-cause readmissions. No differences were observed in physical health hospitalizations, drug and alcohol admissions, or ED use. Data from qualitative stakeholder interviews illuminated facilitators and barriers of implementing Connected Care.

CONCLUSIONS: Payer-level healthcare information sharing can help identify members who could benefit from care coordination services, inform care management activities, and assist with pharmacy management. Results can inform state, health plan, and provider efforts around integration of care for individuals with SMI and improve care efficiencies and quality, which is especially important in this time of Medicaid expansion.

Am J Manag Care. 2016;22(10):678-682

The number of individuals with healthcare coverage under Medicaid is expanding with full enactment of the Affordable Care Act (ACA), and the number of enrollees with serious mental illness (SMI), such as severe mood disorders and schizophrenia, who currently comprise 12.8% of those covered by Medicaid, is also increasing.[1,2] Individuals with SMI have higher rates of physical illness than the general population,[3,4] and healthcare systems often struggle to meet their needs.[5] Recent efforts to improve health outcomes for this population have focused on physical and mental healthcare coordination.[6-8]

Under the ACA, states have options to develop new and refined solutions to address the special needs of the Medicaid population to provide care coordination, health promotion, and a connection to resources. The development of sophisticated information technology and implementation of health homes by many states grants opportunity for improvements in care coordination for individuals with the highest need.[9] Many states currently utilizing health home models contract with managed care organizations (MCOs) for delivery of other Medicaid benefits. States support MCOs to provide care management and care coordination to enrolled members; however, few states engage MCOs in health home programs—partially due to limited examples of how to do this effectively.[10] States, MCOs, and other decision makers need effective models to enhance care coordination.

In some cases, states deliver Medicaid benefits through managed care "carve out" of behavioral health services to MCOs with specialty expertise. Some models, such as Pennsylvania's, were developed in part to assure that behavioral health services are well integrated with other social services frequently used by Medicaid members. Regardless of carve-out status, identifying effective models of coordination within and across MCOs is critical to enabling integration of services for individuals receiving care in both delivery systems.

Care coordination is expected to improve health outcomes and lower costs by decreasing gaps in care, thereby lowering the rates of crisis and acute care, decreasing duplication of services, and improving medication management.[7] Despite growing consensus that care

coordination leads to better outcomes,[11,12] there is little evidence of how to best do it among Medicaid beneficiaries with SMI. The present study provides an overview of the implementation of Connected Care, a care coordination improvement effort of managed care partners in southwest Pennsylvania (PA) for adult Medicaid beneficiaries with SMI.

UPMC *for You* and Community Care Behavioral Health (CCBH), physical and behavioral health payers, respectively, collaborated to implement Connected Care using several strategies: enhanced care management, member education, and information sharing between payers and providers through multidisciplinary case review meetings and notifications of hospitalizations, emergency department (ED) visits, potential care gaps, and medication refill gaps. Details of Connected Care components are outlined in **Table 1**.

The Center for Health Care Strategies (CHCS), Pennsylvania Department of Human Services (PA DHS), and Allegheny County Department of Human Services provided oversight and technical assistance during the 2-year program, from 2009 to 2011. A stakeholder advisory group provided input on how best to engage members and feedback on program materials (eg, welcome kits, brochures/fliers, consent forms). Mathematica Policy Research, a program evaluation and policy research firm, served as an independent evaluator.

In this paper, we highlight several outcomes of the Connected Care program and provide a summary of our implementation experience to inform future MCO and system-level efforts to coordinate physical and behavioral healthcare for Medicaid beneficiaries.

TAKE-AWAY POINTS

This study provides evidence that making system-level connections for physical and behavioral healthcare produced positive health outcomes for individuals with serious mental illness (SMI).

- Improvements in mental health hospitalization and all-cause readmissions were observed for adult Medicaid beneficiaries with SMI in the Connected Care program.
- The approach described here may help to inform the efforts of other states, health plans, and providers interested in better integration of care for individuals with physical and behavioral health needs and improve efficiencies and quality in care delivery, which is especially important in this time of Medicaid expansion.

METHODS

The Connected Care group (n = 8633) and comparison group (n = 10,514) included those with at least 1 claim with diagnosis of schizophrenia, major mood disorder, psychotic disorder not

TABLE 1. Components of Connected Care[a]

Component	Description
Member risk stratification	• Using data from Medicaid claims, enrollment data, and utilization history, members were categorized into 3 risk tiers based on risk of adverse physical and behavioral health events[b]: › Tier 1: High physical health risk[c]; high or low behavioral health risk[d] › Tier 2: Low physical health risk; high behavioral health risk › Tier 3: Low physical health risk; low behavioral health risk
Integrated care plan development	• Plan care managers, either onsite at community health centers or via phone, educated eligible members about Connected Care. Care managers shared health information that did not include any diagnostic information (ie, notifications of hospitalizations, ED visits, and/or lapses in atypical antipsychotic refills) across the plans and with providers; mental health and substance use information was included if members consented to share this information • Case reviews of complex cases with providers, pharmacists, and other key staff
Hospitalization notification	• Physical/behavioral health care plans alerted one another within 1 business day when a member was hospitalized or visited an ED • Individual providers were notified by care managers using daily reports • Member education and follow-up after hospitalization to emphasize alternatives to ED resources for nonemergency conditions
Refill gap notification	• Automated letters notified prescribers of refill gaps for members prescribed an atypical antipsychotic

ED indicates emergency department.

[a]As part of this project, the Pennsylvania Department of Human Services established several performance measures to increase collaboration across the partners. Although these measures covered some key elements of integrated care, for example, pharmacy management and information exchange, they were not intended to cover all of the core elements.

[b]Based on the National Council for Behavioral Healthcare's Four Quadrant Model

[c]High physical health risk includes: ≥3 ED visits in last 3 months or ≥3 inpatient admissions excluding maternity, skilled nursing facility, and rehabilitation, in the past 6 months.

[d]High behavioral health risk includes: history of being served in a state mental hospital in the past 2 years or within the past 12 months; discharge from a state mental hospital; diversion from a state mental hospital to a less restrictive level of care; ≥5 admissions to the most restrictive levels of care including readmissions to those levels of care within 30 days; 4 admissions to the most restrictive levels of care and inpatient mental health, or residential treatment facility admission, or community treatment team admission; 2 to 3 admissions to the most restrictive levels of care and inpatient mental health along with open authorization for certain behavioral health services; or 1 admission to the most restrictive levels of care and inpatient mental health or residual treatment facility discharge with authorization for certain behavioral health services.

otherwise specified, and/or borderline personality disorder (based on the PA DHS's definition of SMI)[13] in the time frame beginning 2 years before program initiation and end of the 2-year intervention period; being 18 years or older on the date of service with SMI diagnosis; living in Allegheny County, PA; and being a CCBH member. The Connected Care group was enrolled in UPMC *for You* for physical health managed care and the comparison group in other physical health Medicaid managed care plans in same service area.

We conducted a mixed methods evaluation, combining qualitative data collection with analysis of administrative claims data. We analyzed Medicaid service claims for all eligible members in both groups to assess changes in hospitalizations (separately for mental health, drug and alcohol, and physical health); 30-, 60-, and 90-day readmissions; and ED use. The main analysis consisted of a difference-in-differences (DID) calculation on the mean of each outcome, comparing rates 12 months before implementation of Connected Care to rates during the intervention period. To obtain a measure of significance for the DID estimate, we ran a weighted regression, where the only controls were treatment (study group) indicator, pre-post indicator, and interaction between the 2. The coefficient on the interaction term was the DID estimate. (The magnitude of the coefficient in the logit model was not the DID estimate, but we used it for the measure of significance of the estimate.) Means were generated from postestimation recycled predictions. Secondary analysis examined outcomes for members who provided written consent to share health information across plans and with providers, compared with outcomes for the comparison group. All analyses were done using SAS version 9.3 (SAS Institute Inc., Cary, North Carolina).

Finally, semi-structured interviews were conducted with representatives from UPMC *for You*, CCBH, county health department staff, consumer advisory board members, consumers, and providers. Mathematica conducted 24 interviews, each 45 to 90 minutes (for program staff) or 15 to 20 minutes (for consumers). Topics included organizational structure and motivation for participation, member outreach strategies, core intervention components, implementation successes and lessons, expectations of short- and long-term intervention effects, and other factors that shaped implementation.

RESULTS

Both the study and comparison groups had similar demographic characteristics; however, the Connected Care group had a significantly higher mean age (39.4 vs 38 years), percentage of males (37.3% vs 34.3%), and percentage of whites (61.8% vs 58.2%) than the comparison group. Both groups had similar behavioral health diagnoses, with the majority having a diagnosis of mood disorder (89.4% Connected Care vs 89% comparison group), although the Connected Care group had a higher proportion of comorbid anxiety diagnoses (33.8% vs 30.5%). The Connected Care group also had significantly higher percentages of physical health conditions and inpatient utilization at baseline (**Table 2**). Of the 8633 in the Connected Care group, 2500 (29%) agreed to work with a care manager and 870 (~10%) agreed to share additional mental health and substance use information. Individuals in Connected Care and comparison groups were enrolled in their plan for average of 18.3 months and 15.9 months, respectively.

Quantitative

The rate of mental health hospitalizations (per 1000 members per month) decreased for Connected Care members from 41.1 to 39.6, while increasing for comparison group members from 33.8 to 37.2 ($P = .04$). This decrease for Connected Care was an estimated 12% lower than what we would expect based on the change in rate of hospitalizations observed in the comparison group. The percentage of admissions resulting in a readmission (for all causes) within 30 days decreased nearly 10% for the Connected Care group (from 43.1% to 38.9%), while increasing slightly for the comparison group (from 39.5% to 39.7%) ($P < .001$). This pattern was similar for 60- and 90-day all-cause readmissions. No statistically significant changes in physical health hospitalizations, drug and alcohol admissions (hospital and nonhospital), or ED use were found (Table 2). Regression analyses confirmed these results. Both members who consented to share health information across plans and with providers and the entire study group experienced a significant decrease in mental health–related hospitalizations relative to the comparison group.

Qualitative

Established member relationships facilitated the implementation of Connected Care. CCBH and UPMC *for You* care managers had preexisting relationships with many members and providers in the program due to their existing roles as care coordinators for health home initiatives in UPMC practices. Given this, some members already felt comfortable meeting with care managers and offering detailed information that could be shared with providers. Care manager facilitation of information sharing between behavioral health providers and primary care physicians (PCPs) was welcomed due to the existing relationship between CCBH and UPMC provider offices and hospitals. PCPs valued receiving previously unavailable clinical information about members from navigators and care managers, noting that information about members' mental health status and recent healthcare and medication use was particularly useful for care integration. Because the behavioral and physical managed care plans were within the same corporate structure, having shared leadership and support for Connected Care was beneficial in shifting toward integrated care.

Implementation challenges included variability in member comfort with their healthcare information being shared across providers. Some members assumed this was already happening, whereas others had concerns of provider stigmatization with the sharing of behavioral health information and, hence, refused to

TABLE 2. Results[a]

Measure	Connected Care (n = 8633)	Comparison Group (n = 10,514)
Baseline characteristics	**%**	**%**
Age, years: mean[b]	39.4	38.0
Female[b]	62.7	65.7
Race		
African American	34.7	39.3
White	61.8	58.2
Other	3.6	2.4
Ethnicity		
Hispanic[b]	0.9	0.5
Behavioral health conditions		
Schizophrenia	19.5	18.5
Mood disorder	89.4	89.0
Borderline personality disorder	2.4	1.9
Comorbid anxiety[b]	33.8	30.5
Comorbid nondependent drug abuse	47.0	48.6
Physical comorbidities		
Asthma[b]	21.3	19.7
Chronic obstructive pulmonary disease[b]	12.9	11.0
Congestive heart failure[b]	3.5	2.7
Coronary artery disease[b]	8.3	6.6
Diabetes[b]	14.9	12.9
Hyperlipidemia[b]	22.5	18.8
Hypertension[b]	33.0	28.8
Outcomes	**Percentage change in the rate in the baseline and intervention periods**	
Mental health hospitalizations[c,d]	–3.9%	+10.1%
Physical health hospitalizations[c]	–10.3%	–8.1%
Alcohol and other drug hospitalizations[c]	–3.4%	–3.8%
30-day all-cause readmissions[b]	–9.7%	+0.5%
60-day all-cause readmissions[b]	–8.3%	+0.6%
90-day all-cause readmissions[b]	–8.0%	–0.2%
Emergency department use[c]	–7.3%	–0.8%

[a]Results confirmed using regression adjustment, controlling for age, gender, race, ethnicity, and number of months enrolled. Adjusted for 7 common physical health conditions (chronic obstructive pulmonary disease, congestive heart failure, coronary artery disease, diabetes, hyperlipidemia, hypertension, and asthma) and 5 common behavioral chronic conditions (schizophrenia, mood disorders, anxiety, borderline personality disorder, and nondependent abuse of drugs), and baseline emergency department (ED) utilization (for regressions on the number of inpatient admissions) or baseline inpatient utilization (for regression on the number of ED visits). To identify ED visits or hospitalizations, we used the Use of Services measure specifications from the 2009 Healthcare Effectiveness Data and Information Set. ED and inpatient utilization was either a dichotomous or count variable.
[b]P <.01.
[c]Average number per 1000 members per month.
[d]P <.05.

consent to share information. Further, the initial risk classification strategy to direct finite resources to highest-need members was assessed and readjusted after implementation. Tier 2 (low physical health risk/high behavioral health risk) captured too many members for care managers to conduct effective outreach, so there was a second level of prioritization to narrow the target population within that tier to the highest ED and hospital utilizers. Finally, engaging providers was challenging given the many demands on their time. Engagement strategies were most successful when they were targeted to providers who already had a high proportion of members with SMI and matched the existing practice workflow.

DISCUSSION

This study suggests that making system-level connections for physical and behavioral health can contribute to positive health outcomes for individuals with SMI. Improvements in mental health hospitalization and all-cause readmissions were observed for adult Medicaid beneficiaries in the Connected Care program. The fact that mental health hospitalizations decreased in the Connected Care group while remaining unchanged in the comparison group suggests that better coordination between the physical and behavioral managed care plans has the potential to improve care. In addition, care managers emphasized that contacting members after hospitalizations likely contributed to the decrease in readmissions. However, different strategies may be necessary to affect metrics in which we did not observe differences between the groups.

Other system- and provider-level factors contributed to successful implementation. Because many individuals with SMI have physical health comorbidities, but do not necessarily have relationships with their PCPs, a program that integrates and utilizes both physical and behavioral healthcare management can help improve care for these individuals. Our study indicates that many individuals with SMI are reluctant to consent to

sharing health information across plans and providers; yet, many are willing to engage in care management, providing the plans with an important opportunity to enhance coordination. Our finding that exchanging behavioral health and physical health information technology has the potential to aid collaborative care is consistent with previous findings in Medicaid care coordination.[14] Sharing information among providers was valuable for this effort; organizations engaged in similar efforts should consider enhanced strategies to fully inform and educate members about the potential benefits of information sharing across providers.

During the implementation of Connected Care, other quality improvement initiatives—for example, a patient-centered medical home pilot initiative and ED diversion program—were concurrently employed at both plans, as well as within the provider organizations where members receive services. The plans' previous experience implementing quality improvement initiatives likely improved their organizational capacity needed to implement Connected Care.[15] Because this research was conducted in a real-world setting, it is difficult to disentangle and categorize all potential interventions to which participants were exposed. This important limitation is inherent to many other studies that are conducted within complex, unbounded healthcare settings. Analyzing cost implications was beyond our study scope, but future research weighing cost of improving care coordination against potential savings of reducing unplanned care would provide additional insight for payers to enhance care coordination efforts.

CONCLUSIONS

The Connected Care approach, in which high-risk members are targeted for real-time intervention, can inform efforts of other states, health plans, and providers interested in better integration of care for individuals with physical and behavioral health needs and improve efficiencies and quality in care delivery, which is especially important in this time of Medicaid change and expansion. Our experiences provide clinical- and policy-level decision makers with valuable information in promoting efficient delivery of high-quality care for this vulnerable population.

Author Affiliations: Community Care Behavioral Health Organization (JMS), Pittsburgh PA; UPMC *for You* (JL), and UPMC Center for High-Value Health Care (JNK, SK, CN), and UPMC Insurance Services Division, University of Pittsburgh Medical Center, Pittsburgh PA; Mathematica Policy Research (JYK), Princeton, NJ; Center for Health Care Strategies (AH), Hamilton, NJ.

Source of Funding: Start-up was funded by Community Care Behavioral Health Organization ("Community Care") and UPMC *for You*, which have committed substantial financial, personnel and development resources to the design, testing and implementation of multiple care coordination and wellness activities.

Author Disclosures: Dr Schuster, Mr Lovelace, Ms Nikolajski, and Drs Kogan and Kinsky are employees of University of Pittsburgh Medical Center (UPMC); Connected Care is a clinical program of UPMC. The remaining authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (AH, JNK, JL, JMS); acquisition of data (JYK, JMS); analysis and interpretation of data (JNK, JYK, JMS); drafting of the manuscript (AH, JNK, JYK, SMK, CN, JMS); critical revision of the manuscript for important intellectual content (AH, JYK, SMK, JL, CN, JMS); statistical analysis (JYK); obtaining funding (AH, JMS); administrative, technical, or logistic support (AH, JNK, SMK, JL, CN, JMS); and supervision (JMS).

Address Correspondence to: Jane N. Kogan, PhD, UPMC Center for High-Value Health, UPMC Insurance Services Division, 600 Grant St, 40th Fl, Pittsburgh PA, 15219. E-mail: koganjn@upmc.edu.

REFERENCES

1. Croft B, Parish SL. Care integration in the Patient Protection and Affordable Care Act: implications for behavioral health. *Adm Policy Ment Health.* 2013;40(4):258-263. doi: 10.1007/s10488-012-0405-0.

2. Garfield RL, Zuvekas SH, Lave JR, Donohue JM. The impact of national health care reform on adults with severe mental disorders. *Am J Psychiatry.* 2011;168(5):486-494. doi: 10.1176/appi.ajp.2010.10060792.

3. Carney CP, Jones L, Woolson RF. Medical comorbidity in women and men with schizophrenia: a population-based controlled study. *J Gen Intern Med.* 2006;21(11):1133-1137.

4. Osborn DP, Wright CA, Levy G, King MB, Deo R, Nazareth I. Relative risk of diabetes, dyslipidaemia, hypertension and the metabolic syndrome in people with severe mental illnesses: systematic review and metaanalysis. *BMC Psychiatry.* 2008;8:84. doi: 10.1186/1471-244X-8-84.

5. Bao Y, Casalino LP, Pincus HA. Behavioral health and health care reform models: patient-centered medical home, health home, and accountable care organization. *J Behav Health Serv Res.* 2013;40(1):121-132. doi: 10.1007/s11414-012-9306-y.

6. Hamblin A, Verdier J, Au M. State options for integrating physical and behavioral health care. Integrated Care Resource Center website. http://www.integratedcareresourcecenter.com/pdfs/icrc_bh_briefing_document_1006.pdf. Published October 2011. Accessed December 22, 2015.

7. Mechanic D. Seizing opportunities under the Affordable Care Act for transforming the mental and behavioral health system. *Health Aff (Millwood).* 2012;31(2):376-382. doi: 10.1377/hlthaff.2011.0623.

8. Woltmann E, Grogan-Kaylor A, Perron B, Georges H, Kilbourne AM, Bauer MS. 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.* 2012;169(8):790-804. doi: 10.1176/appi.ajp.2012.11111616.

9. Compilation of Patient Protection and Affordable Care Act. HHS website. http://www.hhs.gov/sites/default/files/ppacacon.pdf. Published June 9, 2010. Accessed December 22, 2015.

10. Hasselman D, Bachrach D. Implementing health homes in a risk-based Medicaid managed care delivery system. Center for Health Care Strategies website. http://www.chcs.org/media/Final_Brief_HH_and_Managed_Care_FINAL.pdf. Published June 2011. Accessed December 22, 2015.

11. Institute of Medicine (US) Committee on Crossing the Quality Chasm: Adaptation to Mental Health and Addictive Disorders. *Improving the Quality of Health Care for Mental and Substance-Use Conditions.* Washington, DC. National Academy Press; 2006.

12. Mental health policy and guidance package: organization of services for mental health. World Health Organization website. http://www.who.int/entity/mental_health/policy/services/4_organisation%20services_WEB_07.pdf?ua=1. Published 2003. Accessed December 22, 2015.

13. Mental health bulletin—serious mental illness: adult priority group. Pennsylvania Department of Human Services website.. http://www.dhs.pa.gov/cs/groups/webcontent/documents/bulletin_admin/d_003685.pdf. Published March 4, 1994. Accessed December 22, 2015.

14. Kozubal DE, Samus QM, Bakare AA, et al. Separate may not be equal: a preliminary investigation of clinical correlates of electronic psychiatric record accessibility in academic medical centers. *Int J Med Inform.* 2013;82(4):260-267. doi: 10.1016/j.ijmedinf.2012.11.007.

15. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci.* 2009;4(1):50. doi: 10.1186/1748-5908-4-50. ■