SMI Innovations Project in Pennsylvania:

Final Evaluation Report

October 1, 2012

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EXECUTIVE SUMMARY

In 2009, the Pennsylvania Department of Public Welfare (DPW) and the Center for Health Care Strategies (CHCS) partnered to launch two pilot programs to integrate physical and behavioral health care services for adult Medicaid beneficiaries with serious mental illness (SMI) and co-occurring physical health conditions. The project was part of the Rethinking Care Program, a CHCS-led national initiative made possible through support from Kaiser Permanente that sought new ways to improve the quality and decrease spending for high-need, high-cost Medicaid beneficiaries. In Pennsylvania and many other states, physical and behavioral health care delivery and payment systems in Medicaid are reimbursed separately, creating fragmentation in services. Medicaid beneficiaries with SMI are particularly negatively affected by the resulting lack of coordination in care, often receiving more sporadic and lower-quality care than other Medicaid beneficiaries (Hamblin 2011). Despite the growing consensus that improved integration will lead to improved care and lower costs (Institute of Medicine 2006; World Health Organization 2003), evidence on how best to achieve such integration is lacking.

The SMI Innovations Project

The SMI Innovations Project was a two-year pilot that began in July 2009 in Southeast and Southwest Pennsylvania. Each pilot was a collaboration between physical health managed care organizations, behavioral health managed care organizations, and county behavioral health offices (referred to as "the partners").[1] DPW selected two regions in which to implement pilot projects that would test promising strategies and facilitate an examination of implementation challenges specific to each region and intervention approach. The partners in each region designed their own programs, guided by a common framework of key elements of an integrated system of physical and behavioral health care, developed by DPW. Understanding the importance of fostering support for a new program and the lack of financial alignment across the physical and behavioral health systems, DPW established a bonus incentive that partners could attain by meeting several performance measures, which included member stratification into risk groups, joint development of patient-centered care plans, notification of hospital admissions, and prescriber notification of refill gaps for atypical antipsychotics. In the second year, half of the bonus was tied to improvements in emergency department (ED) visits and hospitalizations.

Southeast Pennsylvania: HealthChoices HealthConnections

HealthChoices HealthConnections (HCHC) was a decentralized, community-based partnership among Magellan Behavioral Health; Keystone Mercy Health Plan; and the county behavioral health offices in Bucks, Montgomery, and Delaware counties (Table 1). After jointly developing a core strategy, each county customized its own approach based on its existing infrastructure and resources—for example, deciding the types of staff that would implement the intervention and how they would be funded. This flexible approach improved support at the county level, and partners preferred this strategy over a one-size-fits-all model, because it enabled them to design a program that they could potentially sustain. The three counties varied in terms of experience with system

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[1] For detailed descriptions of the pilot programs, refer to the HCHC and Connected Care case studies.

reforms. Notably, the Montgomery County behavioral health office had been working toward a system of person-centered recovery-oriented care for several years, making integrating physical health and establishing navigator teams a natural next step.

Consumer or member engagement and enhanced care coordination through a navigator (a nurse, behavioral health clinician, or case manager employed by a behavioral health agency) were core components of HCHC. Navigators engaged members, obtaining their consent to share health care information with providers. Through regular, in-person contact, navigators bridged the gap between their own agency, physical health providers, and other behavioral health providers, sharing information on recent hospital and ED use and developing member care plans. Navigators emphasized early recognition of symptoms that could lead to a decline in physical or mental health.

Table 1. SMI Innovations Project: Overview of the Southeast and Southwest Pennsylvania Pilots

	HealthChoices HealthConnections (Southeast Pennsylvania)	Connected Care (Southwest Pennsylvania)
Counties	Bucks, Montgomery, and Delaware	Allegheny
Behavioral Health Plan	Magellan Behavioral Health	Community Care Behavioral Health
Physical Health Plan	Keystone Mercy Health Plan	UPMC for You
Program Model	Decentralized, community-based model	Centralized, plan-based model
Key Program Elements	Navigators employed by a behavioral health agency engaged members who provided consent to share health information; navigators also worked with members to coordinate care Member health profile integrated key behavioral and physical health, pharmacy, and provider contact information Case rounds with staff from both plans and the behavioral health navigator	Plan care managers engaged members (primarily by telephone) UPMC practice-based nurse care managers helped coordinate care for members in select primary care practices Multidisciplinary case conferences informed care planning for complex cases Plans shared with providers hospitalization and ED use and care gaps for members

ED= Emergency Department; UPMC = University of Pittsburgh Medical Center.

Southwest Pennsylvania: Connected Care

Connected Care partners included UPMC for You, Community Care Behavioral Health (CCBH), and the Allegheny County Department of Human Services, Office of Behavioral Health (Table 1). The program had a centralized, top-down structure with full corporate support from health plan executives and consumer input through a Consumer and Family Advisory Committee. Although staff from UPMC for You and CCBH are owned by the same corporate entity and share offices in the same corporate complex, they previously had not worked together systematically. They therefore had to build relationships and learn each other’s practices much as staff from separate organizations would have had to do. UPMC for You and CCBH did, however, have several initiatives in place before Connected Care that facilitated implementation.

Key components of the pilot included enhancing outreach to high-risk members through UPMC for You and CCBH care managers and information sharing between plans and with providers through multidisciplinary case review meetings and notifications of hospitalizations, ED visits, potential care gaps, and medication refill gaps. Plans obtained members’ consent to share any health information with one another or with providers, other than notification of a hospitalization or ED visit. UPMC for You and CCBH care managers conducted comprehensive assessments identifying members’ behavioral health, medical, and psychosocial needs and linking members to services; providing education about appropriate ED and service use; and following up after hospitalizations. Most of this member contact occurred via telephone. However, UPMC for You care managers, who had offices within primary care practices as part of the plan's medical home initiative, also engaged Connected Care members and helped coordinate their care.

Evaluation Objectives and Methods

To determine whether the SMI Innovations Project improved care, we conducted a mixed-methods evaluation, combining qualitative data collection with an analysis of outcome measures constructed from administrative claims data. We conducted a site visit in each region in early 2010 to gather information about program development and early implementation. The next year, we conducted a follow-up site visit and held focus groups with navigators and care managers. In both years, we conducted telephone interviews with partners and other stakeholders in both regions. To evaluate the intervention's impact on health care utilization, we identified eligible Medicaid clients in each study county and comparison group populations for each program. We analyzed claims and enrollment data for the study and comparison groups to determine whether the programs had an effect on ED or hospital visits; readmissions; and the number of days between hospitalizations. To isolate potential changes due to the intervention rather than other unrelated factors or existing trends, we compared the difference in rates between the baseline and intervention periods for the study and comparison groups and adjusted for differences between them via regression analysis.

The Study Population

The eligible study populations in both pilot programs were large. HCHC included 4,788 study group and 7,039 comparison group members. From the study group, each county invited 614 to 710 eligible members to participate (1,955 total members across the three counties). Although the proportion of invited members who provided consent was from 39 to 47 percent in a given county, the absolute number of members who consented to share their information was fewer than 300 in each county (fewer than 20 percent of eligible members). Across all counties, 78 percent of the study group and 66 percent of the comparison group were enrolled in both plans for 18 months or more. The comparison counties were more rural and had a larger proportion of individuals of Hispanic ethnicity than the study group counties.

In Connected Care, the study and comparison groups included 8,633 and 10,514 members, respectively. Connected Care identified and stratified on a monthly basis members who might benefit most from the program. Although only 10 percent of eligible members consented to share their health information, care managers engaged all members who agreed to be contacted—about 2,500 members (29 percent) over the course of the intervention period. Members eligible for Connected Care at the start of the program (the "early" cohort) were enrolled in both plans for 20 months, on average, and 75 percent were enrolled for 18 or more months. Members who became eligible after the intervention started (the "late" cohort) were enrolled in both plans for 15 months, on average, and 32 percent were enrolled for 18 or more months. Because study and comparison group members resided in the same county, they had similar demographic characteristics.

Evaluation Findings

Partners Met Most Performance Measures in Both Study Years

The partners met most performance measures in both years of the SMI Innovations Project with a few notable exceptions. For example, the HCHC partners did not meet the hospital admission notification measure in the first year, but met all other performance measures. In year two, HCHC did not meet the stratification measure, but met the three other performance measures and both outcome measures. Likewise, the Connected Care program met three of the four collaboration measures in both years and both outcome measures. It did not meet the atypical antipsychotic refill gap measure in either year. The primary reason for not meeting measures related to data systems issues.

Partners Achieved Mixed Success in Improving ED Visit and Hospitalization Rates

Both programs had some success at improving ED use, mental health hospitalizations, or both among all eligible members, though some effects were isolated in specific subpopulations. The findings from the outcomes analysis suggest that *both models in the SMI Innovations Project hold promise for improving ED and mental health hospitalization rates among Medicaid beneficiaries with SMI*. However, these findings should be considered within the context that they are based on a test of two pilot programs, rather than definitive evidence that any type of integration program can have favorable effects on health care utilization at the population level.

The HCHC program improved the ED visit rate at the population level, compared with the comparison group, but improvements were primarily isolated to Montgomery County, which was the first county to begin implementation (Table 2). The rate of ED visits was an estimated 9 percent lower across all HCHC counties combined and an estimated 14 percent lower in Montgomery County alone than we projected would have occurred in the absence of the program, based on the outcomes observed in the comparison group. However, we did not identify effects on ED use in Bucks or Delaware counties. Differences in the rate of hospitalizations or the all-cause, 30-day readmission rate were small and not statistically significant. A number of factors might explain the absence of more wide-ranging effects, including implementation delays of almost a year in Bucks and Delaware counties and the relatively small number of engaged members in all counties compared with the number of eligible members.

Table 2. HCHC: ED Visits, Mental Health Hospitalizations, and 30- Day Readmissions

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
ED Visits[a]	148.1	142.4	-5.7	183.8	194.4	10.5	-16.2	0.036
Mental Health Hospitalizations[a]	30.1	24.4	-5.7	42.5	35.0	-7.5	1.9	0.485
Readmissions Within 30 Days[b]	38.4	38.6	0.2	32.9	32.8	-0.2	0.4	0.808

[a] Per 1,000 members per month.

[b] Percentage of discharges with a readmission within 30 days.

Note: The study group included all members who met the program eligibility requirements based on Medicaid claims or enrollment data, regardless of actual participation in the program. For information on sample size, please see Chapter II.

ED = emergency department; HCHC = HealthChoices HealthConnections.

The Connected Care program, most likely in conjunction with other concurrent initiatives in Allegheny County, contributed to improved population-level outcomes for eligible members (Table 3). Specifically, the mental health hospitalization and the all-cause 30-day readmission rates for the entire study population were an estimated 12 percent and 10 percent lower, respectively, compared with projected trends in these outcomes without the intervention. Among members of the late cohort, we also found favorable changes in ED use and mental health hospitalizations and readmissions. Specifically, among the late cohort, ED visits per 1,000 member months rose 17 percent in the comparison group; it rose much less in the study group (3.1 percent, $p = 0.052$). The same pattern was true of mental health hospitalizations per 1,000 member months ($p < 0.01$). The 30-day readmission rate for the late cohort fell 20 percent in the study group and rose slightly (2 percent) in the comparison group ($p < 0.01$).

Table 3. Connected Care: ED Visits, Mental Health Hospitalizations, and 30- Day Readmissions

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	p-Value
ED visits[a]	181.8	168.5	-13.3	179.9	178.5	-1.4	-12.0	0.100
Mental health hospitalizations[a]	41.1	39.6	-1.6	33.8	37.2	3.4	-4.9	0.041
Readmissions (30-days)[b]	43.1	38.9	-4.2	39.5	39.7	0.2	-4.4	<0.01

[a] Per 1,000 members per month.

[b] Percentage of discharges with readmissions within 30 days.

Note: The study group included all members who met the program eligibility based on Medicaid claims or enrollment data, regardless of actual participation in the program. For information on sample size, please see Chapter II.

ED = emergency department.

Lessons for Program Planning and Implementation

Pilot partners benefited from a balance of state-level and external leadership, but taking ownership of their programs fostered buy-in and sustainability. The SMI Innovations Project benefited from support at the highest levels of DPW. Moreover, local ownership—at the plan, county, or community level—was essential for partners to implement changes that their staff members would buy into and want to sustain.

Care integration in Pennsylvania Medicaid was previously uncharted territory; therefore, it was important to establish formal venues and methods for deliberate collaboration at multiple levels. Meetings held by the partners, which included leaders across the counties and plans, were critical for the establishment of common program elements and goals. At the state level, DPW held joint meetings across regions to share information; some partners noted that they would have benefited from more of these learning opportunities.

Privacy issues related to information exchange were critical for the state and partners to address early. The SMI Innovations Project required partners to share health information across systems and providers, subject to the constraints of federal and state privacy laws. Given the complexities associated with these laws, DPW invested considerable time in developing guidance on consent requirements for sharing behavioral health and HIV information between entities and providers. This guidance was essential for establishing the bounds within which the partners could plan information exchange strategies, although they proceeded more conservatively than DPW required.

Joint care planning and real-time hospital notification measures encouraged information sharing and a more holistic approach to care across systems. The joint care planning measure drove innovation and development of the member health profile in HCHC; the real-time hospital notification measure facilitated collaboration and identification of at-risk members in Connected Care. These performance measures provided a good starting point to encourage collaboration, but program developers might consider building in time for the partners to test the measures and providing regular feedback on measure performance so partners can make midcourse corrections to meet their goals. In addition, critical next steps include identifying how to improve interaction and information sharing with and among providers and identifying more clinically focused measures, such as measures of body mass index screening rates, weight loss, and smoking cessation.

Consumer- Level Lessons

Although partners employed multipronged member-engagement strategies, providing targeted education and support to a large number of members at risk of additional ED use or a readmission might be an effective approach. Because many individuals with SMI do not have relationships with their primary care providers (PCPs), a program that integrates physical and behavioral health care might be best introduced by a behavioral health clinician or case manager who has established a rapport and trust with members. This was HCHC's primary approach, and one that Connected Care turned to after encountering challenges with other methods. However, evaluation findings suggest that Connected Care's approach to member outreach—targeting members at highest risk for ED use or readmission to the hospital—also holds promise for improving quality of care.

Comprehensive member assessments, education about appropriate ED use, and follow-up after hospitalizations were key components of both pilot programs. Navigators and care managers played a crucial role in assessing members' needs using a holistic approach. Member education and follow-up after a hospitalization were critical functions of the navigators and care managers, who emphasized to members that resources other than the ED were available to them for non-emergency issues. In HCHC, particularly in Montgomery County, this strategy appears to have led to a more favorable ED visit rate.

Provider- Level Lessons

In states with county-based systems similar to Pennsylvania's, the behavioral health system might be the more natural point of provider and consumer engagement and care coordination for individuals with SMI. Behavioral health providers as standard business practice interact more frequently with behavioral health managed care organizations and county behavioral health offices. On the physical health side, there was no equivalent agency that established contracts with providers. In addition, individuals with SMI often receive most of their care in the behavioral health care setting, potentially making behavioral health providers a more natural starting point for integration efforts.

Resources to support integrated care and the size of the SMI population relative to the overall practice affected partners' ability to engage PCPs. A health plan's relationship with its PCPs can facilitate or hinder its participation in integration efforts. Plans with a complicated or adversarial history with their PCPs might have to build trust before engaging them in what could be viewed as supplemental activities. Health plans might find it easier to engage PCPs whose practices have a large proportion of members with SMI or resources to help coordinate care, although individual PCPs will have varying levels of interest.

Once engaged, PCPs valued receiving previously unavailable clinical support and information about members from navigators and care managers. Although engagement of PCPs was challenging, some PCPs noted that information about members' mental health status and recent health care and medication use was particularly helpful. PCPs also appreciated having a resource to consult on behavioral health issues or to help members follow through with appointments or self-care.

System- Level Lessons

Effective program design and implementation requires balancing flexibility with standardization, which can be challenging in practice. The programs included both required elements (for example, the target population) and were also flexible in design (for example, the partners developed their own outreach and enrollment activities, interventions, and staffing models). Although flexibility enabled stronger support, it also magnified the challenge of bringing together multiple systems to build consensus around programmatic elements.

Exchanging behavioral health and physical health information was critical for a holistic approach to care. Information exchange took multiple forms in the two pilot regions, including the development of member health profiles; notification across plans when members were hospitalized or had an ED visit; case reviews with plan medical directors, pharmacists, and navigators or care managers; and informal discussions between plans and providers. Through these approaches, partners were better able to integrate care and manage members' physical and behavioral health care.

Multidisciplinary care teams are requisite to an integrated health care experience for members with SMI. Experienced registered nurses were crucial, particularly in integration efforts led by behavioral health agencies, because they provided clinical expertise to help manage comorbid physical conditions and filled the gap in understanding medical conditions and their impact on members' behavioral health. The partners also noted that pharmacists provided valuable input on medication reviews at case review meetings.

Conclusions

The experiences of the SMI Innovations Project pilots in Pennsylvania suggest that states, many of which deliver behavioral health services through managed care carve-outs, can develop effective strategies to promote integration across separate financing and delivery systems. Integration challenges remain, particularly with regard to information sharing, privacy concerns, and engagement of very busy health care providers. Pennsylvania's SMI Innovation Project also confirmed that there is no one-size-fits-all approach to integration, even within the same state. Findings from the evaluation suggest that both the HCHC and Connected Care models hold promise for improving outcomes, although further research is needed to provide more definitive information on components of the interventions that lead to positive results. Future research assessing longer-term programs and linking processes and outcomes will help advance our understanding of the most promising aspects of integration.

Both pilots shared an emphasis on program activities that might have contributed to improved outcomes, including comprehensive member assessments, development of integrated care plans, use of multidisciplinary care teams, member education and support around appropriate ED utilization, and follow-up after a hospital discharge. Key functions of the navigators and care managers were assessing members' behavioral and physical health and social needs, connecting members to services, and providing education on appropriate ED use and follow-up after hospitalizations. Integrated care plans describing a member's behavioral and physical health histories, utilization, and medications provided the care teams with information to better assess the member as a whole person. Targeting a large number of members at risk of additional ED visits or readmissions was a component of Connected Care's approach that potentially contributed to its ability to improve mental health hospitalization and readmission rates. We further hypothesize that the pilots show promise in part due to previous work that influenced their design and implementation. For instance, the Connected Care program partners had been building a foundation for system changes in the years leading up to this pilot. Similarly, the Montgomery County behavioral health office had been building a foundation to provide patient-centered recovery-oriented care for several years before initiating HCHC.

I. INTRODUCTION

People with SMI have intensive behavioral health care needs and often require care from multiple providers in diverse settings. Medicaid beneficiaries with SMI often have significant physical health care needs. Previous research has found that adult members of the Medicaid population with co-occurring physical and behavioral health conditions are very costly; in fact, about 5 percent of Medicaid beneficiaries account for as much as 50 percent of total Medicaid spending (Center for Health Care Strategies 2009). Moreover, more than half of all Medicaid beneficiaries with physical disabilities are also diagnosed with a mental illness, an indication of the potential complexity of needs among beneficiaries with SMI (Kronick 2009).

Despite the complex care that beneficiaries with multiple chronic conditions require, physical and behavioral health services are often fragmented with little coordination across providers, leading to suboptimal care and escalating health care costs (Hamblin 2011). In many states, including Pennsylvania, service delivery and payment systems for physical and behavioral health care operate through separate county and state agencies. As a result, many Medicaid physical and behavioral health agencies function in silos, rarely coordinate with one another, and have few incentives to change their practices. Medicaid beneficiaries with SMI are often negatively affected by this lack of coordination, and often receive more sporadic and lower quality care than many other Medicaid beneficiaries, resulting in poorer outcomes for patients and higher costs for states.

Although there is growing consensus that improved integration of physical and behavioral health care will produce higher quality and lower costs (Institute of Medicine 2006; World Health Organization 2003), evidence on how best to achieve such integration is lacking. However, states are increasingly active in developing and implementing policies and programs to enhance integration and coordination (Hamblin 2011). For instance, some states—including Tennessee, Kentucky, and Kansas are including both physical and behavioral health benefits in managed care contracts, as opposed to carving out behavioral health care. Others, like North Carolina and Vermont, are seeking to enhance integration through primary care case management programs. Another approach, which is being considered by Arizona and pursued by Massachusetts and Iowa, is to contract with behavioral health organizations to provide both physical and behavioral health services for people with SMI. Finally, there is the strategy implemented in Pennsylvania and described in this report: a shared incentives approach that maintains the separation of physical and behavioral health care but aims to better align payment and improve coordination of care through collaboration across physical and behavioral health plans and county behavioral health systems.

The Pennsylvania SMI Innovations Project

In July 2009, the Pennsylvania Department of Public Welfare (DPW) and the Center for Health Care Strategies (CHCS) launched a two-year pilot program in Southeast and Southwest Pennsylvania, focusing on the integration of physical and behavioral health care services for adult Medicaid beneficiaries with SMI and co-occurring physical health conditions.[2] The project was part of the Rethinking Care Program, a CHCS-led national initiative made possible through support from Kaiser Permanente that sought new ways to improve the quality and decrease spending for high-

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[2] For more detailed information, see the pilot program case studies.

need, high-cost Medicaid beneficiaries. The Pennsylvania pilot programs, collectively referred to as the SMI Innovations Project, were designed to test a shared incentives approach to addressing the challenge of physical and behavioral health integration. Partnering with physical and behavioral health plans and county behavioral health offices, DPW established a bonus incentive program tied to performance measures designed to increase collaboration across the partners in each region. DPW selected two regions of the state with different geographic characteristics that would test models using different plan structures, and gave partners flexibility to design their own programs.

The activities that partners developed were guided by a set of core program elements identified by DPW; these essential components of the pilots were referred to as "pillars." Table I.1 provides an overview of the pillars, which the partners in the Southwest and the Southeast adapted to best suit their local resources and needs.

Table I.1. SMI Innovations Project Components and Examples of Associated Activities

Component	Example of Associated Activities
Pharmacy management	Joint plan review of medication lists; reports to prescribers on refill gaps for members taking atypical antipsychotics
Data management and information exchange	Creation of joint care plans; sharing member profiles with providers (with consent in HCHC)
Appropriate ED use for behavioral health treatment	Identification and prioritization of members with frequent ED visits; member education about appropriate ED use
Consumer engagement	Navigator or care manager outreach to members; development of a consumer and family advisory committee (Connected Care)
Alcohol and substance abuse treatment, care coordination	Sharing alcohol and substance use information across plans (with member consent) and with community providers (in HCHC, with consent)
Provider engagement and medical home	Health plan and navigator outreach to primary care and behavioral health providers; utilization of existing practice-based care managers to help cultivate health homes (Connected Care)
Coordination of hospital discharge and follow-up	Notification of hospitalizations across plans and navigators; follow-up with members after hospitalization
Co-location of services	Hiring registered nurses in behavioral health agencies (HCHC)

Note: Except where noted, activities apply to both pilot programs.

SMI = serious mental illness; ED = Emergency department; HCHC = HealthChoices HealthConnections.

Southeast Pennsylvania: HealthChoices HealthConnections

HealthChoices HealthConnections (HCHC) was a decentralized, community-based partnership among Magellan Behavioral Health; Keystone Mercy Health Plan; and the county behavioral health offices in Bucks, Montgomery, and Delaware counties (see the separate case study for a comprehensive description). After an HCHC Vision Group (akin to a steering committee) developed its core strategy, each county customized its own approach based on its existing infrastructure and resources; for example, deciding what types of staff would implement the intervention and how they would be funded. This flexible approach improved support at the county level, and partners preferred this strategy over a one-size-fits-all model because it enabled them to design a program that they could potentially sustain. The three counties varied in terms of previous experiences with system reforms. Most notably, the Montgomery County behavioral health office had been working toward a system of patient-centered recovery-oriented care for several years, making integrating physical health and establishing navigator teams a natural next step.

Counties' approaches to identification and initial outreach to members varied. All three counties first identified potential participants using medical claims and plan enrollment data. From the initial lists of eligible members, Montgomery and Delaware counties identified members served by their largest behavioral health providers, analyzed which PCPs were connected to these members, selected a subset of core PCPs, and sent invitations to HCHC-eligible members assigned to those PCPs. The counties chose this strategy to help with relationship-building and program participation from the outset. Bucks County took a different approach in sending an informational packet to behavioral health providers for case managers to distribute to members.

A unifying element of HCHC was the use of navigators, care managers employed by the behavioral health agencies, to lead member engagement. The navigators' roles in HCHC extended from the preliminary stages of member outreach and enrollment throughout the care coordination process. Navigators engaged members, obtaining their consent to share health care information with providers. Subsequently, through regular, in-person contact with members, navigators bridged the gap between their own agency, physical health providers, and other behavioral health providers, sharing information on recent hospitalizations and emergency department (ED) visits and developing individualized care plans for members. Navigators emphasized the importance of early recognition of symptoms that could lead to a decline in physical or mental health.

HCHC system-level activities included pharmacy management, co-location of physical and behavioral health services, a focus on appropriate ED use for behavioral health treatment, and data management and information exchange. The focus of pharmacy management was identification of adherence patterns for members on second-generation antipsychotics. Counties took preliminary steps to encourage co-location through the hiring of nurses to work in multidisciplinary teams with behavioral health specialists. A core feature of data management and information exchange was the use of member profiles that aggregated members' physical and behavioral health information. Another key element related to data management and information exchange was bimonthly joint case rounds, during which both plans' medical directors, plan-level care managers, and navigators discussed particularly challenging members' cases. To encourage appropriate ED use for behavioral health treatment, ED visits were included in member profile updates. Partners also brainstormed about ways to help HCHC members through joint case round meetings and ongoing navigator contact with members.

At the provider level, HCHC focused on connecting members to appropriate alcohol and substance use treatment when needed, engaging providers, and coordinating hospital discharge and follow-up. A key element of HCHC was its decision to engage only members who agreed to share their health information, including alcohol and substance use history, to ensure that the navigators were aware of all of the members' conditions that might affect their ability to provide comprehensive care. County behavioral health agencies and navigators conducted much of the care coordination and relationship building with PCPs. For instance, nurse navigators in Montgomery and Bucks counties developed relationships with PCP office staff including managers, triage nurses, and residents. The partners also took steps to better coordinate hospital discharge and follow-up with the goal of sharing hospital discharge information in real time, although in practice, process delays were sometimes unavoidable.

Southwest Pennsylvania: Connected Care

The Connected Care program was a partnership between UPMC for You, Community Care Behavioral Health (CCBH), and the Allegheny County Department of Human Services, Office of Behavioral Health (see the separate case study for a comprehensive description). Connected Care had a centralized, top-down structure with full corporate support from health plan executives and consumer input through a Consumer and Family Advisory Committee. Although staff from UPMC for You and CCBH are owned by the same corporate entity and shared offices in the same corporate complex, they had not previously worked together systematically and had to build relationships and learn each other's practices, much as staff from separate organizations would have had to do. UPMC for You and CCBH did, however, have several initiatives in place before Connected Care that facilitated implementation.

Key components of the pilot included enhancing outreach to high-risk members through UPMC for You and CCBH care managers and information sharing between plans and with providers through multidisciplinary case review meetings and notifications of hospitalizations, ED visits, potential care gaps, and medication refill gaps. Plans obtained members' consent to share any health information with one another or with providers, other than notification of a hospitalization or ED visit. The plans used consent to guide what information they could share with each other and with providers but actively engaged all members who agreed to work with a care manager, regardless of consent. Care managers provided support and education and linked members to services for all members identified with a need. UPMC for You and CCBH care managers conducted comprehensive assessments identifying members' behavioral health, medical, and psychosocial needs and linking members to services; providing education about appropriate ED and service use; and following up after hospitalizations. Most of this member contact occurred via telephone. However, UPMC for You practice-based care managers, whose offices were located within primary care practices as part of the plan's medical home initiative, also engaged Connected Care members and helped coordinate their care.

Connected Care's initial member engagement activities included sending letters to members that describe the program and its potential benefits and phone calls to members from plan care managers. The plans focused first on engaging members with the highest physical and behavioral health risk, generating monthly member lists. Within the first few months, the partners recognized that they needed to engage more members as the initial number of members who consented to share information was low, but needed to prioritize the large number of members who fell into the next risk tier. To more easily manage all of these members, Connected Care revised its engagement strategy to focus on members with recent hospitalizations or ED visits.

Once the care managers engaged members, they assessed member needs and tailored the intervention to meet their most critical needs first. UPMC care managers focused on helping members manage their chronic physical health conditions, preventing readmissions and unnecessary ED visits through member education and follow-up within 24 or 48 hours of a hospital admission or ED visit, and addressing members' psychosocial needs. CCBH care managers reviewed all hospital and ED utilization, whether members had a PCP and behavioral health provider, or received other services such as those from a community treatment team or mobile medication team. UPMC practice-based care managers were able to provide additional support for members because they could meet with them in person and because they had established relationships with some members, having served as care coordinators for about a year before Connected Care began.

Connected Care engaged both physical health and behavioral health providers through individual and group meetings or presentations. Initial outreach focused on providers participating in UPMC's medical home pilot initiative or chronic care management Medicaid pay-for-performance program. To increase collaboration and information sharing, the plans notified providers (and each other) of members' hospitalizations, ED visits, and refill gaps (for those prescribed atypical antipsychotics).

Common Pathway to Success

Despite differences between the two programs, both operated with a common pathway to success in mind. Figure I.1 provides an illustration of the common pathway both SMI Innovation Project pilots envisioned when developing and implementing their projects. Starting with the inputs of the partners, the pathway describes the relationships between resources invested, planned activities, and the benefits or changes that are expected to result in the form of short- and long-term outcomes.

Figure I.1. SMI Innovations Project Pathway

INPUTS

Context

- Separate BH and PH systems
- Lack of coordination across PH and BH providers
- High-need, high-cost adults with SMI

Partners

- Plans, counties

Program resources

- Shared savings bonus incentives
- Plan and county personnel, time, systems, provider relationships

ACTIVITIES

- Establish program management and care teams
- Establish data sharing protocols and processes for reporting
- Identify eligible members
- Engage members and providers
- Coordinate hospital discharge and follow-up with provider and members
- Encourage appropriate BH ED and medication use by members

OUTPUTS

- Number/proportion of eligible members who consent to share health care information
- Contacts between BH providers and members
- New connections between PCPs and members and/or BH providers
- Member-centered care plans
- Information exchange between BH and PH providers and plans
- Discharge planning for members with hospital admissions
- Adherence to medications to treat SMI or other health conditions

OUTCOMES

Short-Term

- Greater coordination across BH/PH plans and providers
- Improved care for BH, PH, and substance use conditions
- More member empowerment and engagement
- Decreased ED visits
- Increased outpatient visits

Long-Term

- Improved health, quality of life
- Reduced costs
- Better-integrated BH and PH care systems for members with SMI
- Decreased hospitalizations, readmissions

BH = behavioral health; ED = emergency department; PCP = primary care provider; PH = physical health; SMI = serious mental illness.

Organization of the Report

This report describes the context in which the SMI Innovations Project developed and launched; highlights implementation processes, strategies, and challenges; and discusses findings and key lessons learned from the pilot programs in Southwest and Southeast Pennsylvania. It is divided into five chapters and references two case studies. Chapter II provides an overview of our evaluation methods. In Chapter III, we present results from the performance and outcomes measures. Chapter IV offers lessons from the two pilot programs at the system, consumer, and provider levels, and might be useful to states and their partners interested in pursuing policies and programs to improve physical and behavioral health integration for individuals with SMI. Chapter V discusses conclusions. Separate case studies include detailed descriptions and findings for each pilot program.

II. METHODS

To understand whether the SMI Innovations Project improved care for members with SMI and co-occurring chronic conditions, the evaluation used a mixed methods approach incorporating three data sources: (1) Medicaid enrollment and administrative claims data to identify changes in hospitalizations, readmissions, and emergency department (ED) visits; (2) stakeholder interviews and focus groups to identify promising implementation strategies and challenges; and (3) results of the performance measure targets for the Pennsylvania Department of Public Welfare's bonus incentive program to understand whether the partners' ability to establish processes to meet the performance measures contributed to improved integration.

Given the relatively short length of the intervention period (two years) and the potential that the pilot programs might not have affected population-level outcomes, qualitative methods augmented the evaluation. They provide insight into which components of the programs contributed to improved integration or were particularly challenging, and what contextual or implementation-related factors might help explain any quantitative findings. In addition, the qualitative components help identify changes in business practices among Medicaid providers that are often difficult to capture through quantitative methods.

At the outset of the evaluation, we recognized that identifying impacts on outcomes such as hospitalizations and ED visits would be difficult given the potential for low participation among the target population, implementation delays due to necessary operational changes, and a possible lack of support among community providers. In addition, HCHC invited a subset of members to participate, which meant a smaller group than the eligible population had the opportunity to be engaged. However, the goal of this pilot was to identify areas of potential impact—namely, whether physical health-behavioral health integration holds promise—and theories of change to be tested that could advance integration. Equally important was learning about the implementation experiences of the partners, specific strategies that worked well, barriers they encountered and overcame, and challenges that remain to be addressed.

Quantitative Outcomes Analysis

The goal of the outcomes analysis was to address the following research questions:

- Did the SMI Innovations Project pilots demonstrate promise in improving patient quality of care as evidenced by health care services utilization, such as hospitalizations, emergency room visits, or readmissions?
- Did outcomes vary by county or among those who consented to share information?

To address these questions, we analyzed Medicaid claims and enrollment data to identify changes in ED visits, hospitalizations (separately for physical health, mental health, and other alcohol and drug treatment), and readmissions among members eligible for the SMI Innovations

Project and a similar population in a comparison group for each region.[3] To isolate potential changes due to the intervention rather than existing trends, we compared the difference in rates between the baseline year and the two-year intervention period for the study group with the difference in rates for the comparison group. We then confirmed results using a regression adjustment. We also assessed the differences between the baseline year and each six-month interval within the intervention period to account for potential implementation delays that might mask changes in outcomes later in the intervention period.

For the primary analysis, we analyzed outcomes for all members eligible for the program (in either the study or comparison groups) regardless of their participation. Study and comparison group members were eligible if they had at least one claim with a diagnosis of SMI during the specified date ranges in Table II.1; were at least age 18 on the date of service of the first claim with a diagnosis of SMI; resided in one of the pilot counties; and were enrolled in the participating behavioral health and physical health plans. DPW defined individuals with SMI as those diagnosed with schizophrenic, major mood, or borderline personality disorders. The baseline period was the one-year period from July 1, 2008, through June 30, 2009. The intervention period began on July 1, 2009, and ended on June 30, 2011.

Table II.1. Eligibility Criteria

	HealthChoices HealthConnections	Connected Care
Dates of Eligibility (Service Date of SMI Claim)	July 1, 2007, through June 30, 2009[a]	July 1, 2007, through June 30, 2011
Plan Enrollment	Enrollment for at least one day in both the physical and behavioral health plans during the year of the claim with the diagnosis of serious mental illness	
Physical Health Plan		
Study Group	Keystone Mercy Health Plan	UPMC for You Health Plan or UPMC for Life Specialty Plan
Comparison Group	AmeriHealth, Gateway, or Unison	Gateway or Unison
Behavioral Health Plan	Magellan Behavioral Health	Community Care Behavioral Health
County		
Study Group	Bucks, Delaware, or Montgomery	Allegheny
Comparison Group	Lehigh or Northampton	Allegheny
Exclusion Criteria	Evidence of a third-party payer Lapse in HealthChoices eligibility	None

Note: The Pennsylvania Department of Public Welfare's definition of serious mental illness for this pilot included schizophrenia, major mood disorder, psychotic disorder NOS (not otherwise specified), or borderline personality disorder (DSM-III-R diagnostic codes 295.xx, 296.xx, or 301.83).

[a] HealthChoices HealthConnections limited enrollment to members identified before July 2009. Only 85 members were identified after July 1, 2009; the main analysis excludes those members.

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[3] In both regions of Pennsylvania, we selected comparison groups of Medicaid beneficiaries with SMI who were enrolled in the same behavioral health managed care organization as the study groups but enrolled in any MCO providing physical health benefits (other than those participating in the pilot). For Connected Care, we identified beneficiaries who resided in Allegheny County and were enrolled in CCBH and a physical health plan other than UPMC that did not have any formal integration initiatives. For HCHC, there were no other MCOs that provided physical health benefits to a large number of Medicaid beneficiaries with SMI in Bucks, Delaware, and Montgomery counties. Instead, we identified Medicaid beneficiaries who lived in Lehigh and Northampton counties and were enrolled in Magellan and any physical health plan.

We also conducted several secondary analyses. In Southeast Pennsylvania, we examined outcomes for all eligible HCHC members by county and for those invited to participate. Because Montgomery County started its pilot program sooner than Bucks and Delaware counties, we also examined outcomes for consumers invited to participate in Montgomery County separately from Bucks and Delaware counties. In Southwest Pennsylvania, we compared outcomes separately for Connected Care members eligible before the start of the intervention period (July 1, 2009) and for those who became eligible after the start of the intervention, to identify potential impacts that might be obscured by implementation delays. We refer to these groups as the "early" and "late" cohorts, respectively. In addition, we examined outcomes for those who agreed to share their health information (through written consent) compared with the comparison group in each region. For ED visits and hospitalizations, we conducted regression analysis to adjust for member characteristics and baseline utilization.

It is important to note that depending on the region and the county's participation rates, large differences in the rates of hospitalizations and ED visits were needed to demonstrate a statistically significant change, particularly in HCHC, where the partners focused primarily on the subgroup of members who provided consent (see Appendix B, Table B.7 for minimum detectable differences). Finally, we examined differences in the baseline characteristics between study group members who provided consent and those who did not. Appendix B provides additional details on the methodology for the outcomes analysis, including tables summarizing the data sources (Table B.2) and primary and secondary analyses (Table B.6).

We conducted a descriptive analysis of baseline characteristics for both study and comparison group members, including demographic information and co-morbidities to assess similarities and differences between the groups. We chose comparison groups that had populations similar to the study groups and would have data available for the evaluation. Although the comparison groups were not perfect matches to the study groups, the primary objective for using them was to identify existing trends that might account for the observed changes in outcomes through a difference-in-differences analysis. Nevertheless, we conducted a sensitivity test to assess the comparability of the comparison groups. Specifically, we analyzed the difference in differences in the rates of ED visits and hospitalizations for study and comparison group members that were eligible two years before the start of the intervention (between July 1, 2007, and June 30, 2008). We used the one-year period from July 1, 2007, through June 30, 2008 as the baseline year and from July 1, 2008, through June 30, 2009 as the follow-up period.

Qualitative Data Collection

To complement the quantitative analysis, we collected and analyzed qualitative information to assess the implementation of the SMI Innovations Project. The goal of qualitative analysis was to address the following research questions:

- How did the partners and DPW implement the pilot programs? What factors and strategies facilitated or posed challenges to implementation? How different or similar were these factors across the two regions or across counties within a region?
- Do the implementation strategies, such as member engagement strategies and intervention intensity, help explain the outcomes observed in each region?

To answer these questions, we gathered information in three ways. First, we conducted two rounds of interviews with stakeholders within each region from each pilot program, including plan leaders and staff, directors and staff from county behavioral health offices, case managers or navigators responsible for engaging and interacting with members, community providers (when possible), and DPW leaders and staff. In the second round of data collection, we also conducted interviews with one member from each county, recommended by a case manager or navigator. Second, we conducted focus groups with case managers and navigators to gather more detail about the experiences of those directly implementing the intervention. Finally, we analyzed information from the partners through program materials, meeting minutes, presentations, and e-mail correspondence.

Both rounds of stakeholder interviews included telephone interviews and site visits in each region. The first round took place from February 2010 to March 2010 and included 9 to 12 interviews at each program. In the second round, which took place from February 2011 to April 2011, we conducted 12 to 16 interviews at each program. Interviews with program staff lasted 45 to 90 minutes and included one to six individuals. Interviews with individual consumers were 15 to 20 minutes in length. Appendix C lists the stakeholders who participated in the interviews, excluding consumers; whether the interview was conducted by telephone or in person; and the list of topics covered in each round.

Given the timing of the data collection relative to the intervention start, we tailored the interviews to cover slightly different information. The purpose of the first round of interviews was to gather background information on the partners, their roles, incentives for participating, prior experiences collaborating with one another, and expectations for the intervention; the context and environment surrounding implementation; the structure and details of the intervention; and early implementation challenges and successes. In the second round of interviews, we focused on changes in staff, organizational roles, and the environment; changes or updates to the intervention; implementation successes and barriers; factors facilitating or inhibiting successful integration efforts; and stakeholder perspectives on the sustainability and replication of the pilot programs.

Performance Measures

DPW established a joint financial incentive program based on performance measures it designed to increase collaboration among the partners. DPW did not expect the funds partners received as a result of meeting the joint incentive requirements to cover program costs, but offered the bonus as a way to reward joint performance and foster collaboration. DPW developed two new measures (stratification and development of integrated care plan) and used two measures (notification of hospital admissions and prescription refill gaps) conceived for previous projects that it felt would be appropriate for the SMI Innovations Project. Although the performance measures covered some elements of the core framework for integrated care, DPW did not intend the performance measures to cover all of the core elements.

Under this incentive program, the health plans and county behavioral health offices were eligible for an annual bonus based on meeting four performance measures in the first year and six measures in the second year. DPW designed four of the measures to increase plan collaboration that partners had to meet in both years of the intervention: (1) stratification of at least 90 percent of members into joint behavioral health and physical health risk groups and annual restratification; (2) development of patient-centered care plans (at least 1,000 in the first year); (3) notification of hospital admissions at least 90 percent of the time (85 percent in the second year); and (4) notification of prescribers of refill gaps for atypical antipsychotics at least 90 percent of the time (85 percent in the second year). In the second year, half of the bonus was tied to targets for incremental improvement in two outcomes: hospitalizations (a combined measure of physical health and mental health hospitalizations) and ED visits.

DPW developed and collected data on the performance measures; we report the results of these measures in the context of the broader evaluation. Appendix D describes the goals and objectives for establishing performance measures in this project. It also summarizes feedback on the measures that we received during our interviews with partners and provides examples of potential measure concepts that program developers might consider when implementing a similar program.

III. FINDINGS: PERFORMANCE MEASURES AND OUTCOMES

This chapter presents findings from the analysis of performance measures and health care outcomes. Although these results suggest some potentially positive impacts stemming from the SMI Innovations Project, the short length of the pilots' implementation period and the non-experimental study design limit our ability to make conclusive statements about whether the programs improve quality of care for Medicaid beneficiaries with SMI. Future research assessing longer term programs and linking processes and outcomes will help advance our understanding of which aspects of integration are most promising.

Findings for the HealthChoices HealthConnections Program

The Study Population

The HCHC study and comparison groups included 4,788 and 7,039 members, respectively (Table III.1). The percentage of eligible members invited to participate (by letter) varied across the counties, from 29 percent in Delaware to 54 percent in Montgomery. Among study group members, 18 percent consented to share their health care information with providers, though the consent rate among the eligible population varied from 14 percent (Delaware) to 21 percent (Bucks and Montgomery) across the three counties. The consent rate among the invited population ranged from 39 percent (Montgomery) to 47 percent (Delaware). More than three-quarters of all study group members were enrolled for at least 18 months, although only about two-thirds in the comparison group (Magellan members residing in Lehigh or Northampton Counties) were enrolled as long.

Table III.1. HCHC: Number of Study and Comparison Group Members and Enrollment

	Study Group				Comparison Group
	All Counties	Bucks	Delaware	Montgomery	
Number of Eligible Members	4,788	1,312	2,163	1,313	7,039
Number of Eligible Members Invited	1,955	614	631	710	--
Percentage of Eligible Members Invited	40.8	46.8	29.2	54.1	--
Number Who Consented	857	282	297	278	--
Percentage of Eligible Members Who Consented	17.9	21.5	13.7	21.2	--
Percentage of Invited Members Who Consented	43.8	45.9	47.1	39.2	--
Percentage Enrolled for 18–24 Months	77.5	77.9	79.5	73.7	65.9

At baseline, the study and comparison groups had generally similar characteristics, though there were some differences. For example, the two groups were similar in terms of age (a mean of 41 for the study group versus 39 in the comparison group) and gender (females comprised about 70 percent in both groups). However, there were statistically significant differences between the groups in the proportion of members reporting Hispanic ethnicity: less than 4 percent in the study group compared with 45 percent in the comparison group. In addition, the proportion of African American members was much higher in the study group (about 26 percent) than the comparison group (7 percent). Although a larger proportion of study group members had evidence of physical health conditions in claims data—such as coronary artery disease, diabetes, hypertension, and hyperlipidemia—these members had inpatient and ED use similar to that of comparison group members at baseline (Appendix A, Table A.10).

Performance Measures

In the first year of the pilot, HCHC met the risk stratification/restratification, patient-centered care plan development, and pharmacy notification collaboration measures. In the second year, HCHC again fulfilled the requirements for the patient-centered care plans and pharmacy notification measures, and the partners also met the hospital admission and discharge notification measure (Table III.2). For the stratification of members into joint behavioral and physical health risk groups, DPW determined HCHC did not meet the target in the second program year.[4] Also in the second year, HCHC met the DPW targets for reductions in ED visits and hospitalizations.

Notification of hospital admissions and discharges presented an initial challenge for the HCHC partners. In the first year of the pilot, HCHC was able to complete the notification process for most hospitalizations (84.7 percent) but fell short of the target (90 percent) due to internal data system issues. Keystone Mercy produced a daily report of hospitalizations for both members who provided consent and those who did not. Before sharing the report with Magellan, KMHP removed sensitive information related to members who did not provide consent. For approximately 20 days within a six-month period, there was an error in the process; therefore, the daily hospitalization report was suspended. Once the issue was resolved, the partners achieved nearly 100 percent notification in subsequent periods and were able to meet the target for the second year of the pilot.

Table III.2 HCHC: Summary of Performance Measures

Performance Measure	Met Goal in Year 1	Met Goal in Year 2
Stratification of at least 90 percent of members into risk groups and annual restratification	✓	
Patient-centered care plans	✓	✓
Notification of at least 85 or 90 percent of admissions within one business day of responsible entity learning of admission		✓
Prescriber notification of at least 85 or 90 percent of medication refill gaps for atypical antipsychotics leading to a medication possession ratio of < 0.8[a]	✓	✓
Incremental Improvement Measure		
ED Visits	n/a	✓
Hospitalizations, Combined for Physical Health and Mental Health	n/a	✓

Source: Island Peer Review Organization and DPW Office of Medical Assistance Programs.

Note: A check (✓) indicates that the performance measure was met. n/a = not applicable (measure was added for Year 2)

[a] Medication possession ratio, a measure of continuity or adherence, is the ratio of the number of days between the most recent refill and the next expected refill to the number of days between the most recent refill and the next actual refill.

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[4] The HCHC partners appealed this decision on the premise that new members had not been enrolled in the second year. DPW stated that failure to meet this performance measure was due to a lack of data for new member stratification.

Outcomes Measures

During the intervention period, the number of ED visits for any reason among members in the HCHC intervention counties decreased by 4 percent while ED visits in comparison counties increased by 6 percent; this corresponds to a rate that is an estimated 9 percent lower than the projected trend without the intervention.[5] The decrease in ED visits was most substantial for members who resided in Montgomery County, where the rate was an estimated 14 percent lower than we projected would have occurred in the absence of the program, based on the comparison group's experience. As Table III.3 indicates, the average number of ED visits per 1,000 members per month among study group members dropped from 148.1 to 142.4, compared with an increase among comparison group members from 183.8 to 194.4 ($p = 0.036$). In Montgomery County, the average number of ED visits in the study group decreased from 166.4 to 151.5 visits per 1,000 members per month ($p = 0.049$). However, there were no differences between HCHC intervention counties and the comparison counties in the rates of hospitalizations, readmissions, or the number of days between admissions.

Table III.3 HCHC: Average Number of ED Visits, per 1,000 Members per Month

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
All Eligible Members	148.1	142.4	-5.7	183.8	194.4	10.5	-16.2	0.036
Montgomery County	166.4	151.5	-14.9	183.3	194.4	10.5	-25.4	0.049

Note: The rate was calculated by multiplying the average number of hospitalizations for each member per month (number of days enrolled in both plans divided by 30) by 1,000. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. Included mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

Findings for the Connected Care Program

The Study Population

The study group included 8,633 members; 63 percent who were eligible at the start of the intervention period and 37 percent after the intervention had already began (Table III.4). The comparison group (Allegheny County residents enrolled in CCBH but not UPMC for You) included 10,514 members, and the same proportions were eligible before and after the start of the intervention period as the study group. At baseline, study and comparison groups were generally similar on measured characteristics, such as age, gender, and racial and ethnic characteristics,

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[5] We estimated the projected trend by applying the percent change observed in the comparison group to the study group to identify what the rate would have been without the intervention and comparing that rate with the actual observed rate for the study group. For example, the rate of ED visits in the comparison group increased 5.7 percent (from 183.8 to 194.4 per 1,000 members per month); applying that percent change to HCHC's pre-intervention rate of 148.1, we would estimate that without the intervention, the rate would increase 8.5 (5.7 percent) to 156.6. Instead the actual intervention rate was 142.4, a difference of 14.2 or 9 percent of the projected pre-intervention rate of 156.5.

although small differences were statistically significant because of the large number of members in each group (Appendix A, Table A.19). A slightly higher percentage of study group members had evidence of physical health conditions in claims data, such as diabetes (14.9 versus 12.9 percent), hyperlipidemia (22.5 versus 18.8 percent), and hypertension (33.0 versus 28.8 percent), than comparison group members did in the two years before the start of the intervention. The study group also had a higher rate of hospitalizations at baseline than the comparison group (75.9 versus 67.9 hospitalizations per 1,000 members per month, $p < 0.01$).

Table III.4. Connected Care: Number of Study and Comparison Group Members and Enrollment

	Study Group			Comparison Group		
	All Members	Early Cohort	Late Cohort	All Members	Early Cohort	Late Cohort
Number of Eligible Members	8,633	5,425	3,208	10,514	6,657	3,857
Number Who Consented[a]	870	778	92	--	--	--
Percentage Enrolled for 18–24 Months	59.0	74.8	32.3	49.6	68.5	17.0

Note: The early cohort (cohorts 2–3) included members eligible between July 1, 2007, and June 30, 2009. The late cohort (cohorts 4–5) included members eligible between July 1, 2009, and June 30, 2011.

[a] Members who consented could have withdrawn their consent at any time. Connected Care used consent to guide what information the plans could share with each other and with providers but actively engaged all members who agreed to work with a care manager, regardless of consent.

Because Connected Care prioritized outreach and obtaining consent from high-risk members, those who consented were more likely to have greater behavioral and physical health needs and service use than other eligible members. Members who consented had a higher proportion of behavioral health and physical health conditions and a higher rate of hospitalizations and ED use at baseline, compared with study group members who did not provide consent (Appendix A, Table A.20). In addition, these members were slightly older than both study group members who did not consent (43.8 versus 39.0 years) and comparison group members (38.0 years). A greater proportion of members who provided consent were African American than study group members who did not consent (40.0 versus 34.1 percent). Although the plans used the member's consent status to guide what information the plans could share with each other and with providers, they actively engaged all members who agreed to work with a care manager, regardless of consent. The partners estimated that approximately 2,500 members agreed to work with a care manager over the course of the intervention period, although we do not have enough information to identify differences between these members and those who did not actively work with Connected Care.

Performance Measures

DPW determined that the Connected Care program met three of the four collaboration measures in both years and both incremental improvement measures in the second year (Table III.5). Connected Care met the risk stratification/restratification, patient-centered care plan development, and hospital admission notification measures. For the pharmacy notification measure, DPW determined that the plans notified prescribers of 47 percent of refill gaps for atypical antipsychotics during the first year. The partners were still finalizing their pharmacy notification letters several months after the intervention period started, which likely contributed to a failure to meet the measure in the first year. In the second year, the rate improved to 73 percent, but still fell short of the target. UPMC's automated system, designed for its Medicare medication therapy management program, generated and sent notification letters to prescribers on record. The plan managers noted that they were not always aware who the prescriber was. The automated notification process did not enable plan staff to see where the information was being sent. It is possible that their system did not identify the prescription gaps in the same manner that DPW identified them, leading to fewer letters being generated than DPW expected.

Table III.5 Connected Care: Summary of Performance Measures

Performance Measure	Met Goal in Year 1	Met Goal in Year 2
Stratification of at least 90 percent of members into risk groups and annual restratification	✓	✓
Patient-centered care plans	✓	✓
Notification of at least 85 or 90 percent of admissions within one business day of responsible entity learning of admission	✓	✓
Prescriber notification of at least 85 or 90 percent of medication refill gaps for atypical antipsychotics leading to a medication possession ratio of < 0.8[a]		
Incremental Improvement Measure		
ED Visits	n/a	✓
Hospitalizations, Combined for Physical Health and Mental Health	n/a	✓

Source: Island Peer Review Organization and DPW Office of Medical Assistance Programs.

Note: A check (✓) indicates that the performance measure was met. n/a = Not applicable (measure was added for Year 2)

[a] Medication possession ratio, a measure of continuity or adherence, is the ratio of the number of days between the most recent refill and the next expected refill to the number of days between the most recent refill and the next actual refill.

Outcomes Measures

Favorable changes in the rate of mental health hospitalizations and all-cause readmissions for the entire study population suggest that the program showed promise at improving quality of care for Medicaid beneficiaries with SMI. Connected Care partners engaged members identified both before and after the intervention period started. Because the partners refined their engagement strategies and activities during the first several months of the first year, we hypothesized that outcomes might differ for those who were eligible before the start of the intervention period (referred to as the early cohort) and those eligible after (the late cohort) and assessed outcomes separately for those two groups. Among the late cohort, we found favorable changes in ED use that did not exist among the early cohort.

Mental Health Hospitalizations. Mental health hospitalizations decreased among Connected Care consumers and increased in the comparison group. Although this was observed for the entire study population, it also held true for members who provided consent to share their health information and members of the late cohort (Table III.6). The mental health hospitalization rate (per 1,000 members per month) dropped 4 percent for the full Connected Care study population (41.1 to 39.6) but rose 10 percent for the comparison group (33.8 to 37.2); this corresponds to a rate that is an estimated 12 percent lower than the projected trend without the intervention.[6] Among late cohort members (who had a lower baseline rate of mental health hospitalizations than those in the

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[6] We estimated the projected trend by applying the percent change observed in the comparison group to the study group to identify what the rate would have been without the intervention and comparing that rate with the actual observed rate for the study group.

early cohort), there was an increase in the mental health hospitalization rate during the intervention. However, it was smaller than that of the comparison group. The resulting difference-in-differences estimate was statistically significant ($p < 0.01$).

Table III.6. Connected Care: Average Number of Mental Health Hospitalizations, per 1,000 Members per Month

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
All Members	41.1	39.6	-1.6	33.8	37.2	3.4	-4.9	0.041
Members who Consented	74.7	59.4	-15.3	33.8	37.2	3.4	-18.6	<0.01
Early Cohort	47.6	37.9	-9.7	41.4	34.5	-6.8	-2.9	0.351
Late Cohort	25.8	43.3	17.6	16.2	45.1	29.0	-11.4	<0.01

Note: The study group included all members who met the program eligibility based on Medicaid claims or enrollment data, regardless of actual participation in the program. Members who consented could have withdrawn their consent at any time. The early cohort (cohorts 2–3) included members who were eligible between July 1, 2007, and June 30, 2009. The late cohort (cohorts 4–5) included members eligible between July 1, 2009, and June 30, 2011. See Table III.4 for sample numbers. The rate was calculated by multiplying the average number of hospitalizations for each member per month (number of days enrolled in both plans divided by 30) by 1,000. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. Included mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

Among members who gave consent to share their health information, the mental health hospitalization rate decreased by 20 percent (74.7 to 59.4). This effect was one of the largest; however, members who consented were also more likely to have other chronic health conditions (particularly hypertension, high cholesterol, diabetes, chronic obstructive pulmonary disease, and asthma) and greater ED and hospital use from the start, suggesting there was greater room for improvement. In addition, consented members were self-selected and there was no comparable subgroup in the comparison group, suggesting that the large change in the mental health hospitalization rate might have been as attributable to unobserved characteristics, such as the member's own motivation to change, as it was to the intervention.

All-Cause Readmissions. Readmissions improved during the intervention period for all study group members and for those in the late cohort (Table III.7). The percentage of all-cause readmissions within 30, 60, and 90 days of an admission decreased for the study group while remaining relatively stable for the comparison group. For example, the 30-day, all-cause readmission rate dropped nearly 10 percent (43.1 to 38.9 percent) for the study group but increased slightly for the comparison group (39.5 to 39.7); the difference in these changes was statistically significant ($p < 0.01$). The 30-day, all-cause readmission rate for the Connected Care full study population was an estimated 10 percent lower than we projected would have occurred in the absence of the program, based on the comparison group's experience. The effect was larger for members of the late cohort with the 30-day, all-cause readmission rate falling 20 percent (44.7 percent to 35.7 percent) for the study group but rising 2 percent (39.2 to 40.0) in the comparison group ($p < 0.01$).

Table III.7. Connected Care: Hospital Readmission Rates

	Study Group			Comparison Group			Difference in Differences	
Readmission Period	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
All Members								
30 days	43.1	38.9	-4.2	39.5	39.7	0.2	-4.4	<0.01
60 Days	53.9	49.4	-4.5	50.3	50.6	0.3	-4.8	<0.01
90 Days	61.3	56.4	-4.9	57.5	57.4	-0.1	-4.8	<0.01
Late Cohort								
30 days	44.7	35.7	-9.0	39.2	40.0	0.8	-9.8	<0.01
60 Days	55.1	46.7	-8.4	49.4	51.2	1.8	-10.2	<0.01
90 Days	61.4	54.2	-7.2	56.4	57.3	0.9	-8.1	<0.01

Note: The study group included all members who met the program eligibility based on Medicaid claims or enrollment data, regardless of actual participation in the program. The late cohort (cohorts 4–5) included members eligible between July 1, 2009, and June 30, 2011. See Table 2 for sample numbers. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans.

ED Use. Among late cohort members, changes in ED visits favored the study group. Although the rate of ED visits increased for both the study and comparison groups during the intervention period, it increased by a smaller margin for the study group. The rate of ED visits (per 1,000 members per month) increased by 3 percent in the study group (184.4 to 190.0) and by 17 percent in the comparison group (167.1 to 195.6, $p = 0.052$, Table III.8). The ED rate across the four six-month calendar periods declined steadily in all four periods for the study group but in only the first three periods for the comparison group. The decrease was larger in the study group in the first six months of 2010 ($p = 0.034$) and the first six months of 2011 ($p < 0.01$); the second and fourth six-month periods, respectively. Although these differences were statistically significant, we cannot rule out potential differences due to seasonal or other unexplained factors. In particular, although the Connected Care partners reported focusing much effort to engage late cohort members, the sporadic pattern of ED use during the intervention period leads us to only be cautiously optimistic about the program's promise at reducing ED use.

Table III.8. Connected Care: Average Number of ED Visits, per 1,000 Members per Month, in the 12-Month Pre-Intervention Period, Full Two-Year Intervention Period, and Each 6-Month Period of the Intervention,[a] Cohorts 4 and 5

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	p-Value
Full Intervention	184.4	190.0	5.7	167.1	195.6	28.5	-22.9	0.052
Number of Members	3,208	3,208		3,857	3,857			
July 1–Dec. 31, 2009	206.6	250.4	43.8	182.4	232.6	50.1	-6.3	0.808
Number of Members	1,404	1,404		1,042	1,042			
Jan. 1–June 30, 2010	190.2	195.3	5.1	176.6	216.1	39.6	-34.4	0.034
Number of Members	2,482	2,482		2,186	2,186			
July 1–Dec. 31, 2010	182.5	188.7	6.1	171.1	184.8	13.8	-7.7	0.583
Number of Members	3,091	3,091		3,019	3,019			
Jan. 1–June 30, 2011	182.5	169.3	-13.2	162.3	184.9	22.5	-35.8	<0.01
Number of Members	2,895	2,895		3,521	3,521			

Note: The study group included all members who met the program eligibility based on Medicaid claims and enrollment data, regardless of actual participation in the program. Cohorts 4–5 included members eligible between July 1, 2009, and June 30, 2011. The rate was calculated by multiplying the average number of ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. We included ED visits for all diagnoses and used the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

[a] The study and comparison groups included only those members who were eligible and did not discontinue enrollment before the start of the respective six-month period.

IV. LESSONS LEARNED

In a study of state efforts to integrate physical and behavioral health care—including the SMI Innovations Project—Hamblin (2011) and colleagues identified several key clinical- and system-level elements that facilitate integration in various forms of service delivery arrangements. At the clinical level, these elements included comprehensive physical and behavioral health screening, beneficiary engagement, shared development of care plans (involving providers, caregivers, and beneficiaries), and care coordination and navigator support. At the system level, Hamblin et al. identified core components of integration as aligned financial incentives across physical and behavioral health systems; real-time information sharing across systems; multidisciplinary care teams that coordinate physical, behavioral, and long-term support services as needed; competent provider networks; and mechanisms for assessing and rewarding high-quality care.

As this chapter will describe, many of the program elements identified above, among others, facilitated the implementation of the SMI Innovations Project. Using Figure I.1 as a framework, we elaborate on lessons gleaned across the two pilot programs from the planning process through implementation, incorporating results from the outcomes analysis.

Lessons for Program Planning and Implementation

Pilot partners benefited from a balance of state-level and external leadership but taking ownership of their programs fostered buy-in and sustainability. The SMI Innovations Project benefited from having Pennsylvania's secretary of public welfare as a champion who believed in the benefits of integration, encouraged DPW's behavioral health and medical divisions to work together, and ensured that funds for the bonus incentive program would be available in a difficult fiscal environment. Although strong state commitment was necessary to launch a new program, the state also empowered the partners to take ownership of their programs. To move the initiative beyond a single project to lasting change in the way care was delivered, local ownership—at the plan, county, or community level—was essential for partners to implement changes that their staff members would support and want to sustain. As one partner described, "Each individual county does it differently, but we're all respectful of the pillars. We have specific strategies and tools, but we use them differently. That [approach] has been great and made the program successful. Before, there wasn't that level of flexibility in other programs." Partners reported that external leadership from CHCS played an important role in keeping them focused, discussions productive, and momentum moving forward.

Care integration in Pennsylvania Medicaid was previously uncharted territory; therefore, it was important to establish formal venues and methods for deliberate collaboration at multiple levels. The current separate systems for behavioral and physical health care have made integration challenging and required DPW and the partners to be especially deliberate about their coordination efforts. With HCHC, project partners started from scratch in their working relationships. Establishing and maintaining a vision group of high-level participants across the counties and plans was critical for the partners to learn about one another's systems and processes and to establish common parameters and goals. With Connected Care, although shared leadership helped get the pilot off the ground, the partners still faced the challenges of operating as two different systems--with separate data management, staff, and providers--and held regular meetings for staff to learn about and from one another. Interviews and focus groups suggest that training for care managers and navigators was crucial for staff members interacting with consumers and providers to gain familiarity and confidence in their ability to provide more holistic care for individuals with SMI. At the state level, DPW held joint meetings across regions to share information; some partners noted, however, that they would have benefited from more early learning opportunities across regions, for example, to share integrated care plans and discuss the role of peers and consumers, consent, financing issues and opportunities, and evaluation findings.

Privacy issues related to information exchange were critical for the state and partners to address early. To realize the goals of integrated care, the SMI Innovations Project required project partners to share health information across systems and providers, subject to the constraints of federal and state privacy laws. Given the complexities associated with these laws, the state invested considerable time in developing specific guidance on consent requirements for sharing drug, alcohol, mental health, and HIV information between different entities and providers. This guidance was essential for establishing the bounds within which partners could begin planning their information exchange strategies. However, due to the sensitive nature of these privacy issues–particularly concerns regarding the relevance and precedence of various federal, state, and local statutes on exchange of personal health information–the partners proceeded more conservatively than the state otherwise required.

Joint care planning and real-time hospital notification measures encouraged information sharing and were important first steps toward care integration. Based on the structure of the program and implementation decisions, different measures fostered collaboration in each region. HCHC partners reported the member health profile catalyzed critical information sharing across plans and providers and fostered a holistic approach to care across systems. In Connected Care, the hospital notification measure fostered collaboration and information sharing across plans and helped identify members who might need more intensive follow-up. Although establishing new processes and conducting the required activities to meet the performance measures were resource-intensive, most of the partners agreed that the performance measures provided a good starting point to encourage collaboration. However, several lessons also emerged. First, program developers might consider building in a testing phase for the measures to help partners resolve any problems before they are implemented. DPW requested feedback from the partners on the measures and adjusted the measures in the second year, taking into consideration the partners' feedback. Second, program developers might not have the internal capacity or expertise to develop and test performance measures, especially during the planning period when there are numerous competing demands and decisions to be made. Although integration is new area for performance measurement, program developers might draw upon the expertise of those who have developed measures in related fields, such as care coordination, and providers who use them. Third, once a new program is underway, partners would benefit from regular feedback on measure performance to facilitate midcourse corrections that can help them meet target goals within the reporting period. Finally, although fostering interaction and information sharing across insurers is one useful strategy, critical next steps include identifying how to improve interaction and information sharing with and among providers and identifying more clinically-focused measures, such as measures of BMI screening rates, weight loss, or smoking cessation.

Consumer- Level Lessons

Although partners employed multipronged member engagement strategies, providing targeted education and support to a large number of members at risk of additional ED use or a readmission might be an effective approach. Because many individuals with SMI do not have relationships with their PCPs, a program such as HCHC or Connected Care may be best introduced by a behavioral health clinician or case manager who has established a rapport and trust with members. This approach was HCHC's strategy, and Connected Care followed suit after encountering challenges with other methods. However, evaluation findings suggest that Connected Care's approach to member outreach—targeting members at highest risk for ED use or readmission to the hospital and providing specific services to them—holds promise for improving health care utilization. However, additional evidence is needed to support this contention. In particular, further exploration of the frequency and types of contacts between care managers/navigators and members and characteristics of those members would provide useful information about what contributed to reductions in hospitalizations, readmissions, and ED use.

Comprehensive member assessments, education about appropriate ED use, and follow-up after hospitalizations were key components of consumer engagement for both pilot programs. Partners emphasized that navigators and care managers played a crucial role in assessing members' needs using a holistic approach, addressing behavioral health conditions, medical conditions, medication issues, and social needs. In addition to providing health-related support, they identified and helped connect members to housing, transportation, employment, and other services that affected their health or ability to access health care. Member education and follow-up after a hospitalization were critical functions of the navigators and care managers. They emphasized to members that they had other resources--such as their PCP, behavioral health provider, or the navigators themselves--than the ED for non-emergent issues, and provided important follow-up after hospitalizations. Data on member contacts were not available for either pilot project but could provide insight into the types and frequency of member contacts with the greatest potential to improve member outcomes.

Provider- Level Lessons

In states with systems organized similar to Pennsylvania's, the behavioral health system might be the more natural point of provider and consumer engagement and care coordination for individuals with SMI. Behavioral health providers in states with systems similar to Pennsylvania's county-based system might be more receptive than primary care providers to county- or plan-engagement efforts for several reasons. First, in behavioral health, providers have more interaction with managed care organizations and county behavioral health offices as standard business practice, whereas in physical health, PCPs' interactions with MCOs are often limited to submitting claims or obtaining preauthorization for services. Behavioral health providers obtain authorization for all psychiatric hospitalizations and often send the BHMCO information about services that do not require preauthorization. In physical health, PCPs are not often involved or aware of hospitalizations. In addition, county behavioral health offices often have a direct role in the delivery of services and thus have established relationships with behavioral health providers. On the physical health side, there is no equivalent agency that establishes contracts with providers. Second, individuals with SMI often receive the majority of their care in a behavioral health setting. Because some patients do not have a PCP, they are more likely to have a relationship with staff at the behavioral health agency. Therefore, behavioral health providers might offer a natural starting point to initiate integration efforts and coordinate care for Medicaid clients.

Resources to support integrated care and the size of the SMI population relative to the overall practice affected partners' ability to engage PCPs. Partners identified several factors that affected their ability to engage PCPs: the plan's or agency's history and current relationship with the PCP, the proportion of members with SMI in the PCP's practice, and the internal and external resources available to PCPs for care coordination activities. A health plan's relationship with its PCPs can facilitate or hinder participation in integration efforts. Although UPMC was a primary payer in Allegheny County, it also invested resources in maintaining provider relations (with a dedicated staff). Plans with a complicated or adversarial history with their PCPs might need to build trust before engaging these physicians in what might be viewed as supplemental activities. Health plan managers might find it easier to gain the attention of PCPs whose practices have a large proportion of plan members, and in the case of projects like this, members with SMI. However, the level of interest among PCPs is likely to vary. One PCP stated, "You can't be in primary care and not care about the SMI population. We deal with it all the time." Finally, PCPs with available resources to help coordinate care, such as a care manager or navigator, were more likely to be engaged. Other states and plans might consider these factors when assessing how best to engage PCPs in their areas.

Once engaged, PCPs valued receiving previously unavailable clinical support and information about members from navigators and care managers. Feedback from navigators and care managers and a limited sample of PCPs we interviewed revealed that PCPs welcomed any additional information that would help inform or support their care. Information about a member's mental health conditions, whether and how often a member saw a therapist or psychiatrist, medications, and recent hospitalizations and ED visits was particularly helpful. PCPs expressed appreciation for having a resource to consult on behavioral health issues or to help members follow through with additional appointments or self-management (taking insulin injections, for example). One PCP also noted the importance of having someone who understood the member and had the experience and trust of the member to help the member avoid a crisis. Although in-person contact with PCP offices was important for establishing the relationship, another PCP indicated that being able to reach a live person by telephone when needed was more important than in-person contact.

System- Level Lessons

Program design and implementation requires balancing flexibility with standardization to be successful and ensure buy-in but can be challenging in practice. At the program level, DPW included both required elements (the target population and activities related to the performance measures) and flexibility (the partners developed their own outreach and enrollment activities, interventions, and staffing models). Because HCHC included three counties, the partners had to bring together multiple decision makers to develop one program and then decide how much structure to introduce at the county and agency levels—for example, whether and how agencies across counties should conduct standard assessments, or how to assess the effectiveness of the model across the counties. Partners sought to make integration the new way of doing business; meaning each county would have ownership and the flexibility to build its own program using a common structure (navigators employed by behavioral health agencies) as the starting point. A flexible approach was necessary because the community, existing infrastructure, and workflow differed in each county. However, it magnified the challenge of bringing multiple systems together to collaborate because it required consensus among that many more decision makers. For example, in Bucks County, having flexibility in program design helped the county establish a long-term funding mechanism for its nurse navigators, which increased the likelihood the program would be sustainable after the pilot ended, but also led to a nine-month delay in hiring nurses and starting the program, which might have affected the ability to detect improvements in outcomes.

Exchanging behavioral health and physical health information was critical for a holistic approach to care. Information exchange took multiple forms in the two pilot regions, including the development and sharing of member health profiles; notification across plans when members were hospitalized or had an ED visit; case reviews with plan medical directors, pharmacists, and navigators or care managers; and informal discussions between plans and providers across systems. Some approaches were more effective than others. For instance, all HCHC partners noted how useful the member health profile was for identifying gaps in care, such as preventive screening, or potential medication issues; however, notification of hospitalizations was less useful for navigators. Connected Care partners agreed that having information about behavioral and physical health conditions and medications was a critical part of integrating care. Because they encountered challenges with the shared information tool, care managers relied on informal communication modes to share information. Partners in both regions emphasized the importance of establishing strategies to share information across previously separate systems of care.

Multidisciplinary care teams were requisite to an integrated health care experience for members with SMI. In particular, nurses and pharmacists were critical members of the multidisciplinary care teams. Experienced registered nurses were crucial, particularly in integration efforts led by behavioral health agencies, because they provided clinical expertise to help manage co-morbid physical conditions and filled the gap in understanding medical conditions and their impact on members' behavioral health. Registered nurses were well-positioned to facilitate clinical discussions on members' care with PCPs and pharmacists, advocate on a member's behalf, and serve as a clinical bridge between physical and behavioral health providers. The partners also noted how valuable it was to have pharmacists at case review meetings and to provide input on medication reviews.

V. CONCLUSIONS

The SMI Innovations Projects focused on five core elements related to integrated care: (1) developing processes for information exchange and joint care planning across the behavioral and physical health care systems, through development of an integrated care plan or member health profile, multidisciplinary case reviews, and a navigator or care manager who helped coordinate care across systems and providers; (2) engaging consumers in care through outreach and designated care homes; (3) engaging providers to partner in care and become designated care homes; (4) providing follow-up after hospitalizations and ED visits; and (5) improving medication management, focused on medication reviews by care teams and plan pharmacy staff. All of these elements required collaboration across systems to identify, target, and improve care for the appropriate SMI population.

Both pilots shared an emphasis on particular program activities that might have contributed to improved outcomes. These activities included comprehensive member assessments, development of integrated care plans, the use of multidisciplinary care teams, member education and support around appropriate ED utilization, and hospitalization discharge follow-up. A key function of the navigators and care managers was assessing members' needs—ranging from behavioral health and medical conditions to medication issues and social needs—and then connecting members to services to address those needs. Developing integrated care plans describing a member's behavioral health and medical histories, utilization, and medications, provided the care teams with information to better assess the member as a whole person. Education focused on appropriate use of the ED and follow-up after hospitalizations likely contributed to reductions in psychiatric hospitalizations (among Connected Care members) and ED use (among HCHC members and a subset of Connected Care members). Targeting a large number of members at risk of additional ED visits or a readmission was an additional component of Connected Care's approach that potentially contributed to its ability to improve the rate of mental health hospitalizations, readmissions, and ED visits among its members.

Although HCHC and Connected Care shared some common elements, they employed different care integration models for Medicaid beneficiaries with SMI. Our results suggest that both models hold promise for positively shaping outcomes, although more research is needed to obtain definitive information on the specific components of the interventions that might contribute to improved outcomes. For example, information on the frequency and types of contacts among care managers/navigators, members, and providers could provide insight into what contributed to reductions in hospitalizations, readmissions, and ED use. Due to the early implementation challenges—expected with any pilot program but especially one tackling the daunting task of integration programs—states might benefit from identifying which systems and processes should be in place before beginning a pilot or supporting evaluation activities beyond the pilot phase to allow more time to detect changes in outcomes.

We further hypothesize that trends in some health care outcomes were positive for the study populations associated with Connected Care and HCHC in part due to previous work that influenced the design and implementation of the SMI Innovations Project pilots. For instance, the Connected Care program partners had been building a foundation for system changes in the years leading up to this pilot. This prior work influenced Connected Care's focus on member education and follow-up after hospitalizations among members at high risk. Similarly, in Southeast Pennsylvania, the Montgomery County behavioral health office had been building a foundation to provide patient-centered recovery-oriented care for several years prior to initiating HCHC. This experience helped influence the county and its behavioral health agencies to establish navigator teams to make progress toward integrating behavioral and physical health care.

Despite its robust mixed methods approach, this study still has some limitations. First, the length of the pilots (two years) and the number of sites (two) limited our options for data collection and analysis. Although we were able to identify sizable comparison groups, they were not a perfect match to the study groups. However, because the primary objective for using comparison groups was to identify existing trends that might account for the observed changes in outcomes through a difference-in-differences analysis, the ones used for this evaluation were reasonably sufficient. In addition, findings from the regression analyses, controlling for confounding factors that differed at baseline between the study and comparison groups, were largely consistent with the findings from our primary difference-in-differences analyses. Second, our site visits and telephone interviews were limited in number and specific to the two pilot programs involved in this evaluation. Although we followed rigorous qualitative research techniques to ensure these interviews had internal validity, we cannot claim they also have external validity.

Despite these limitations, this evaluation provides insight into two models of care integration that demonstrated promise in achieving desired outcomes. As states continue to grapple with establishing more integrated, coordinated, and cost-effective care for adult Medicaid beneficiaries with SMI, lessons gleaned from the experiences of the SMI Innovations Project partners will be informative. Future research involving longer term, multisite integration efforts will further enhance our knowledge of programmatic and policy factors shaping positive outcomes in this challenging area of health care delivery.

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APPENDIX A

OUTCOME MEASURES AND BASELINE CHARACTERISTICS

Table A.1. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12- Month Pre- Intervention Period and the Intervention Period, Southeast Pennsylvania

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	4,788	4,788		7,093	7,093			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	22.3	33.8	11.5	18.4	27.9	9.6	1.9	0.592
Average number per 1,000 members per month[c]	33.6	31.8	-1.8	22.9	21.7	-1.2	-0.6	0.753
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	17.9	23.4	5.5	26.2	32.8	6.5	-1.0	0.707
Average number per 1,000 members per month[c]	30.1	24.4	-5.7	42.5	35.0	-7.5	1.9	0.485
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	1.4	2.2	0.8	0.7	1.1	0.3	0.4	0.853
Average number per 1,000 members per month[c]	1.9	1.4	-0.5	0.8	0.7	-0.1	-0.4	0.209
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	38.4	38.6	0.2	32.9	32.8	-0.2	0.4	0.808
Percentage of admissions resulting in a readmission within 60 days	50.4	50.3	-0.1	43.3	43.3	-0.0	-0.1	0.950
Percentage of admissions resulting in a readmission within 90 days	57.7	57.6	-0.1	50.9	50.4	-0.5	0.4	0.835
ED Visits[e]								
Percentage with any ED visit[b]	56.2	70.6	14.4	66.1	80.7	14.6	-0.2	0.019
Average number per 1,000 members per month[c]	148.1	142.4	-5.7	183.8	194.4	10.5	-16.2	0.036

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.2. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and the Intervention Period, Southeast Pennsylvania, Bucks County

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	1,312	1,312		7,093	7,093			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	20.4	32.3	11.9	18.4	27.9	9.6	2.4	0.415
Average number per 1,000 members per month[c]	28.5	28.7	0.2	22.9	21.7	-1.2	1.4	0.631
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	14.6	22.3	7.7	26.2	32.8	6.5	1.1	0.065
Average number per 1,000 members per month[c]	24.4	19.2	-5.2	42.5	35.0	-7.5	2.3	0.596
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	1.2	1.7	0.5	0.7	1.1	0.3	0.2	0.977
Average number per 1,000 members per month[c]	1.4	1.1	-0.3	0.8	0.7	-0.1	-0.2	0.710
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	33.1	35.2	2.1	32.9	32.8	-0.2	2.3	0.385
Percentage of admissions resulting in a readmission within 60 days	43.1	46.7	3.7	43.3	43.3	-0.0	3.7	0.185
Percentage of admissions resulting in a readmission within 90 days	50.9	53.3	2.5	50.9	50.4	-0.5	3.0	0.288
ED Visits[e]								
Percentage with any ED visit[b]	53.5	68.2	14.7	66.1	80.7	14.6	0.1	0.114
Average number per 1,000 members per month[c]	133.7	137.2	3.6	183.8	194.4	10.5	-6.9	0.579

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.3. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12- Month Pre- Intervention Period and the Intervention Period, Southeast Pennsylvania, Delaware County

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	2,163	2,163		7,093	7,093			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	25.4	36.8	11.4	18.4	27.9	9.6	1.9	0.941
Average number per 1,000 members per month[c]	40.2	37.0	-3.2	22.9	21.7	-1.2	-2.0	0.432
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	18.9	23.2	4.3	26.2	32.8	6.5	-2.3	0.497
Average number per 1,000 members per month[c]	29.4	24.8	-4.6	42.5	35.0	-7.5	2.9	0.411
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	1.3	2.4	1.1	0.7	1.1	0.3	0.7	0.428
Average number per 1,000 members per month[c]	1.8	1.4	-0.4	0.8	0.7	-0.1	-0.3	0.506
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	37.7	38.1	0.4	32.9	32.8	-0.2	0.6	0.763
Percentage of admissions resulting in a readmission within 60 days	50.1	50.2	0.1	43.3	43.3	-0.0	0.1	0.976
Percentage of admissions resulting in a readmission within 90 days	57.7	58.0	0.3	50.9	50.4	-0.5	0.8	0.702
ED Visits[e]								
Percentage with any ED visit[b]	57.9	72.2	14.3	66.1	80.7	14.6	-0.3	0.089
Average number per 1,000 members per month[c]	145.8	140.2	-5.5	183.8	194.4	10.5	-16.0	0.114

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.4. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12- Month Pre- Intervention Period and the Intervention Period, Southeast Pennsylvania, Montgomery County

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	1,313	1,313		7,093	7,093			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	19.1	30.1	11.0	18.4	27.9	9.6	1.5	0.557
Average number per 1,000 members per month[c]	27.8	26.0	-1.8	22.9	21.7	-1.2	-0.6	0.816
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	19.4	24.9	5.5	26.2	32.8	6.5	-1.1	0.974
Average number per 1,000 members per month[c]	36.9	29.1	-7.7	42.5	35.0	-7.5	-0.2	0.964
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	1.9	2.4	0.5	0.7	1.1	0.3	0.1	0.593
Average number per 1,000 members per month[c]	2.7	1.6	-1.1	0.8	0.7	-0.1	-1.0	0.049
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	43.8	42.8	-1.0	32.9	32.8	-0.2	-0.9	0.747
Percentage of admissions resulting in a readmission within 60 days	56.6	53.8	-2.8	43.3	43.3	-0.0	-2.8	0.275
Percentage of admissions resulting in a readmission within 90 days	62.9	60.6	-2.3	50.9	50.4	-0.5	-1.9	0.446
ED Visits[e]								
Percentage with any ED visit[b]	56.1	70.4	14.3	66.1	80.7	14.6	-0.3	0.117
Average number per 1,000 members per month[c]	166.4	151.5	-14.9	183.8	194.4	10.5	-25.4	0.049

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.5. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12- Month Pre- Intervention Period and the Intervention Period, Southeast Pennsylvania, Members who Consented to Participate

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	857	857		7,093	7,093			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	23.3	34.3	11.0	18.4	27.9	9.6	1.4	0.983
Average number per 1,000 members per month[c]	36.3	33.7	-2.7	22.9	21.7	-1.2	-1.5	0.685
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	24.4	28.9	4.5	26.2	32.8	6.5	-2.1	0.490
Average number per 1,000 members per month[c]	42.9	37.8	-5.1	42.5	35.0	-7.5	2.4	0.681
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	1.0	3.0	2.0	0.7	1.1	0.3	1.6	0.115
Average number per 1,000 members per month[c]	1.1	1.7	0.5	0.8	0.7	-0.1	0.6	0.239
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	38.6	42.7	4.1	32.9	32.8	-0.2	4.2	0.140
Percentage of admissions resulting in a readmission within 60 days	54.4	54.4	0.0	43.3	43.3	-0.0	0.0	0.992
Percentage of admissions resulting in a readmission within 90 days	60.6	62.5	1.9	50.9	50.4	-0.5	2.3	0.411
ED Visits[e]								
Percentage with any ED visit[b]	57.6	70.8	13.1	66.1	80.7	14.6	-1.5	0.107
Average number per 1,000 members per month[c]	150.6	155.2	4.6	183.8	194.4	10.5	-5.9	0.716

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.6. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and Each 6-Month Period of the Intervention Period, Southeast Pennsylvania

	Difference in Rate[a]		Difference in Differences	p-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[b]						
July 1–December 31, 2009	-4.7	-3.9	-0.8	0.804	4,771	6,945
January 1–June 30, 2010	-3.6	-9.0	5.4	0.090	4,493	6,396
July 1–December 31, 2010	-5.4	-8.5	3.1	0.332	4,110	5,848
January 1–June 30, 2011	-6.3	-12.3	5.9	0.088	3,780	5,006
ED Visits[c]						
July 1–December 31, 2009	-4.5	8.2	-12.7	0.128	4,771	6,945
January 1–June 30, 2010	-5.0	-2.4	-2.6	0.770	4,493	6,396
July 1–December 31, 2010	-0.2	16.9	-17.1	0.073	4,110	5,848
January 1–June 30, 2011	-2.3	14.0	-16.3	0.090	3,780	5,006

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.7. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and Each 6-Month Period of the Intervention Period, Southeast Pennsylvania, Bucks County

	Difference in Rate[a]		Difference in Differences	p-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[b]						
July 1–December 31, 2009	-5.1	-3.9	-1.3	0.814	1,306	6,945
January 1–June 30, 2010	-3.4	-9.0	5.6	0.282	1,235	6,396
July 1–December 31, 2010	-4.1	-8.5	4.4	0.403	1,134	5,848
January 1–June 30, 2011	-2.9	-12.3	9.4	0.103	1,040	5,006
ED Visits[c]						
July 1–December 31, 2009	0.1	8.2	-8.1	0.542	1,306	6,945
January 1– June 30, 2010	6.9	-2.4	9.3	0.515	1,235	6,396
July 1–December 31, 2010	5.0	16.9	-11.9	0.449	1,134	5,848
January 1–June 30, 2011	8.3	14.0	-5.7	0.717	1,040	5,006

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.8. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and Each 6-Month Period of the Intervention Period, Southeast Pennsylvania, Delaware County

	Difference in Rate[a]		Difference in Differences	p-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[b]						
July 1–December 31, 2009	-3.6	-3.9	0.3	0.943	2,155	6,945
January 1–June 30, 2010	-4.0	-9.0	5.0	0.239	2,045	6,396
July 1–December 31, 2010	-4.9	-8.5	3.6	0.405	1,878	5,848
January 1–June 30, 2011	-6.5	-12.3	5.8	0.210	1,756	5,006
ED Visits[c]						
July 1–December 31, 2009	-0.4	8.2	-8.6	0.433	2,155	6,945
January 1–June 30, 2010	-7.4	-2.4	-5.0	0.671	2,045	6,396
July 1–December 31, 2010	-6.8	16.9	-23.7	0.060	1,878	5,848
January 1–June 30, 2011	-1.9	14.0	-15.9	0.202	1,756	5,006

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.9. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and Each 6-Month Period of the Intervention Period, Southeast Pennsylvania, Montgomery County

	Difference in Rate[a]		Difference in Differences	*p*-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[b]						
July 1–December 31, 2009	-6.0	-3.9	-2.1	0.707	1,310	6,945
January 1–June 30, 2010	-3.1	-9.0	5.9	0.278	1,213	6,396
July 1–December 31, 2010	-7.5	-8.5	1.0	0.863	1,098	5,848
January 1–June 30, 2011	-9.8	-12.3	2.5	0.682	984	5,006
ED Visits[c]						
July 1–December 31, 2009	-15.9	8.2	-24.1	0.081	1,310	6,945
January 1–June 30, 2010	-13.2	-2.4	-10.7	0.468	1,213	6,396
July 1–December 31, 2010	6.0	16.9	-10.9	0.503	1,098	5,848
January 1–June 30, 2011	-14.1	14.0	-28.1	0.085	984	5,006

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.10. Baseline Characteristics of the Study and Comparison Groups, by County and for Southeast Pennsylvania (Percentages, Unless Otherwise Noted)

	Study Group by County			Study Group (Three Counties Combined)	Comparison Group
	Bucks	Delaware	Montgomery		
Number of Beneficiaries	1,312	2,163	1,313	4,788	7,093
Age					
Mean	40.4*	41.8*	40.2*	41.0*	38.8
18 to 34 years	38.0	31.1^	36.3^	34.4^	40.7
35 to 54 years	47.0	51.7	50.7	50.1	46.1
55 to 64 years	13.6	16.0	12.5	14.4	12.3
65 years or older	1.4	1.2	0.5	1.0	0.9
Female	71.0	71.2*	67.5	70.1*	67.7
Race					
African American	9.8^	36.3^	24.1^	25.7^	7.0
American Indian or Alaskan Native	0.2	0.1	0.5	0.2	0.1
Asian	0.6	1.2	1.4	1.1	0.4
Native Hawaiian or other Pacific Islander	0.0	0.0	0.1	0.0	0.0
White	84.0	57.3	66.5	67.1	45.3
Other or not volunteered	5.4	5.0	7.4	5.8	47.1
Ethnicity					
Hispanic	3.7*	3.6*	4.2*	3.8*	45.2
Behavioral Health Conditions[a]					
Schizophrenia	22.2*	34.5*	32.9*	30.7*	18.0
Mood disorder	91.7*	85.2*	85.5*	87.1*	95.1
Borderline personality disorder	1.1	1.7*	2.7*	1.8*	0.9
Anxiety	39.8*	34.1*	33.2	35.4*	30.9
Nondependent drug abuse	40.7*	43.2	37.2*	40.9	45.0
Physical Comorbidities[b]					
Asthma	19.8*	22.6*	19.8*	21.1*	25.7
Chronic obstructive pulmonary disease	13.7*	16.1*	11.4*	14.2*	7.0
Congestive heart failure	3.1	5.2*	4.3*	4.4*	2.3
Coronary artery disease	12.0*	11.7*	9.7*	11.2*	6.9
Diabetes	19.0	22.5*	20.0	20.9*	18.6
Hyperlipidemia	41.1*	37.9*	35.9	38.2*	32.4
Hypertension	40.2*	42.7*	38.2*	40.8*	33.6
Healthcare Utilization					
ED visits per 1,000 members per month	133.2*	145.4*	166.3	147.8*	179.4
Hospitalizations per 1,000 members per month	54.1*	71.2	67.7	65.6	65.8

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. For complete technical details, see Appendix B.

^ The difference in the distribution, not individual categories, between the study and comparison groups is significantly different.

* $p < 0.01$. Due to the large sample sizes, statistically significant differences above the 0.01 level are not shown.

ED = emergency department.

[a] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 295.xx to identify schizophrenia, 296.xx for mood disorders, 305.xx to identify nondependent drug abuse, 300.0x to identify anxiety, and 301.83 for borderline personality disorder on all professional and institutional medical claims in the 24-month period before the intervention began.

[b] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 493.xx to identify asthma; 491.2x, 491.9x, 492.xx, 494.xx, and 496.xx to identify chronic obstructive pulmonary disease; 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, and 428.xx for congestive heart failure; 410.xx, 411.xx, 412.xx, 413.xx, and 414.xx for coronary artery disease; 250.xx, 357.2x, 362.0x, and 366.41 for diabetes; 272.0x, 272.4x, and 272.9x for hyperlipidemia; and 401.xx, 402.xx, 403.xx, and 404.xx for hypertension on all professional and institutional medical claims in the 24-month period before the intervention began.

Table A.11. Baseline Characteristics of Members who Consented to Participate versus Members who did not Consent to Participate, by County and for Southeast Pennsylvania (Percentages, Unless Otherwise Noted)

	Bucks County		Delaware County		Montgomery County		All Three Counties	
	Consented	Did Not Consent	Consented	Did Not Consent	Consented	Did Not Consent	Consented	Did Not Consent
Number of Beneficiaries	282	1,030	297	1,866	278	1,035	857	3,931
Age								
Mean	42.6*	39.8	45.7*	41.1	43.1*	39.4	43.9*	40.3
18 to 34 years	27.7^	40.9	18.2^	33.2	25.9^	39.1	23.8^	36.8
35 to 54 years	56.7	44.4	58.2	50.6	57.2	49.0	57.4	48.6
55 to 64 years	15.2	13.1	23.2	14.8	16.9	11.3	18.6	13.5
65 years or older	0.4	1.7	0.3	1.3	0.0	0.6	0.2	1.2
Female	70.9	71.1	65.0	72.1	73.0	66.0	69.5	70.2
Race								
African American	11.3	9.3	46.5^	34.7	24.5	24.1	27.8	25.3
American Indian or Alaskan Native	2.0	0.4	0.0	0.1	0.4	0.5	0.2	0.2
Asian	0.2	0.2	1.0	1.3	1.8	1.4	1.2	1.1
Native Hawaiian or other Pacific Islander	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
White	83.3	84.2	47.1	58.9	62.6	67.5	64.1	67.8
Other or not volunteered	-0.8	4.3	5.4	4.9	10.8	6.5	6.8	5.5
Ethnicity								
Hispanic	2.5	4.1	4.7	3.4	6.8	3.5	4.7	3.6
Behavioral Health Conditions[a]								
Schizophrenia	30.1*	20.0	57.6*	30.8	48.2*	28.8	45.5*	27.4
Mood disorder	89.4	92.3	77.1*	86.5	79.1*	87.2	81.8*	88.2
Borderline personality disorder	0.4	1.4	1.7	1.7	4.7	2.1	2.2	1.7
Anxiety	33.0*	41.6	24.2*	35.7	32.7	33.3	29.9*	36.6
Nondependent drug abuse	43.6	39.9	44.1	43.0	38.1	36.9	42.0	40.6
Physical Comorbidities[b]								
Asthma	19.9	19.8	32.3*	21.1	24.1	18.6	25.6*	20.1
Chronic obstructive pulmonary disease	19.2*	12.2	23.2*	15.0	14.8	10.5	19.1*	13.1
Congestive heart failure	3.6	3.0	9.4*	4.6	3.2	4.6	5.5	4.2
Coronary artery disease	12.4	11.8	12.8	11.5	10.1	9.6	11.8	11.1
Diabetes	22.7	18.0	29.3*	21.5	28.1*	17.8	26.7*	19.6
Hyperlipidemia	44.7	40.1	47.1*	36.4	41.7	34.3	44.6*	36.8
Hypertension	42.9	39.5	57.6*	40.3	42.4	37.0	47.8*	39.2
Healthcare Utilization								
ED visits per 1,000 members per month	128.0	134.7	132.6	147.4	179.6	162.8	146.3	148.1
Hospitalizations per 1,000 members per month	46.5	56.2	96.2*	67.2	93.4	60.8	78.9*	62.6

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. For complete technical details, see Appendix B.

^ The difference in the distribution, not individual categories, between the study and comparison groups is significantly different.

* $p < 0.01$. Due to the large sample sizes, statistically significant differences above the 0.01 level are not shown.

ED = Emergency department.

[a] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 295.xx to identify schizophrenia, 296.xx for mood disorders, 305.xx to identify nondependent drug abuse, 300.0x to identify anxiety, and 301.83 for borderline personality disorder on all professional and institutional medical claims in the 24-month period before the intervention began.

[b] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 493.xx to identify asthma; 491.2x, 491.9x, 492.xx, 494.xx, and 496.xx to identify chronic obstructive pulmonary disease; 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, and 428.xx for congestive heart failure; 410.xx, 411.xx, 412.xx, 413.xx, and 414.xx for coronary artery disease; 250.xx, 357.2x, 362.0x, and 366.41 for diabetes; 272.0x,272.4x, and 272.9x for hyperlipidemia; and 401.xx, 402.xx, 403.xx, and 404.xx for hypertension on all professional and institutional medical claims in the 24-month period before the intervention began.

Table A.12. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12- Month Pre- Intervention Period and the Intervention Period, Southwest Pennsylvania

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	8,633	8,633		10,514	10,514			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	21.0	32.3	11.4	20.8	31.5	10.7	0.6	0.584
Average number per 1,000 members per month[c]	30.1	27.1	-3.1	28.5	26.1	-2.3	-0.7	0.669
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	24.0	34.2	10.3	19.6	32.2	12.6	-2.3	0.001
Average number per 1,000 members per month[c]	41.1	39.6	-1.6	33.8	37.2	3.4	-4.9	0.041
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	2.4	3.6	1.2	2.0	3.2	1.2	0.1	0.816
Average number per 1,000 members per month[c]	2.9	2.8	-0.1	2.6	2.5	-0.1	0.0	0.958
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	43.1	38.9	-4.2	39.5	39.7	0.2	-4.4	<0.001
Percentage of admissions resulting in a readmission within 60 days	53.9	49.4	-4.5	50.3	50.6	0.3	-4.8	<0.001
Percentage of admissions resulting in a readmission within 90 days	61.3	56.4	-4.9	57.5	57.4	-0.1	-4.8	<0.001
ED Visits[e]								
Percentage with any ED visit[b]	61.4	75.7	14.3	61.3	77.1	15.7	-1.5	0.077
Average number per 1,000 members per month[c]	181.8	168.5	-13.3	179.9	178.5	-1.4	-12.0	0.100

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.13. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and the Intervention Period, Southwest Pennsylvania, Cohorts 2-3

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	5,425	5,425		6,657	6,657			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	21.0	31.3	10.3	21.5	30.0	8.5	1.8	0.123
Average number per 1,000 members per month[c]	30.5	26.2	-4.2	29.1	24.5	-4.6	0.3	0.874
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	27.1	30.7	3.7	22.9	28.5	5.6	-1.9	0.049
Average number per 1,000 members per month[c]	47.6	37.9	-9.7	41.4	34.5	-6.8	-2.9	0.351
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	2.6	3.0	0.5	2.1	2.9	0.9	-0.4	0.273
Average number per 1,000 members per month[c]	3.1	2.3	-0.8	2.6	2.3	-0.3	-0.4	0.455
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	42.7	40.6	-2.0	39.6	39.6	-0.0	-2.0	0.177
Percentage of admissions resulting in a readmission within 60 days	53.5	50.8	-2.7	50.5	50.3	-0.2	-2.5	0.093
Percentage of admissions resulting in a readmission within 90 days	61.2	57.5	-3.7	57.8	57.5	-0.4	-3.3	0.024
ED Visits[e]								
Percentage with any ED visit[b]	61.2	74.5	13.3	61.8	75.6	13.8	-0.5	0.562
Average number per 1,000 members per month[c]	180.7	159.0	-21.7	185.3	172.7	-12.6	-9.1	0.324

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. Cohort 2 and 3 members were eligible between July 1, 2007, and June 30, 2009. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.14. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and the Intervention Period, Southwest Pennsylvania, Cohorts 4-5

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	3,208	3,208		3,857	3,857			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	20.9	34.4	13.6	19.1	35.4	16.3	-2.8	0.045
Average number per 1,000 members per month[c]	29.4	29.1	-0.3	27.0	30.9	3.8	-4.2	0.175
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	16.8	41.3	24.5	12.1	41.2	29.1	-4.7	<0.001
Average number per 1,000 members per month[c]	25.8	43.3	17.6	16.2	45.1	29.0	-11.4	0.003
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	1.9	4.9	3.0	1.9	3.9	2.0	1.0	0.264
Average number per 1,000 members per month[c]	2.4	3.8	1.4	2.7	3.3	0.6	0.7	0.481
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	44.7	35.7	-9.0	39.2	40.0	0.8	-9.8	<0.001
Percentage of admissions resulting in a readmission within 60 days	55.1	46.7	-8.4	49.4	51.2	1.8	-10.2	<0.001
Percentage of admissions resulting in a readmission within 90 days	61.4	54.2	-7.2	56.4	57.3	0.9	-8.1	0.001
ED Visits[e]								
Percentage with any ED visit[b]	61.9	77.8	15.9	60.3	80.2	19.9	-4.0	0.006
Average number per 1,000 members per month[c]	184.4	190.0	5.7	167.1	195.6	28.5	-22.9	0.052

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. Cohort 4 and 5 members were eligible between July 1, 2009, and June 30, 2011. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.15. Hospitalizations, Readmissions, and Emergency Department (ED) Visits in the 12- Month Pre- Intervention Period and the Intervention Period, Southwest Pennsylvania, Members who Consented to Participate

	Study Group			Comparison Group			Difference in Differences	
	Pre-Intervention	Intervention	Difference	Pre-Intervention	Intervention	Difference	Estimate	*p*-Value
Number of Beneficiaries	870	870		10,514	10,514			
Physical Health Hospitalizations[a]								
Percentage with any hospitalization[b]	25.5	38.6	13.1	20.8	31.5	10.7	2.3	0.686
Average number per 1,000 members per month[c]	38.0	40.2	2.2	28.5	26.1	-2.3	4.5	0.267
Mental Health Hospitalizations[a]								
Percentage with any hospitalization[b]	34.4	41.7	7.3	19.6	32.2	12.6	-5.3	0.001
Average number per 1,000 members per month[c]	74.7	59.4	-15.3	33.8	37.2	3.4	-18.6	0.002
Alcohol and Other Drug Hospitalizations[a]								
Percentage with any hospitalization[b]	3.1	2.7	-0.4	2.0	3.2	1.2	-1.6	0.038
Average number per 1,000 members per month[c]	3.3	1.7	-1.6	2.6	2.5	-0.1	-1.5	0.220
Readmissions[d]								
Percentage of admissions resulting in a readmission within 30 days	44.8	48.6	3.7	39.5	39.7	0.2	3.5	0.144
Percentage of admissions resulting in a readmission within 60 days	56.9	57.9	0.9	50.3	50.6	0.3	0.6	0.794
Percentage of admissions resulting in a readmission within 90 days	64.8	66.0	1.2	57.5	57.4	-0.1	1.3	0.562
ED Visits[e]								
Percentage with any ED visit[b]	66.9	80.4	13.5	61.3	77.1	15.7	-2.2	0.713
Average number per 1,000 members per month[c]	239.4	224.5	-14.9	179.9	178.5	-1.4	-13.5	0.442

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] Includes physical health, behavioral health, and alcohol and other drug services inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–General Hospital/Acute Care, Mental Health Utilization, and Identification of Alcohol and Other Drug Services. Physical health inpatient utilization includes care and services in (1) total inpatient, (2) medicine, (3) surgery, and (4) maternity.

[b] The duration of the pre-intervention period (one year) was shorter than the duration of the intervention period (two years). Therefore, the percentage with any hospitalization or ED visit is not directly comparable across the pre-intervention and intervention periods.

[c] Average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) multiplied by 1,000.

[d] Includes readmissions for all diagnoses.

[e] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.16. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and Each 6-Month Period of the Intervention Period, Southwest Pennsylvania

	Difference in Rate[a]		Difference in Differences	*p*-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[a]						
July 1–December 31, 2009	-0.4	2.4	-2.8	0.408	6,782	7,591
January 1–June 30, 2010	-1.3	1.6	-2.9	0.346	7,449	8,347
July 1–December 31, 2010	-0.5	0.0	-0.5	0.860	7,721	8,760
January 1–June 30, 2011	-7.0	3.2	-10.2	0.001	7,151	8,319
ED Visits[c]						
July 1–December 31, 2009	-3.1	-2.0	-1.1	0.904	6,782	7,591
January 1–June 30, 2010	-12.6	-6.8	-5.8	0.491	7,449	8,347
July 1–December 31, 2010	-9.7	1.5	-11.2	0.182	7,721	8,760
January 1–June 30, 2011	-22.8	5.9	-28.7	0.001	7,151	8,319

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.17. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12-Month Pre-Intervention Period and Each 6-Month Period of the Intervention Period, Cohorts 2-3

	Difference in Rate[a]		Difference in Differences	*p*-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[a]						
July 1–December 31, 2009	-6.9	-4.3	-2.6	0.461	5,378	6,549
January 1–June 30, 2010	-10.5	-7.6	-2.9	0.423	4,967	6,161
July 1–December 31, 2010	-8.2	-9.0	0.8	0.838	4,630	5,741
January 1–June 30, 2011	-12.1	-7.3	-4.9	0.251	4,256	4,798
ED Visits[c]						
July 1–December 31, 2009	-9.7	-6.5	-3.1	0.753	5,378	6,549
January 1–June 30, 2010	-20.2	-19.2	-0.9	0.926	4,967	6,161
July 1–December 31, 2010	-19.8	-3.9	-15.9	0.133	4,630	5,741
January 1–June 30, 2011	-29.7	-3.9	-25.8	0.020	4,256	4,798

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. Cohort 2 and 3 members were eligible between July 1, 2007, and June 30, 2009. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.18. Mental Health Hospitalizations and Emergency Department (ED) Visits in the 12- Month Pre-Intervention Period and Each 6- Month Period of the Intervention Period, Cohorts 4- 5

	Difference in Rate[a]		Difference in Differences	*p*-Value	Number of Members in Study Group	Number of Members in Comparison Group
	Study	Comparison				
Mental Health Hospitalizations[a]						
July 1–December 31, 2009	39.6	72.0	-32.4	0.004	1,404	1,042
January 1–June 30, 2010	22.9	36.0	-13.0	0.030	2,482	2,186
July 1–December 31, 2010	15.4	21.8	-6.5	0.166	3,091	3,019
January 1–June 30, 2011	4.8	22.2	-17.4	<.0001	2,895	3,521
ED Visits[c]						
July 1–December 31, 2009	43.8	50.1	-6.3	0.808	1,404	1,042
January 1–June 30, 2010	5.1	39.6	-34.4	0.034	2,482	2,186
July 1–December 31, 2010	6.1	13.8	-7.7	0.583	3,091	3,019
January 1–June 30, 2011	-13.2	22.5	-35.8	0.006	2,895	3,521

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. The study and comparison groups included only those members who were eligible and did not discontinue their enrollment before the start of the respective six-month period. Cohort 4 and 5 members were eligible between July 1, 2009 and June 30, 2011. We weighted all analyses to account for members who were enrolled in both the physical and behavioral health programs simultaneously for only part of the year. The weights are a function of the total number of days enrolled in both plans. For complete technical details, see Appendix B.

[a] The difference in rate between the one-year pre-intervention period and the specified six-month period during the intervention. The rate was calculated by multiplying the average number of hospitalizations or ED visits for each member per month (number of days enrolled in both plans divided by 30) by 1,000.

[b] Includes mental health inpatient utilization based on the technical specifications of Healthcare Effectiveness Data and Information Set (HEDIS®) 2009 Inpatient Utilization–Mental Health Utilization.

[c] Includes ED visits for all diagnoses and uses the following HEDIS® 2009 Table AMB-B Codes to identify ED visits: CPT 99281-99285, UB revenue 045x, 0981, OR CPT 10040-69979, and POS 23.

Table A.19. Baseline Characteristics of the Study and Comparison Groups, Southwest Pennsylvania (Percentages, Unless Otherwise Noted)

	Cohorts 2 and 3		Cohorts 4 and 5		All Cohorts Combined	
	Study Group	Comparison Group	Study Group	Comparison Group	Study Group	Comparison Group
Number of Beneficiaries	5,425	6,657	3,208	3,857	8,633	10,514
Age						
Mean	40.7*	39.5	37.3*	35.3	39.4*	38.0
18 to 34 years	34.7^	38.5	45.6^	51.7	38.8^	43.4
35 to 54 years	50.5	48.5	44.9	39.9	48.4	45.3
55 to 64 years	14.0	12.2	8.9	8.2	12.1	10.7
65 years or older	0.8	0.8	0.6	0.2	0.8	0.6
Female	63.0*	66.2	62.0	64.8	62.7*	65.7
Race						
African American	36.6^	39.2	31.6^	39.6	34.7^	39.3
American Indian or Alaskan Native	0.3	0.1	0.3	0.1	0.3	0.1
Asian	0.4	0.4	0.4	0.2	0.4	0.3
Native Hawaiian or other Pacific Islander	0.1	0.0	0.1	0.0	0.1	0.0
White	59.9	58.6	65.0	57.6	61.8	58.2
Other or not volunteered	2.8	1.7	2.7	2.5	2.8	2.0
Ethnicity						
Hispanic	0.9*	0.4	1.0	0.7	0.9*	0.5
Behavioral Health Conditions[a]						
Schizophrenia	24.5	23.8	11.2*	9.3	19.5	18.5
Mood disorder	89.1	88.7	90.0	89.4	89.4	89.0
Borderline personality disorder	3.0	2.4	1.5	1.0	2.4	1.9
Anxiety	36.3*	32.1	29.5	27.7	33.8*	30.5
Nondependent Drug Abuse	51.5	52.7	39.3	41.4	47.0	48.6
Physical Comorbidities[b]						
Asthma	24.0*	21.6	16.7	16.4	21.3*	19.7
Chronic obstructive pulmonary disease	15.7*	13.6	8.1*	6.4	12.9*	11.0
Congestive heart failure	4.3*	3.0	2.1	2.2	3.5*	2.7
Coronary artery disease	9.8*	7.6	6.0	4.8	8.3*	6.6
Diabetes	17.8*	15.4	10.1	8.7	14.9*	12.9
Hyperlipidemia	27.3*	23.0	14.3*	11.5	22.5*	18.8
Hypertension	38.0*	33.8	24.6*	20.3	33.0*	28.8
Healthcare Utilization						
ED visits per 1,000 members per month	181.5	183.7	155.4	143.4	171.8	168.9
Hospitalizations per 1,000 members per month	83.5*	74.0	63.2	57.6	75.9*	67.9

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same eligibility criteria as applied to the study group with the exception of county. Cohort 2 and 3 members were eligible between July 1, 2007, and June 30, 2009. Cohort 4 and 5 members were eligible between July 1, 2009, and June 30, 2011. For complete technical details, see Appendix B.

^ The difference in the distribution, not individual categories, between the study and comparison groups is significantly different.

* $p < 0.01$. Due to the large sample sizes, statistically significant differences above the 0.01 level are not shown.

ED = Emergency department.

[a] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 295.xx to identify schizophrenia, 296.xx for mood disorders, 305.xx to identify nondependent drug abuse, 300.0x to identify anxiety, and 301.83 for borderline personality disorder on all professional and institutional medical claims in the 24-month period before the intervention began for cohort 2 and 3 members and during the 12-month period before the intervention began for cohort 4 and 5 members.

[b] We used *International Classification of Diseases- Ninth Revision* diagnosis codes 493.xx to identify asthma; 491.2x, 491.9x, 492.xx, 494.xx, and 496.xx to identify chronic obstructive pulmonary disease; 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, and 428.xx for congestive heart failure; 410.xx, 411.xx, 412.xx, 413.xx, and 414.xx for coronary artery disease; 250.xx, 357.2x, 362.0x, and 366.41 for diabetes; 272.0x, 272.4x, and 272.9x for hyperlipidemia; and 401.xx, 402.xx, 403.xx, and 404.xx for hypertension on all professional and institutional medical claims in the 24-month period before the intervention began for cohort 2 and 3 members and during the 12-month period before the intervention began for cohort 4 and 5 members.

Table A.20. Baseline Characteristics of Members who Consented to Participate versus Members who did not Consent to Participate, Southwest Pennsylvania (Percentages, Unless Otherwise Noted)

	Consented	Did not Consent
Number of Beneficiaries	870	7,763
Age		
Mean	43.8*	39.0
18 to 34 years	24.1^	40.4
35 to 54 years	56.0	47.5
55 to 64 years	18.9	11.3
65 years or older	1.0	0.7
Female	66.4	62.2
Race		
African American	40.0^	34.1
American Indian or Alaskan Native	0.6	0.3
Asian	0.5	0.4
Native Hawaiian or other Pacific Islander	0.0	0.1
White	56.6	62.4
Other or not volunteered	2.4	2.8
Ethnicity		
Hispanic	0.8	0.9
Behavioral Health Conditions[a]		
Schizophrenia	34.7*	17.8
Mood disorder	87.4	89.6
Borderline personality disorder	5.5*	2.1
Anxiety	40.2*	33.1
Nondependent Drug Abuse	56.0*	46.0
Physical Comorbidities[b]		
Asthma	33.4*	19.9
Chronic obstructive pulmonary disease	24.8*	11.5
Congestive heart failure	6.3*	3.1
Coronary artery disease	16.6*	7.4
Diabetes	27.1*	13.6
Hyperlipidemia	35.6*	21.0
Hypertension	49.3*	31.2
Healthcare Utilization		
ED visits per 1,000 members per month	237.0*	164.4
Hospitalizations per 1,000 members per month	116.5*	71.4

Note: The study group includes all members who met the program eligibility criteria based on Medicaid claims or enrollment data, regardless of actual participation in the program. The comparison group includes members who met the same program eligibility criteria as applied to the study group with the exception of county of residence. For complete technical details, see Appendix B.

^ The difference in the distribution, not individual categories, between the study and comparison groups is significantly different.

* $p < 0.01$. Due to the large sample sizes, statistically significant differences above the 0.01 level are not shown.

ED = Emergency department.

[a] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 295.xx to identify schizophrenia, 296.xx for mood disorders, 305.xx to identify nondependent drug abuse, 300.0x to identify anxiety, and 301.83 for borderline personality disorder on all professional and institutional medical claims in the 24-month period before the intervention began for cohort 2 and 3 members and during the 12-month period before the intervention began for cohort 4 and 5 members.

[b] We used *International Classification of Diseases--Ninth Revision* diagnosis codes 493.xx to identify asthma; 491.2x, 491.9x, 492.xx, 494.xx, and 496.xx to identify chronic obstructive pulmonary disease; 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, and 428.xx for congestive heart failure; 410.xx, 411.xx, 412.xx, 413.xx, and 414.xx for coronary artery disease; 250.xx, 357.2x, 362.0x, and 366.41 for diabetes; 272.0x,272.4x, and 272.9x for hyperlipidemia; and 401.xx, 402.xx, 403.xx, and 404.xx for hypertension on all professional and institutional medical claims in the 24-month period before the intervention began for cohort 2 and 3 members and during the 12-month period before the intervention began for cohort 4 and 5 members.

APPENDIX B

TECHNICAL APPENDIX

This technical appendix details the outcomes analyses conducted for the evaluation, including an overview of the data and data sources, the research sample, and the outcome measures. It also explains the primary and secondary analyses conducted, an analysis of outcomes by six-month calendar periods, and a participation analysis to examine whether and how baseline characteristics differed for members who provided (or did not provide) consent to share their health information. Finally, it describes the robustness check used to examine whether the study and comparison groups were comparable when assessing differences in outcomes before the intervention began and a regression analysis to confirm the results of the outcomes analysis for emergency department (ED) visits and hospitalizations, controlling for member characteristics and baseline utilization.

Overview of the Data and Data Sources

We used Medicaid claims and enrollment data to measure the outcomes of interest (ED visits, hospitalizations, and readmissions). Table B.1 lists the partners and study and comparison groups in each pilot program.

Table B.1. Overview of the Pilot Programs, Partners, and Study and Comparison Groups

	Southeast Pennsylvania	Southwest Pennsylvania
Pilot Program Name	HealthChoices HealthConnections (HCHC)	Connected Care
Partners		
Physical Health Plan	Keystone Mercy Health Plan (KMHP)	UPMC for You
Behavioral Health Managed Care Organization	Magellan Behavioral Health (MBH)	Community Care Behavioral Health (CCBH)
Study Group	Members enrolled in KMHP and MBH in Bucks, Delaware, or Montgomery counties	Members enrolled in UPMC for You and CCBH in Allegheny County
Comparison Group	MBH members in Lehigh or Northampton counties	CCBH members in Allegheny County, ***not*** members of UPMC

UPMC = University of Pittsburgh Medical Center.

We used four types of data files to complete the analysis: eligible population, active participant, enrollment, and claims (Table B.2). The source and time period covered by the data file varied based on the type of data. The partners, the Island Peer Review Organization (IPRO), and the Pennsylvania Department of Public Welfare (DPW) Office of Medical Assistance Programs provided the data files for the evaluation. For each file, IPRO prepared data specifications for the partners and DPW.[7] IPRO conducted a validation or check for completeness for select data files and then transferred the files to Mathematica through a secure File Transfer Protocol (FTP) site.[8]

Eligible Population Data. IPRO defined cohorts of eligible members based on the member's year of eligibility, shown in Table B.3, using July 1 as the start of each study year based on the start date of the intervention. DPW identified eligible members for the study and comparison groups in each pilot program, using Medicaid claims and enrollment data, separately for each cohort. To be included in the eligible population file, members had to reside in one of the study counties, be 18 or older, have at least one medical claim containing a diagnosis of a serious mental illness (SMI), and be enrolled in both the participating physical and behavioral health plans on the last day of each

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[7] IPRO developed data specifications for the data files and outcome measures and shared the specifications with Mathematica and the partners for comment.

[8] IPRO validated the DPW files for the study group and checked comparison group files for completeness.

cohort's year. DPW defined individuals with SMI as those patients diagnosed with schizophrenia, mood disorders, or borderline personality disorder.[9] These files contained the date of service for the qualifying SMI claim and member characteristics including case county, race, ethnicity, gender, and date of birth. In addition to claims and enrollment data, the partners also used their own data to identify members (see the next section on Active Participant data), resulting in partners identifying members not included in DPW's eligible population files. For these members, IPRO provided supplemental eligibility data.

Table B.2. Summary of Data Sources

Type of Data	Sample	Source
Eligible Population	Study and comparison groups	DPW[a]
Enrollment		
Physical Health	Study group Comparison group	Partners[a] IPRO
Behavioral Health	Study and comparison groups	Partners[a]
Active Participant	Study group	Partners
Claims	Study and comparison groups	IPRO

DPW = Pennsylvania Department of Public Welfare; IPRO = Island Peer Review Organization.

[a] IPRO provided additional data to fill gaps due to a mismatch between members in the eligible population and active participant files and variations in the way IPRO and Mathematica defined the study populations.

Table B.3. Dates Used to Identify Eligible Population in Each Cohort

Cohort	Members with an SMI Claim with a Service Date Between
1	July 1, 2006, through June 30, 2007
2	July 1, 2007, through June 30, 2008
3	July 1, 2008, through June 30, 2009
4	July 1, 2009, through June 30, 2010
5	July 1, 2010, through June 30, 2011

Note: Before the intervention, the partners reviewed data for members with an SMI claim in Cohort 1, but the final research sample excluded members who were in only Cohort 1 and no other cohort.

Active Participant Data. In addition to Medicaid claims and enrollment data, the partners employed utilization history to identify eligible members for their pilot programs—data neither DPW nor Mathematica could access. As a result, the partners and DPW identified slightly different study populations. To ensure our analysis included all of the members the partners, we asked the partners to submit two files over the course of the project with the eligible members they included in their study groups. These files specified the member identification dates, whether each study group member provided consent, the date of consent, the date the member was invited to participate (for HCHC only; Connected Care did not have this distinction), and physical health and behavioral health risk levels first assigned to the member. Although members could withdraw their consent at any time during the project, the files did not include information about whether or when members withdrew consent. To allow program staff to focus on a smaller group of members and maximize the time of interaction with those members, HCHC limited the sample to a subset of members who were eligible before the intervention began. Therefore, the two HCHC Active Participant files included the same members with identification dates between June 30, 2008, and

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[9] International Classification of Disease, Ninth Revision, Clinical Modification Codes 295.xx, 296.xx, or 301.83.

May 31, 2009. Connected Care's first Active Participant file included members identified between July 6, 2009, and August 17, 2010; the second included members identified between September 17, 2010, and June 17, 2011.

Enrollment Data. For members included in the Eligible Population files, the partners submitted enrollment data for the study groups, and the partners and DPW provided enrollment data for the comparison groups (Table B.4). When needed, IPRO provided supplemental enrollment data to fill gaps in data provided by DPW and the partners.

Table B.4. Summary of Enrollment Data

Group	Cohort	Source	Period Covered
Physical Health Enrollment			
Study group	Cohorts 2–3	Partners	July 1, 2006–June 30, 2011
	Cohorts 4–5	Partners	July 1, 2008–June 30, 2011
Comparison group	Cohort 2	DPW	July 1, 2007–June 30, 2009
		IPRO	July 1, 2009–June 30, 2011
	Cohort 3	DPW	July 1, 2008–June 30, 2010
		IPRO	July 1, 2010–June 30, 2011
	Cohorts 4–5	IPRO	July 1, 2008–June 30, 2011
Behavioral Health Enrollment			
Study group	Cohorts 2–3	Partners	July 1, 2006–June 30, 2011
	Cohorts 4–5	Partners	July 1, 2008–June 30, 2011
Comparison group	Cohort 2	Partners	July 1, 2007–June 30, 2009
		IPRO	July 1, 2009–June 30, 2010
		Partners	July 1, 2010–June 30, 2011
	Cohort 3-5	Partners	July 1, 2008–June 30, 2011

DPW = Pennsylvania Department of Public Welfare; IPRO = Island Peer Review Organization.

Claims Data. IPRO provided claims from July 1, 2006, to June 30, 2011 for cohorts 2 and 3 and from July 1, 2008, to June 30, 2011 for cohorts 4 and 5 for both the study and comparison groups. We used separate behavioral health and physical health institutional and professional claims to identify ED visits and hospitalizations.

The Research Sample

Study group members were included in the research sample if they were in the Active Participant files, had at least one SMI claim during their cohort assignment year (Table B.3) and after their 18th birthday, and were enrolled in both plans for at least one day both before and after the date of the first qualifying SMI claim. Most HCHC members and Connected Care members (74–80 percent) eligible before the intervention started were enrolled for 18 to 24 months. Comparison group members were included in the analysis if they were in the DPW Eligible Population files, had at least one SMI claim during their cohort assignment year and after their 18th birthday, and were enrolled in both plans for at least one day both before and after the date of the first qualifying SMI claim. The percentage of members enrolled for at least 18 months was slightly lower in the comparison groups (66 percent in Southeast Pennsylvania, 69 percent in Southwest Pennsylvania) than the study groups. The analysis excluded any member without an SMI claim during the appropriate time period. Members who appeared in two different or conflicting samples, such as in both the study and comparison groups, were assigned to one group, summarized in Table B.5.

Table B.5. Assignment for Members Who Appeared in More than One Sample

Multiple Samples	Assignment
Member appeared in multiple cohorts (either study or comparison group)	Member assigned to earliest cohort, unless he or she switched between study and comparison groups (see below)
Before the start of the intervention (July 1, 2009), member switched between study and comparison groups	Member assigned to latest cohort and classified as study or comparison based on his or her county of residence or health plan enrollment
After the start of the intervention (July 1, 2009):	
Member switched from the comparison group in one cohort to the study group in a later cohort	Member assigned to the later cohort and classified as a study group member
Member switched from the study group in one cohort to the comparison group in a later cohort	Member assigned to the earlier cohort and classified as a study group member, but member's data were truncated based on the length of time he or she was enrolled in both study group plans
Member was in a different group (study or comparison) before and after July 1, 2009	
Members assigned to Cohort 4	Member assigned to Cohort 4 study or comparison group
All other members	Member assigned to earlier cohort (his or her data was truncated prior to July 1, 2010)
Comparison group members in the Active Participant file	Member assigned to the study group

IPRO identified study members separately for each cohort; as a result, some members appeared in more than one cohort. To avoid duplication of members in our analysis, we assigned members to the earliest cohort identified. For members identified only by the partners (and not already part of a cohort based on the Eligible Population files), we assigned a cohort based on the date of the first SMI claim that qualified them for the study, using the criteria that DPW used to prepare the eligible population files.[10] We then grouped these cohorts into two categories: those identified before the start of the intervention (cohorts 2 and 3), and those identified after (cohorts 4 and 5).

The pre-intervention and follow-up periods were defined separately for each member. For both HCHC and Connected Care, each member in cohorts 2 and 3 was assigned an index date equal to the first day he or she was enrolled in both plans on or after July 1, 2009 (the start of the intervention). In Connected Care, new members were continually identified after the start of the intervention. Therefore, each member in cohorts 4 and 5 was assigned an index date equal to first day he or she was enrolled in both plans on or after the date of his or her first qualifying SMI claim. For the HCHC program, the partners included only a subset of eligible members in their Active Participant file—those members identified earlier in the study period to allow their program staff to have as much time to interact with members as possible. Because this subset included only 82 of 4,484 members eligible after July 1, 2009, we excluded all members eligible after this date. Additionally, HCHC staff confirmed that these members were not the focus of the intervention.

Some research sample members had gaps in Medicaid enrollment during the intervention period. These gaps could be due to discontinued enrollment from one or both plans (physical or behavioral). After each member's index date, we classified a member as disenrolled (and no longer a

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[10] The Connected Care partners identified and stratified members monthly, beginning in July 2009 (after the start of the intervention). Although all members had an identification date of July 6, 2009, or later in the Active Participant file (which would have placed all members in cohorts 4 or 5), some members had a claim with an SMI diagnosis before July 6, 2009. Therefore, we assigned members to a cohort using claims and enrollment data.

part of the research sample) if that member was not enrolled in at least one of the designated plans for 180 or more days during the intervention period; the day before the beginning of the gap was considered the date of discontinued enrollment.[11] For all other members, the disenrollment date was the last day of the intervention. Members enrolled in at least one plan were likely continuing to receive services from that plan. It was also likely that the plan would help members re-enroll in the other plan.

Outcome Measures

For the primary outcomes analysis, we analyzed changes between the baseline and intervention periods in ED visits, hospitalizations, readmissions, and the number of community days between hospitalizations for all eligible members in the study and comparison groups in each pilot. To help identify potential changes due to the intervention and not due to factors external to the interventions or existing trends, we used a difference-in-differences approach. We also assessed differences between the baseline year and each six-month calendar interval within the intervention period to account for potential implementation delays that might mask outcomes later in the intervention period. We provide a list of the primary and secondary analyses in Table B.6.

Table B.6. Summary of Analyses

Outcomes	Emergency department visits Physical health hospitalizations Mental health hospitalizations Other alcohol and drug treatment-related hospitalizations Readmissions for any diagnosis Number of community days between hospitalizations
Primary Analysis	
Study vs. comparison group	All eligible HCHC members All eligible Connected Care members
Secondary Analyses	
Study vs. comparison group	All eligible HCHC members in Bucks County All eligible HCHC members in Delaware County All eligible HCHC members in Montgomery County
Consented vs. comparison group	HCHC members Connected Care members
Invited (ever) vs. comparison group	HCHC members HCHC members in Montgomery County

Note: The percentage of members with any visit and for the average number per 1,000 members per month were calculated for ED use and hospitalizations. The percentage of admissions resulting in a readmission for any diagnosis within 30, 60, and 90 days was calculated to identify readmissions.

To identify ED visits and hospitalizations, we used the Use of Services measure specifications from the 2009 Healthcare Effectiveness Data and Information Set (HEDIS).

- **ED Visits.** We used institutional and professional claims to identify procedures rendered in the ED for any reason (Table AMB-B on page 273 in the HEDIS measure specifications). We counted each claim as a single ED visit, and counted only one visit per day. ED visits that ended with an admission to the hospital inpatient department

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[11] We assumed that this group would include members who died during the intervention period and members whose data were truncated because they switched from the comparison to the study group.

were not counted. We used measure specifications to identify ED visits. We excluded claims that had the same date of service as an inpatient claim, claims that occurred before a member was 18 years old, and claims that did not have a date of service.

- **Hospitalizations.** To identify physical health hospitalizations, we included claims for medicine, surgery, and maternity discharges in hospital facilities for a wide range of physical health related diagnoses (Table IPU-A on page 278 in the 2009 HEDIS measure specifications). To identify mental health hospitalizations, we counted hospital discharges with a principal mental health diagnosis on institutional claims (HEDIS measure specification tables MPT-A and MPT-B on page 292). To identify alcohol and other drug services inpatient utilization, we counted inpatient care at either a hospital or treatment facility with any diagnosis of chemical dependency, including inpatient detoxification and discharges associated with residential care and rehabilitation (HEDIS measure specification tables IAD-A and IAD-B on page 287). We excluded claims for inpatient stays that began before the member was 18 years old and claims that did not have a date of service. Claims with overlapping admission and discharge dates were considered part of a single stay. We considered a claim that ended on the same day as the first day of another inpatient claim as a transfer and part of the same stay.

We created a member-day level data set that contained the date of service for an eligible ED visit or hospitalization, the number of days between the service date and the identification date, an eligibility indicator for each day of the baseline and intervention periods, an indicator for whether the member was enrolled in the physical health plan, and an indicator for enrollment in the behavioral health plan. For each outcome measure, we created two variables—ANY and COUNT--for each member in each analysis period, using only the eligible days in the given period. For outcomes with continuous values, we created a continuous weight by dividing the total number of eligible days during a given period by the total number of days in that period. For outcomes with a binary value, we created a binary weight. The binary weight equaled 1 if the binary outcome was 1, and equaled the continuous weight if the binary outcome was 0.

The analysis consists of a difference-in-differences calculation on the mean of each outcome. To obtain a measure of significance for the difference-in-differences estimate, we ran a weighted regression, where the only controls were the treatment (study group) indicator, the pre-post indicator, and the interaction between the two. The coefficient on the interaction term was the difference-in-differences estimate. (The magnitude of the coefficient in the logit model was not the difference-in-differences estimate, but we used it for the measure of significance of the estimate.) The means were generated from post-estimation recycled predictions. All analyses were done using SAS 9.3.

It is important to note that depending on the region's or county's participation rate, or both, large differences in the rates of hospitalizations and ED visits might have been needed to demonstrate a statistically significant change, particularly in HCHC, where the partners focused primarily on a subset of members. In Table B.7, we display the percentage change that would be needed to detect a difference for each outcome.

Table B.7. Minimum Detectable Differences, Expressed as a Percentage of the Baseline Mean, at 80 Percent Power

	HealthChoices HealthConnections		Connected Care	
	Rate per 1,000 Members per Month	Percentage With Any Visit	Rate per 1,000 Members per Month	Percentage With Any Visit
Emergency Department Visits	25	10	25	9
Physical Health Inpatient Use	30	22	33	22
Behavioral Health Inpatient Use	50	33	40	33
Other Alcohol and Drug Inpatient Use	100	100	100	100

Note: The baseline rate of other alcohol and drug inpatient visits was so low that all such hospitalizations would have to be eliminated to demonstrate a statistically significant difference.

Readmissions. We calculated the percentage of admissions resulting in a readmission for any diagnosis within 30, 60, and 90 days.[12] We excluded admissions during which a patient died or discontinued enrollment from both plans. We also excluded admissions that were within 30, 60, or 90 days of death, discontinued enrollment from the study, or the end of the follow-up period, because we could not determine whether there was a readmission during the full run-out period for the respective measure. We applied the same method to the baseline period so that our calculations were consistent across the two periods. If a patient had a readmission within 30, 60, or 90 days of discharge from an index admission, we did not consider the additional admission an index admission for the respective measure.

Community Days. Among members who had at least one hospital admission for any diagnosis, we calculated the number of days after the inpatient discharge until the next hospital admission. We treated each discharge as a separate observation in our analysis. For all analyses, we distinguished between periods that ended in a readmission and those that were truncated due to discontinued enrollment or the end of the baseline or follow-up period. Examination of this measure using all data, nontruncated data only, and truncated data only, revealed similar trends. To examine differences between the study and comparison groups, we calculated the three-month moving average of this measure for each group form March 2008 to April 2011. We determined the month of record based on the discharge date. We then calculated the ratio of the two moving averages. When the resulting statistic is larger than one, it implies that the study group had more days in the community, on average, than the comparison group.

Additional Analyses

We augmented the primary analysis with several secondary analyses. In Southeast Pennsylvania, we examined outcomes for all eligible HealthChoices HealthConnections members by county and for those invited to participate. Because Montgomery County started its pilot program sooner than Bucks and Delaware counties, we also examined outcomes for those invited to participate in Montgomery County. In Southwest Pennsylvania, we compared outcomes separately for Connected Care members eligible before the start of the intervention period (July 1, 2009) and for those who became eligible after the start of the intervention, to identify potential impacts that might be obscured by implementation delays. In addition, we examined in each region outcomes for those

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[12] Our method closely follows that of Krumholtz et. al. (2007).

who agreed to share their health information (through written consent) in relation to the comparison group.

We examined outcomes by each of the following six-month calendar periods to assess whether implementation delays or a ramp-up period had an effect on outcomes:

- First six month-period: July 1, 2009–December 31, 2009
- Second six-month period: January 1, 2010–June 30, 2010
- Third six-month period: July 1, 2010–December 31, 2010
- Fourth six-month period: January 1, 2011–June 30, 2011

The analysis for each period compared changes in outcomes between the 12-month pre-intervention period and the respective 6-month period, and included only members eligible during that 6-month period. Thus, the number of sample members differed for each 6-month period. Outcomes were weighted members based on length of enrollment.

Descriptive Analysis

We conducted a descriptive analysis of demographic characteristics (age, gender, race, and Hispanic ethnicity), baseline values of the outcome measures (number of ED visits and inpatient admissions), and the behavioral health and physical health conditions listed in Table B.8 for both study and comparison group members at baseline. We used claims from the two-year period before the intervention started (July 1, 2007, to June 30, 2009) for HCHC members in Southeast Pennsylvania, and claims from the one-year period before the intervention started (July 1, 2008, to June 30, 2009) for Connected Care members. We looked for diagnosis codes on all claims (institutional and professional).

Table B.8. Diagnosis Codes for Common Physical and Behavioral Health Conditions

Conditions	International Classification of Disease, Ninth Revision, Clinical Modification Codes
Physical Health Conditions	
Chronic Obstructive Pulmonary Disease	491.2x, 491.9x, 492.xx, 494.xx, 496.xx
Congestive Heart Failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.xx
Coronary Artery Disease	410.xx, 411.xx, 412.xx, 413.xx, 414.xx
Diabetes	250.xx, 357.2x, 362.0x, 366.41
Hyperlipidemia	272.0x–272.4x, 272.9x
Hypertension	401.xx, 402.xx, 403.xx, 404.xx
Asthma	493.xx
Behavioral Health Conditions	
Schizophrenia	295.xx
Mood Disorders	296.xx
Anxiety	300.0x
Borderline Personality Disorder	301.83
Nondependent Abuse of Drugs	305.xx

Participation Analysis

We conducted a participation analysis to examine differences in the baseline characteristics between consented and non-consented study group members. For each pilot program, we conducted descriptive analysis of demographic characteristics and behavioral and physical health conditions, assigning members who provided consent as the treatment group and those who did not as the comparison group. Results are shown in Tables A.11 (HCHC) and A.20 (Connected Care). For Connected Care members, we also compared the characteristics of members in the early cohort with those of members in the late cohort (Table A.19).

Robustness Check

We chose comparison groups that had populations similar to the study groups and for whom data were available for the evaluation. Although the comparison groups were not a perfect match to the study groups, the primary objective for using them was to identify existing trends that might account for the observed changes in outcomes through a difference-in-differences analysis. Nevertheless, we conducted a robustness check to assess the comparability of study and comparison groups before the intervention started. We analyzed the difference in differences of the rates for ED visits and hospitalizations for study and comparison group members that were eligible two years before the start of the intervention (between July 1, 2007, and June 30, 2008). We used the one-year period from July 1, 2007, through June 30, 2008 as the baseline year, and from July 1, 2008, through June 30, 2009 as the follow-up period. Among the more than twenty difference-in-differences estimates that we examined, only two were marginally statistically significant at the $p = 0.05$ level, with small effect sizes. Mental health hospitalizations increased for the entire HCHC study group ($p = 0.049$) and for the study group in Delaware County ($p = 0.040$). There were no statistically significant differences in trends for ED visits or other hospitalization measures and no such differences for Connected Care, confirming that results from the primary outcomes analyses were not due to existing trends.

Regression Analysis

Because there were differences in study and comparison groups at baseline, we conducted regression analyses to control for age, gender, race, ethnicity, physical and behavioral chronic conditions; number of months enrolled during the intervention period; early/late cohort (Connected Care only); baseline ED utilization (for regressions on the number of inpatient admissions); and inpatient utilization (for regression on the number ED visits). The regressions also included the study-comparison indicator, the pre-post indicator, and an interaction between these two indicators. We conducted this analysis for the number of ED visits, mental health hospitalizations, and physical health hospitalizations per 1,000 member months.

For each outcome, we employed a two-stage regression model. In the first stage, we estimated the probability that a member had the outcome (for example, the probability that the member had an ED visit) employing a logistic regression using a binary weight that was a function of the number days eligible for the analysis. We calculated predicted probabilities for each sample member, and recycled predictions for both study and comparison group in the pre- and post-intervention periods. We used these predictions to calculate the first-stage effect of the intervention; that is, the effect of the intervention on the probability of having the outcome.

In the second stage, we estimated the level of the outcome of interest (for example, number of ED visits) for all members who had at least one visit using an OLS regression with the same covariates used in the first stage, and using a weight that was a function of the number of days eligible for the analysis. We calculated the predicted values of the outcome variable for each member in the sample, and (as in the first stage) recycled predictions for both study and comparison in the pre- and post-intervention periods. To estimate the average treatment effect, we calculated the mean of the treatment effect across all sample members included in the analysis, using estimates from the first- and second-stage models and predicted values from the regressions. We estimated standard errors for the treatment effect using a bootstrap distribution of the statistic with 250 resamples.

The findings from the regression analyses were largely consistent with the findings from our primary difference-in-differences analyses. In the Connected Care analysis, changes in physical health hospitalizations potentially favored the study group, but the regression analysis did not confirm this result. The percentage of Connected Care members with any physical health hospitalization increased 65 percent for the study group (20.9 to 34.4 percent) and increased 85 percent for the comparison group (19.1 to 35.4 percent, $p = 0.045$). The rate of physical health hospitalizations decreased slightly for the study group, and increased for the comparison group, but the difference was not statistically significant. The regression analysis suggests that this statistically significant finding was not likely due to the intervention, after controlling for member-level differences.

APPENDIX C

LIST OF INTERVIEW RESPONDENTS AND TOPICS

Table C.1. List of Respondents

Organization	Name and Title	Round 1	Round 2
Pennsylvania Department of Public Welfare			
Office of Policy Development	Stefani Pashman, director	✓	
Office of Medical Assistance Programs (OMAP)	David Kelley, MD, chief medical officer	✓	✓
	Cheryl Braxton, human services program specialist supervisor		✓
Office of Mental Health and Substance Abuse Services (OMHSAS)	Ivonne Bucher, chief operating officer, Office of the Medical Director	✓	
	Joan Erney, former deputy secretary, OMHSAS, and current chief business development officer, Community Care Behavioral Health		✓
HealthChoices HealthConnections, Southeast Pennsylvania			
Keystone Health Plan	Faz Rahman, MD, medical director	✓	✓
	Crystal Love, project lead	✓	✓
	Carolyn Macy, manager, Special Needs Unit	✓	✓
	Shree Hughes, care coordinator	✓	✓
	Theresa Thomas, manager, Intensive Case Management		✓
	Meg McIntyre, case manager		✓
	Roland Simmons, lead analyst		✓
Magellan Behavioral Health	Sheri Rubin, RN, former project lead	✓	✓
	Jennifer Tripp, project lead	✓	✓
	Sandy Zebrowski, MD, medical director	✓	✓
	James Leonard, LCSW, MBA, clinical officer		✓
	Linda Hammer-DiValerio, director analysis/programming	✓	✓
	Deb Bukovic, LCSW, HCHC community support care manager	✓	✓
	Jackie Rigby-Siomos, RN, case management integration specialist	✓	✓
County Behavioral Health Offices			
Montgomery County	Lee Ann Moyer, deputy administrator	✓	✓
	Marylynn Windish, HealthChoices adult clinical program manager	✓	✓
	Andrea Galambos, quality improvement coordinator	✓	
	Valerie O’Connor, administrative navigator	✓	
	Joe Shatz, RN, member navigator	✓	
Delaware County	Jonna DiStefano, administrator	✓	✓
	Rosemary Marchitell, quality improvement director	✓	✓
	Brian Ashenfelter, administrative navigator	✓	
	Melissa Hutchinson, member navigator	✓	
Bucks County	Bern McBride, director	✓	✓
	Cindy Grezeszak, manager, Behavioral Health Operations	✓	✓
Primary Care Providers	Hatfield Medical Practice	✓	
	Plumsteadville Family Practice		✓
	Montgomery Family Practice		✓

Table C.1 *(continued)*

Organization	Name and Title	Round 1	Round 2
Connected Care, Southwest Pennsylvania			
UPMC Insurance Services Division	John Lovelace, president, UPMC for You; chief program officer, Community Care Behavioral Health Organization; vice president, Medicaid Services, UPMC Insurance Services Division	✓	✓
UPMC *for You*	Debra Smyers, senior director, program development, Medicaid/SNP/CHIP	✓	✓
	Felicia Steinsdoerfer, supervisor, Medicaid Medical Management	✓	
	Laura Fennimore, RN, DNP, director, Clinical Programs for Medicaid, SNP, CHIP		✓
	Maria Attanucci, manager, Adult Medicaid		✓
	Julianne Buchanan, director, Data Analytics, Health Economics	✓	✓
	Nicholas DeGregorio, MD, medical director	✓	
	Pat Fenton, practice-based care manager	✓	✓
	Chronis Manolis, vice president, Pharmacy	✓	
	Mitch Wentz, pharmacist	✓	✓
Community Care Behavioral Health	Susan Carney, clinical director, Care Management	✓	
	Brandi Holsinger, care manager supervisor	✓	✓
	James Schuster, MD, MBA, chief medical officer	✓	✓
	Thomas Laton, DO, senior medical director	✓	✓
	Sharon Hicks, chief operating officer	✓	✓
	Stephanie Hall, RN, care manager	✓	
	Debbie Duch, Allegheny HealthChoices Program Office		✓
Allegheny County Department of Human Services	Pat Valentine, deputy director, Office of Behavioral Health	✓	✓
Allegheny County Consumer Advisory Committee	Regina Janov, mental health program specialist supervisor, Allegheny County Department of Human Services	✓	✓
	Margaret Park, recovery specialist, Systems Transformation Systems Unit, Allegheny County Department of Human Services	✓	✓
Health First Medical Associates	Nurse practitioner		✓
	Practice manager		✓
MonYough Community Services	Service coordinator unit director		✓
	Clinical services director		✓

Table C.2. Topics Covered During Key Informant Interviews

Topic	Round 1	Round 2
Organizational background, role in RCP implementation, motivation for participation	✓	
Programmatic structure and operational strategies	✓	
Collaborative activities of entities and organizations involved in pilot programs	✓	
Target population, county demographics, and systems of behavioral and physical health care for Medicaid beneficiaries	✓	
Financing and flow of dollars supporting pilot program	✓	✓
Member identification, risk assignment, stratification/re-stratification, and enrollment and disenrollment	✓	✓
Member and provider outreach strategies	✓	✓
Core intervention components and implementation status	✓	✓
Challenges to implementation and strategies to address challenges	✓	✓
Expectations of short- and long-term intervention effects	✓	✓
Implementation successes and lessons		✓
Organizational, structural, and other factors shaping implementation		✓
Participant (member, provider, navigator/care manager) perspectives and experiences in pilot programs		✓
Prospects for sustainability and replication		✓

APPENDIX D

DEVELOPING AND MONITORING PERFORMANCE MEASURES FOR BEHAVIORAL HEALTH- PHYSICAL HEALTH INTEGRATION PROGRAMS

Identifying appropriate performance measures that link program activities to desired short- and long-term outcomes was challenging for the Serious Mental Illness (SMI) Innovations Project because of both the unique nature of the behavioral health-physical integration program and the relatively short intervention period. The structure for integrated activities did not exist in Pennsylvania, making it particularly difficult to identify the processes that might gauge success or failure in meeting desired outcomes. In this appendix, we describe the goals and objectives for establishing performance measures in this project. We also summarize feedback on the measures that we discussed during our interviews with partners and provide example measure concepts that developers might consider when implementing a similar program.

The Pennsylvania Department of Public Welfare (DPW) established an incentive program that encouraged and rewarded collaboration across health care systems, and developed measures that sought to identify processes of care that would indicate integration was occurring. Partners in the project reported that these measures were from domains that are important for health-services integration, including the identification and prioritization of high-risk patient populations; joint care planning; coordination on hospitalizations and emergency department (ED) visits; and medication management.

Because integration was new for the Pennsylvania Medicaid program, the development and implementation of performance measures related to integration was also new to everyone involved. In some cases, the partners could build on existing processes, but they had to develop processes to facilitate activities that would meet the performance measure targets relevant to the SMI Innovations Project. In both pilot programs, this development took time. During the six-month planning phase, partners were able to establish most of the processes but lacked the time to identify and resolve potential problems. Carrying out the activities needed to meet the performance targets was substantially more time consuming than the partners anticipated, particularly as the partners encountered implementation challenges (described in the individual case studies). Moreover, although the partners agreed that the domains were important, they questioned whether the specific measures actually were associated with improving the quality of care. For example, the partners recognized the importance of medication management but questioned whether the measure to notify prescribers of potential refill gaps for members prescribed atypical antipsychotics was effective in improving the process.

Member Stratification into a Behavioral-Physical Health Risk Group. Partners were expected to stratify at least 90 percent of members into joint behavioral health and physical health risk groups and to restratify members annually. Plans used a combination of claims data (costs or utilization) and acuity levels based on treatment history to complete this process. A primary goal, achieved through this activity, was to have the behavioral and physical health plans to begin sharing data and to consider risk stratification in a more integrated manner. However, for many reasons, neither pilot program used the original risk groups to guide the intensity of interventions they delivered. One reason for this deviation was that initial risk classifications were not always congruent with the intensity of the care members required. For example, a member who did not have a recent history of behavioral health services due to a behavioral health condition (such as paranoia or anxiety that makes it difficult to be in crowds) would have had little previous health care usage and be assigned low risk. Meanwhile, another member who had multiple ED visits with a toothache would be assigned high risk. As a result of this potential inconsistency, navigators and care managers identified member needs through their own assessments and tailored the services they provided based on their clinical judgment. Connected Care further prioritized engagement of members who had a recent hospitalization or frequent ED use. Although measurement strategies that account for consumer functioning might be more resource intensive than approaches that rely solely on claims or historical data, more accurate risk stratification that includes both claims data or other information would enable plans to develop interventions around the various risk levels. For example, the partners also included staff directly responsible for member care in the risk-classification process to provide input on how the program might classify members into risk groups.

The Development of Joint Care Plans. The second measure required plans to jointly develop patient-centered care plans for members (at least 1,000 in the first year). For both pilot programs, the partners implemented two key related activities: (1) the development of care plans that integrated clinical information across behavioral and physical health systems and (2) case review meetings involving multidisciplinary staff from the plans and, as needed, behavioral health agencies. DPW defined requirements for meeting the performance target of developing 1,000 care plans in the first year. For example, HealthChoices HealthConnections (HCHC) partners created member health profiles summarizing key behavioral and physical health conditions, service use, and medications, instead of care plans. In the second year, DPW conducted a case audit of 50 care plans (25 on two occasions). Although both pilots developed an information-sharing tool, rather than a true care plan—for all providers involved to help achieve the member's recovery goals—it represented the partners' ability to share data across two systems. This achievement was an important first step in the state's attempt to integrate care. Most HCHC navigators used the member profiles to guide discussions and care planning with members and shared them with other treatment staff as needed. Connected Care anticipated creating a shared information tool for all members and using it as a care plan. However, due to implementation challenges, the tool was shared only between plans, was based mostly on information gathered from claims data, and included limited behavioral health information.

Despite the widely recognized benefits of a shared information tool, its development, implementation, and maintenance required substantial resources and raised concerns about member privacy. Keystone Mercy Health Plan's legal team decided the HCHC consent process was not sufficient to address their member privacy concerns and prohibited participation and sharing of member information after the pilot ended. Although HCHC was able to share the information tool with community providers, information exchange was primarily from the plans to providers and not vice versa. Incorporating information or feedback from PCPs into the profile was limited and posed some challenges. For example, the partners had not yet identified a way for PCPs to update information, such as results from diagnostic tests. Instead, navigators became responsible for tracking down this information.

Case review meetings with multidisciplinary staff from both behavioral and physical health backgrounds facilitated joint care planning. The partners established regular case review meetings, during which medical directors and care managers from both plans and other key staff reviewed challenging or complex cases, and worked together to identify ways to meet the members' needs. HCHC joint case rounds included navigators and took place twice per month, focusing on approximately three cases per session. Connected Care's joint case review meetings included a pharmacist, social worker, member of the community treatment team, and as needed, the therapist or service coordinator at the behavioral health agency; they took place weekly for the first 18 months and then once every two weeks for the last six months. Each meeting covered six to eight cases for members who had an inpatient stay or frequent use of the ED or acute services, or who were challenging to engage or locate. Plan medical directors or case managers also requested specific members be added to the list for review if they wanted input from the care team on next steps in care or identified participants who could benefit from additional support. Decisions and follow-up steps from the case reviews were incorporated into the integrated care plan. Partners from both pilots emphasized that access to both behavioral and physical health information, including information on medications filled by the member, helped facilitate the joint care planning that took place during the case review meetings. They further indicated that having all of the key staff present, including medical directors with the authority to make treatment decisions, made these meetings productive.

Notification of Hospitalizations. For the third performance measure, the plans were required to notify their partners of hospital admissions at least 90 percent of the time (85 percent in the second year of the program) within one business day of learning of the hospitalization. Although partners agreed that it was important to share information about hospitalizations, implementation was more difficult than anticipated. The most notable challenge in HCHC was the lack of a mechanism for Keystone Mercy Health Plan to identify hospitalizations in a timely fashion. (Hospitals are not obligated to obtain authorization before an admission.) Because most physical health hospital stays are less than four days in duration, health plans often learned of a member's admission after he or she was discharged. Navigators sometimes became aware of a member's hospitalization through word of mouth, before receiving notification from the health plan. Connected Care partners were able to implement this measure because University of Pittsburgh Medical Center (UPMC) owned most of the hospitals in the county and therefore had access to this information. Other health plans interested in an integrated care model might not share this advantage. Therefore, identifying a source of timely data and effective ways to share this information with providers (to account for providers using electronic medical records as well as those who do not) would be important next steps.

Notification of Potential Medication Refill Gaps for Members Prescribed Atypical Antipsychotics. The plans were expected to identify refill gaps for members prescribed atypical antipsychotics resulting in a medication possession ratio of less than 80 percent and to notify the prescribing physicians at least 90 percent of the time in the first year and 85 percent of the time in the second year. Partners noted the importance of monitoring adherence to atypical antipsychotics; however, identifying the providers who prescribed the medications to notify them of potential refill gaps was a major obstacle. Although the health plans are responsible for paying pharmacy claims, identifying the originating prescriber was not a straightforward process. Therefore, notifications often went to a provider who had no interaction with the member. Despite this challenge, the performance measures used in the SMI Innovations Project represented an important first step within a new field, and provided valuable information for refining measures for the next phase of care integration.

Potential Performance Measure Concepts

Because most programs lack the resources necessary to measure changes in long-term and sometimes even short-term outcomes within a reasonable time frame, performance measures provide a way to evaluate program implementation and progress toward desired goals. In Table D.1, we provide examples of potential measure concepts that could serve as indicators of progress toward outcomes for a physical health-behavioral health integration program. These recommendations are informed by the logic model for the SMI Innovations Project interventions, feedback from partners, and our own evaluation of the project. We suggest measure concepts that would cover several domains of care: collaboration across behavioral and physical health plans and providers, consumer empowerment and engagement, use of evidence-based or best practices, and outcomes. The concepts that we propose could be formalized into measures and constructed with a variety of data sources, including claims, enrollment, or survey data, depending on the resources available to program implementers. Future efforts should gather input from stakeholders at the outset to develop the most useful measures and then pilot test and refine those measures before implementation.

Table D.1. Potential Performance Measure Concepts

Domain	Potential Measure Concepts
Collaboration across behavioral and physical health plans and providers	• Number and frequency of contacts between plans • Number of unique providers that have reviewed and provided input on a joint care plan • Number of cases reviewed during joint case reviews (and proportion of all eligible members whose case was reviewed) • Number and type of unique staff members represented at joint case reviews • Number of members for whom plans shared information about discharge plans with one another and providers involved in follow-up care
Consumer empowerment and engagement	• Proportion of members who have consented to share health information • Proportion of members actively engaged in the program • Proportion of members who have seen and provided input on their care plans • Number and frequency of contacts between navigator/care manager and member • Proportion of consumers who report knowing where to seek help
Use of evidence-based or best practices	• Proportion of members who received a comprehensive assessment • Proportion of members who received timely follow-up care • Proportion of members who received evidence-based psychosocial treatment and addiction services
Outcomes	• Number of PCP, outpatient, or office visits • Medication review by navigator/care manager and by multidisciplinary care team • Proportion of members who received follow-up after a hospitalization • Number of members for whom plans shared information about discharge plans with one another and providers involved in follow-up care • Proportion of members who received timely post-discharge follow-up appointments

Certainly, health plans, providers, and states could use many other domains of care and many other types of measures to monitor and evaluate care integration programs. Some of the proposed measure concepts are meant to address aspects of the patient-centered approach espoused by proponents of Medicaid integration programs. For example, in addition to collecting information on the number of members who consent to share health information, plans could also consider gathering data on the number of members who have seen and provided input on their care plans, recognizing that the more members who actively participate in their care, the more likely the plan is to improve those members' quality of care. If feasible, plans might also track the number of contacts with members.

Other concepts might help plans determine whether core activities are being implemented as planned. For instance, contacting members shortly after a hospital discharge to help coordinate their care was a key program component in Pennsylvania. To determine whether this contact is happening as expected, plans could collect information on the number of members who are contacted within a specific number of days after a hospitalization.

Of course, the measure concepts proposed here are only suggestions, and the number and type of measures will vary from one program to another depending on data availability, resources to monitor implementation, and motivation of program leadership. Nonetheless, processor performance measures provide an opportunity to regularly evaluate whether activities are being implemented as planned. When this data collection is not too challenging, program leaders might be able to review program activities and assess whether they require modification. In some cases, monitoring might uncover an implementation challenge that can be overcome with a modification to an intervention activity.

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