Integrating Primary Care into Mental Health Care

for Adults with Serious Mental Illness:

Findings from 10 Texas Centers

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EXECUTIVE SUMMARY

The Texas 1115(a) Medicaid waiver provided community mental health centers (CMHCs) a long-awaited opportunity to improve care for their patients with serious mental illness (SMI). This report summarizes structures and outcomes of a statewide sample of CMHCs that have integrated primary care into mental health care through the waiver's Delivery System Reform Incentive Payment pool.

Key Findings

Project structures and processes

The 10 CMHCs in this study used diverse organizational structures for integration, but had common emphases on team approaches and shared information to meet patients' health needs holistically. All sites used team-based care. Almost all CMHCs had a behavioral health care liaison or coordinator who facilitated integration. The majority of projects had shared health records and integrated treatment plans; CMHCs that directly hired primary care providers (PCPs) also benefited from common information systems and had greater initial success in culturally acclimating PCPs to integrated care. CMHCs that partnered with federally qualified health centers (FQHCs) benefitted from higher reimbursement rates for some primary care services. Integrated care typically included smoking cessation, and exercise and nutrition coaching. Most CMHCs took lab samples on site; two had an on-site pharmacy and one had on-site dental services.

Primary care volume at integrated sites was often initially low, but grew substantially over the course of a year early in the projects' development, almost doubling in the number of patients served between waiver Demonstration Year 3 (10/1/2013 – 9/30/2014) and Demonstration Year 4 (10/1/2014 – 9/30/2015). Project staffing also increased, despite high turnover. Recruiting and retaining the "right kinds" of primary care personnel was a significant challenge for many sites. Four sites experienced either delayed or paused operations for this reason; this affected projects with and without external organizational partners.

Staff experiences of integrated care

Providers believed that integration facilitated more holistic treatment, which commonly centered around medication management. However, some providers also experienced integrated care as more complex as providers became more aware of each other's medication prescriptions and began recalibrating accordingly. Benefits included providers noting improved accuracy in diagnoses, for example in identifying the root cause of requests for pain medication as dependency versus pain.

Patient experiences of integrated care

Patients expressed high satisfaction with integrated care, citing greater comfort receiving primary care in a familiar setting, improved ease of access, increased engagement in medication management and self-care, and more affordability. Most CMHCs used "warm hand-offs," escorting patients between physical and mental health care. Patients at most CMHCs could get primary care appointments within a week, sometimes on a walk-in basis. Integration projects clearly enabled CMHCs to address pressing physical health needs. However, access to specialty

care from external providers was often limited. Reasons included extreme patient poverty and reported hesitance among some external providers to accept patients with Medicaid or without insurance. More than 60% of the patients served were uninsured. Poverty also appeared to reduce medication adherence, even when co-pays were as low as $3 to $5.

Secondary data on quality, health, and cost

Quality. Screening rates for body mass index, blood pressure, smoking, and hemoglobin A1c all increased very substantially during integrated care. For one site that shared patient satisfaction data, the mean satisfaction score during the year before integration was so high as to leave little room for scores to increase during integration. Projects in which the CMHCs directly employed PCPs had higher screening rates for body mass index and blood pressure than did sites that contracted with independent PCPs. This may reflect generally better access to patient information at these sites, or otherwise fuller integration.

Health. Among patients with initially elevated blood pressure, more than half had values demonstrating controlled blood pressure within the first 90 days of receiving integrated care. Projects in which the CMHCs directly employed PCPs averaged better rates of blood pressure control than did sites that contracted with independent PCPs. This is a major accomplishment, given that hypertension is predictive of serious cardiac and circulatory system conditions.

Costs. Among CMHC patients who had at least one hospital encounter during the two-year study period, in the first year of integrated care, the probability of hospital encounters decreased by 18 percentage points, after controlling for other factors such as patient severity, insurance status, and demographics ($p < .001$). For these patients with hospitalizations, less frequent hospital use after receiving integrated care was associated with cost savings exceeding $1,000 per year per year.

The average length of stay was also almost a third shorter during the first year of integrated services compared to the prior year ($p < .001$). Given an average pre-integration accommodation cost for these patients of approximately $4,100 per hospitalization, the one-third reduction in length of stay during integration yielded additional savings from this portion of hospital costs alone of more than $1,200 per hospitalization.

Overall, this study found significant decreases in hospital use for patients receiving integrated care as well as shorter lengths of stay; together the magnitude of the effects and their strong statistical significance suggest that integrated care reduced hospital use and its associated costs.

Next Steps

The CMHCs participating in this study have a wealth of raw data, but currently have limited funding, through Medicaid waiver Delivery System Reform Incentive Payments, to use those data for quality improvement and reporting. Given additional resources, for some CMHCs, the next step in analytic capacity development may be to store patient data in a digitally accessible manner. To facilitate analyses including patients from multiple sites, CMHCs may want to identify common patient satisfaction, health, functioning, and cost measures, as well as more consistent data on patient attributes and services. This may be particularly useful for smaller CMHCs that would not have sufficient sample sizes for some analyses on their own.

Future research should test the impact of integrated care through studies that include comparison groups, in order to further understand the causal relationships between integration and outcomes. Small pilot data pulls focusing first on areas such as data access and transforming data from unstructured to structured formats may be a practical starting point. Results may be useful for quality improvement, as well as reports demonstrating the value of integrated care to payers and other external stakeholders.

BACKGROUND

The Challenge: Improving Physical Health Care for People with Serious Mental Illness

Almost one in twenty-five people in the United States has a serious mental illness (SMI) that substantially impairs major life activities (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). Of these, a subset of individuals is classified as having severe and persistent mental illness because conditions such as schizophrenia, major depression, or bipolar disorder limit their ability to live independently (Texas Health and Human Service Commission, undated). Premature mortality associated with SMI has been estimated at between 8 and 32 years (Druss, Zhao, Von Esenwein, Morrato, & Marcus, 2011; Miller, Paschall & Svendson, 2008; Parks, Svendsen, Singer, Foti, & Mauer, 2006). This disparity is related to higher rates of smoking and unhealthy diets (Chwastiak et al., 2013; Chwastiak, Tsai, & Rosenheck, 2012), antipsychotic drugs that increase risk for metabolic syndrome (Chang & Lu, 2012), and lower levels and quality of primary care (Planner, Gask, & Reilly, 2014; Roberts, Roalfe, Wilson, & Lester, 2007).

For people with SMI, bringing primary care into their behavioral health settings can address their needs more effectively (Mauer, 2009; Kaiser Family Foundation, 2011), thereby improving their health care and outcomes (HealthNet, 2013). Individuals with SMI often have complex medication plans with high risks of interactions and side effects (Parks et al., 2005). Care integration allows multiple health needs to be addressed in the same facility and sometimes on the same day; this is especially important for people with SMI because of their frequent difficulties securing transportation, particularly in rural areas (Decoux, 2005; Nover, 2014; Scharf et al., 2013). Integration can also help primary care providers (PCPs) become more comfortable working with individuals with SMI (Alakeson, 2010). Lack of understanding of SMI and inexperience working with this population can lead to misinterpretations such as symptoms being perceived as delusions instead of medical conditions, and can also negatively impact patient-provider interactions (Cabassa et al., 2014).

Using the Texas 1115(a) Medicaid Waiver to Improve Care for People with SMI

Through the Texas Healthcare Transformation and Quality Improvement Program, otherwise known as the Texas 1115(a) Medicaid waiver, the state has sought to improve access to health care, improve quality of care, and control costs, in part by creating a Delivery System Reform Incentive Payment pool. Participating providers, including Community Mental Health Centers (CMHCs) (also known as local mental health authorities, community mental health and intellectual or developmental disability centers, or community mental health mental retardation centers), may earn Delivery System Reform Incentive Payments for projects that improve system performance in various ways approved by the Texas Health and Human Services Commission and the Centers for Medicare and Medicaid Services.

Texas mental health care leaders identified Delivery System Reform Incentive Payment funding as a means of implementing a range of initiatives to meet the needs of people with SMI. The current report focuses on Delivery System Reform Incentive Payment projects through which primary care is offered by CMHCs to their patients. These projects were motivated by very high levels of unmet need for primary care among individuals with SMI (Bradford et al., 2008; Viron & Stern, 2010).

Prior research has found substantial variability in the nature of primary-mental health care integration (Scharf et al., 2013). There is evidence that integrated sites with better quality indicators have better outcomes as well (Bowersox, Lai & Kilbourne, 2012; HealthNet, 2013). The current study tests that same hypothesis in the context of a diverse group of CMHCs across Texas.

Integrating mental health and primary care for people with SMI is intended in part to reduce hospital use by improving disease prevention and management. One key indication of success is how often people need any hospital care. In addition, length of hospital stay is a commonly used indicator of related resource use. Prior studies have generally, although not always (Pirraglia et al., 2012), found that integrating primary care into mental health care is associated with fewer emergency department visits (Boardman, 2006; Druss, Rohrbaugh, Levinson, & Rosenheck, 2001; HealthNet, 2013).

METHODS

Project Selection

The research team, with the Texas Health and Human Services Commission and Meadows Mental Health and Policy Institute, which together funded this study, agreed that the study sample needed to include sites in all major regions of the state and include a mix of rural and urban service areas because of potential differences in population needs, provider supply, and local infrastructure (e.g., transportation). The 10 regions from which the study sites were chosen are shown in Figure 1, with each region outlined in black.

Figure 1. Ten Regions Included in Study

The 10 CMHCs in the study were chosen from among 33 similar Delivery System Reform Incentive Payment-funded projects across the state that incorporated primary care into mental health care for current adult CMHC patients. Projects that were excluded from the sampling frame of 33 projects typically did not provide comprehensive integration of primary and mental health care. For instance, among projects excluded were those that provided peer support only, health screenings only, health education only, and workforce development projects. Of the 10 projects initially selected, two were replaced with alternatives from the same respective regions because additional information after initial recruitment indicated that one or more of the inclusion criteria were not met.

The study sites were chosen in part based on the local context of the projects, using the United States Department of Agriculture's Economic Research Services Rural-Urban Continuum Codes (RUC Codes) to classify counties by population and level of urbanization (USDA Economic Research Service, 2013), and U.S. Census and Texas state statistics to characterize percentage of people living in poverty, racial and ethnic mix, and Medicaid enrollment (US Census Bureau; Texas Health and Human Services Commission and the Texas Department for State Health Services). However, for some CMHCs, the service area extended beyond the base county.

After concluding that the nature of integrated care varied in part according to the types of organizations involved, the research team categorized the 10 selected projects into three mutually exclusive groups, as shown in Table 1:

- **CMHC only**: The organization providing mental health care services and hired or contracted with a PCP, who functioned as a member of the staff and reported to the CMHC.

- **CMHC + Federally Qualified Health Center (FQHC)**: The organization providing mental health care services partnered with an FQHC; the FQHC provided the CMHC patient population with primary care services.

- **CMHC + Other Primary Care**: The organization providing mental health care services partnered with a non-FQHC PCP; this organization provided the CMHC patient population with primary care services.

Table 1. Local Contexts of Participating Sites

Site Type	CMHC only (N=4)	CMHC + FQHC (N=4)	CMHC + other PCP (N=2)	Overall (N=10)
Rurality RUC Codes (2013)[a]	1, 1, 2, 4	1, 1, 2, 3	1, 3	2
White[b] (%)	44	44	65	48
Black[c] (%)	10	9	10	10
Hispanic[c] (%)	43	43	38	38
Living in poverty[c] (%)	24	15	16	19
Medicaid Enrollment in January 2013[c] (%)	17	13	25	15

Abbreviations: CMHC is Community Mental Health Center; FQHC, federally qualified health center; PCP, primary care provider; RUC, rural-urban continuum.
[a] For the complete definition of RUC codes see the ERS website: http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx#.UYJuVEpZRvY
[b] US Census Bureau: https://www.census.gov/quickfacts/table/PST045216/00
[c] Texas Health and Human Services Commission https://hhs.texas.gov/about-hhs/records-statistics/data-statistics/healthcare-statistics and the Texas Department for State Health Services, https://www.dshs.state.tx.us/chs/popdat/ST2013.shtm .

As Table 1 shows, the 10 study sites serve regions with very similar rates of urbanization, racial and ethnic mix, people living in poverty, and percentages of people enrolled in Medicaid relative

to Texas as a whole. However, this does not ensure the generality of these study findings to similar efforts elsewhere.

Project Structures and Functioning

To learn how projects were initially designed and operating, members of the research team visited each CMHC between October 2014 and January 2015, interviewed key informants, and took notes on research team members' observations at each site. Questions about the physical layout of the integrated facility ranged from addressing availability of physical care exam rooms, to proximity of physical and mental health care, to the presence at the CMHC of pharmacy and dental services. For instance, although co-location "is neither necessary nor sufficient for integration" (Minkoff & Parks, 2015, p. 182), it has been associated with improved prevention (Kilbourne et al., 2011) and outcomes (Pirraglia et al., 2012). Similarly, on-site pharmacies can both help patients get medicine and help providers monitor usage (Minkoff & Parks, 2015). Finally, people with SMI have substantially lower rates of dental care than the general population, making availability of this service relevant (Teng, Lin, & Yeh, 2016).

During the Spring and Summer of 2015, participating CMHC leadership, the Texas Health and Human Services Commission, the Texas Council of Community Centers, and the Meadows Mental Health Policy Institute asked the study team to probe for additional factors about projects, such as the nature of health coaching occurring during integrated encounters, and more specificity about project staffing. This information was collected during a second round of interviews with study site key informants, conducted by telephone between October 2015 and January 2016, one year after the initial site visits. In both rounds of interviews, a number of questions were derived from TriWest's Person-Centered Healthcare Home Fidelity Scales, which in turn drew on Mauer (2009) and Substance Abuse and Mental Health Services Administration –Health Resources and Services Administration (2012). Others drew on the Consolidated Framework for Implementation research (Damschroder et al., 2009).

After site visits and phone interviews, interview transcripts were checked by members of the study team for accuracy and removal of all identifying information. The research team then identified salient themes within and across sites, using case summaries and additional thematic review of interview transcripts and other site visit data (Miles, Huberman, and Saldana, 2014). These qualitative data were used to contextualize and interpret quantitative analyses.

Staff Experiences of Integrated Care

During site visits, primary and mental health care providers completed a questionnaire on the quality of their coordination with the other discipline, using the Relational Coordination scale, which has been extensively validated to measure inter-disciplinary health care teamwork quality (Gittell et al. 2005; Noel et al., 2013).

The scale comprises seven items, with responses assigned values ranging from 0 (never) to 4 (all of the time). The questions included in the questionnaire were:

1. When you need information from [PC/MH care provider], how often do you get it?
2. How often does [PC/MH care provider] give you information as quickly/timely as you need it?
3. How often do you think the information [PC/MH care provider] gives you is accurate?

4. When there is a problem, how often does [PC/MH care provider] work with you to solve the problem?

5. How often does [PC/MH care provider] know about the work you do?

6. How often does [PC/MH care provider] respect the work you do?

7. How often does [PC/MH care provider] have the same goals as you do for taking care of patients?

In the current study, two additional questions were added: (1) a prefatory question ("How often do you need information from [PC/MH care provider] to serve patients in this care integration project?"), was added to discern interdependence between primary and mental health care; and (2) a final question ("How often do you have a say in what [PC/MH care provider] does with patients?") was not in the original survey instrument, but was added because another researcher, Dana Weinberg, found this additional item to have high predictive validity (2014).

These questions were asked of 16 CMHC staff members, two each at the eight sites that were operational at the time of the initial site visit. The study team returned to one site to conduct a patient focus group, but did not approach professionals at that time to complete the coordination survey instrument.

Patient Experiences of Integrated Care

During site visits, one or more professionals at each site walked the research team members through a typical patient's experience of receiving integrated care at their location. The team used this to prepare a flow chart of that site's typical patient care experience (GOAL/QPC, 1988).

To further understand patients' experiences with these integrated care projects, the study team conducted nine patient focus groups; the tenth site was not operational at this point in the study period. Team members first explained the purpose of the study, privacy and confidentiality measures, that participation in the focus groups was entirely voluntary, and that patients could leave at any time during the focus group. All patients who participated provided written informed consent and agreed to have their collective responses recorded for the study.

During the focus group, patients were given a prompt and responses were collected, round robin style, and recorded in a document projected onto a screen or written on a poster for the group to see.

The following questions were used to guide each focus group. To develop this guide, the research team used the Tri-West Patient-Centered Healthcare Home Fidelity Scale, which in turn was based in part on Mauer (2009) and SAMHSA-HRSA Center for Integrated Health Solutions (2012). The questions were:

1. Can you tell us what types of medical care you have received since [facility] started offering these services?

2. What has been most helpful or working well about this program?

3. How would you like to see this program improve?

4. Since this site started offering physical health care, have you changed the way you take care of your physical health or mental health?

5. Has your physical or mental health – how you feel – gotten better or worse?

6. How well do you truly understand what your new medical doctors or nurses [in this project] are saying to you?

7. Have primary care services at this location helped you with any other parts of your life?

8. Do you think [this program] (i.e., receiving both primary and mental health care) has affected how much control you have over your own health?

9. Has [the program] helped you with any other parts of your life?

These sessions included two moderators, one to facilitate the session and the second to record patients' responses. If a patient's response was unclear, the moderator would ask for clarification and permission to alter the original statement being displayed in the projected document. Once all the prompts had been discussed and the listing of patient responses had been collected in the projected document, the moderator read each response displayed and asked patients to indicate how relevant each was to him or her individually, using a three point scale (applies a lot, somewhat applies, does not apply). These individual patient responses were collected by written survey (without identifying information), and responses were then dichotomized into whether each participant did or did not consider other patients' experiences to apply to his or her own experience as well.

The research team identified the most common category of response to each prompt, and then tallied the percentage of participants in each session who found responses within that category applicable to them.

Secondary Data on Quality, Health, and Cost

Experts suggest that integrated care for people with SMI is hampered by a lack of quality measures. For instance, only four of the measures endorsed by the National Quality Forum relate to integration between behavioral and physical health care (Goldman, Spaeth-Rublee, & Pincus, 2015). One of the goals of the current study was to broaden the range of outcomes used to assess integrated care.

Outcome data derive from the CMHCs and their primary care partners, as well as the Texas Health Care Information Collection (THCIC) hospital discharge records. Through discussions in 2015 facilitated by the Texas Council of Community Centers, the study team agreed with participating CMHCs on quality, health, and cost outcome measures to be used in this research.

In their course of practice, CMHCs recorded somewhat different sets of patient outcome data and sometimes used different instruments for patient assessments; as a result, the agreed-upon outcome measures were available for a subset rather than for all 10 CMHCs. Of the 10 CMHCs in the study, six have electronic health record systems that allowed them to provide outcomes data for all their patients who received integrated care. For a seventh CMHC, data for 125 of the 478 patients who had received integrated care were manually extracted by the research team. Three CMHCs were able to share patient satisfaction data: one provided results from the Visit-Specific Satisfaction Instrument (VSQ-9) (Ware & Hays, 1988) and two provided results from the Client Satisfaction Questionnaire (CSQ-8) (Goldman et al., 2015).

The primary data source for analyses of resource use was hospital discharge records obtained from THCIC. Seven CMHCs were able to share a roster of patients with SMI who had received

integrated mental and primary health care. These rosters made it possible to identify when each patient had begun integrated care, so the research team could compare patients' hospital use after beginning integrated care to their respective hospital use in the prior year. In addition, the combined patient roster from all seven CMHCs was used to extract THCIC data on hospital encounters between 1/1/2014 and 12/31/2015. The sample for the hospital discharge model was restricted to patients for whom there was a THCIC record of a hospital encounter during that period.

The average cost savings related to decreased frequency of hospital use was calculated by multiplying the decrease in frequency of hospitalizations by the average pre-integration cost per hospitalization, using an established methodology for estimating hospital prices from state administrative data (Levit, Friedman, & Wong, 2013; Van Horne, Netherton, Helton, Fu, & Greeley, 2015). The average cost per hospitalization before integration was calculated by obtaining from THCIC data the charges for each patient's hospitalization. From Medicare cost reports, Medicare payment rates were obtained as an overall net revenue percent of charges. THCIC records of patient hospitalization charges were then multiplied by Medicare payment rates for each case by hospital by year to estimate payments for each patient's hospitalization. Costs from 2013 and 2014 were adjusted for inflation to standard 2015 dollars, using the medical inflation rate of 2.3% for 2013-2014 and 2.5% for 2014-2015. The mean payment per hospitalization was then calculated.

Using the same method to estimate the average cost savings from shortened length of stay after patients received integrated care, the research team used average daily accommodation charges as a proxy for length of stay charges. Accommodation charges were obtained from THCIC data for the 2409 patients who were hospitalized at one of 159 hospitals. From Medicare cost reports, Medicare payments rates were obtained as an overall net revenue percent of charges. THCIC records of patient accommodation charges were then multiplied by Medicare payment rates for each case by hospital by year to estimate accommodation payments for each patient's hospitalization. Costs from 2013 and 2014 were adjusted for inflation to standard 2015 dollars, using the medical inflation rate of 2.3% for 2013-2014 and 2.5% for 2014-2015. The mean accommodation payment per hospitalization was then calculated.

All patient data were transmitted, stored, and analyzed in accordance with The University of Texas Health Science Center Institutional Review Board-approved protocol and applicable federal and state laws for protected patient health information.

Statistical Analyses

Ordinary least squares regressions were used to test associations between receiving integrated care and systolic and diastolic blood pressure levels, respectively.

A two-stage process was used to test associations between receiving integrated care and (1) the odds of having a hospital encounter during the first year of integration; and (2) for patients who had a hospital encounter, the length of stay (Wooldridge, 2003).

A logit regression was used to test associations between patients' receipt of integrated care and annual odds of a hospital encounter. Length of stay was modeled using ordinary least squares regression, with this outcome log-transformed to reduce skew in its distribution (Manning & Mullahy, 2001).

All regressions used Huber/White corrections to obtain robust standard error estimates. Analyses were conducted with STATA 14.0 (StataCorp: College Station, TX, 2015).

FINDINGS

Attributes of Study Participants

Staff

Descriptive statistics for CMHC staff who were interviewed during initial site visits are shown in Table 2.

Table 2. Summary Statistics for CMHC Staff Members Interviewed (Total N=66)

	Total	
Characteristic	N	%
Race/ethnicity (N=65)		
White	47	72
Black	8	12
Hispanic	15	23
Other	5	8
Education (N=63)		
High school diploma	5	8
Registered nurse	6	9
Bachelor's degree	12	18
Licensed clinical social worker	5	8
Other master's degree	19	29
Nurse practitioner, physician assistant	4	6
Physician	12	18
Other doctorate	1	2
Bilingual (N=60)		
Spanish speaking	17	26
Tenure	Mean±SD	
At the organization (N=62) years	7±8	
In current position (N=64)) years	3±5	

Table 2, above, shows that the majority (72%) of professionals participating in the study were White. There was a wide range of educational backgrounds, with the vast majority of professionals having at least a bachelor's degree and about one in five (18%) being physicians. Almost a third (26%) of professionals in the study spoke Spanish, and they tended to have been at their current organizations for several years at the time of their initial interviews.

Patients

This section characterizes patient attributes and selected quality and health outcomes for the full study sample (N=18,505), using data from participating CMHCs, and for the subset of patients who participated in focus groups (N=75) during site visits, using questionnaires participants completed. In this section, descriptive data for the patient participants is shown separately for

each CMHC rather than categorized by project organizational type (e.g., CMHC+FQHC) as it was in previous sections, because the analyses that follow used patient samples pooled across all CMHCs.

Demographics

Table 3. CMHC Demographic Data for Patients Receiving Integrated Care

	CMHC 1 (N=8,444)		CMHC 2 (N=5,323)		CMHC 3 (N=2,295)		CMHC 4 (N=1,335)		CMHC 5 (N=416)		CMHC 6 (N=567)		CMHC 7 (N=125)		Overall (N=18,505)	
Characteristic	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Sex																
Male	2,804	33	2,510	47	1,172	49	540	40	239	57	212	38	55	44	7,532	41
Female	5,640	67	2,813	53	1,123	51	795	61	177	43	355	63	70	56	10,973	59
Age, years, mean±SD	42±15		46±11		40±13		42±12		47±10		44±11		46±12		43±13	
Age range	18-101		18-87		18-96		18-72		20-76		19-69		21-80		18-101	
Race																
White	7,209	85	1,826	34	1,978	86	1,281	96	233	56	389	69			12,916	70
Non-white	1,046	12	3,497	66	317	14	40	3	183	44	102	18			5,185	28
Unknown	189	2	0	0	0	0	14	1	0	0	76	13	125		420	2
Ethnicity																
Hispanic	4,623	55	664	13	2,023	88	762	57	30	7	20	4			8,122	44
Non-Hispanic	3,512	42	4,641	87	272	12	559	42	386	93	539	95			9,909	54
Unknown	309	4	18	0	0	0	14	1	0	0	8	1	125		474	3

Abbreviations: CMHC indicates community mental health center; SD, standard deviation.

As Table 3 shows, the population of patients receiving integrated care was about 60% female. The ages ranged from 18 to 101 years. The mean age was 43 and most patients were between 30 and 56. A higher proportion of the patients identified by CMHCs as receiving integrated care were White (70%) compared to both the service area base counties' population (48%; Table 1) and the focus group participants (46%; Table 7).

Despite operational challenges in project implementation, projects grew substantially during each site's first year of implementation, with the mean number of patients served almost doubling between Delivery System Reform Incentive Payment Demonstration Years 3 (10/1/2013 –9/30/2014) and 4 (10/1/2014 – 9/30/2015), from an average of 645 to 1,166 unduplicated individuals per CMHC (not shown).

Mental health status

The ANSA scores shown below in Table 4 were the best available indicator of mental health status common to CMHC data.

Table 4. ANSA Levels of Care for Patients Receiving Integrated Care

	CMHC 2 (N=5,066)		CMHC 3 (N=1,631)		CMHC 4 (N=1,312)		CMHC 5 (N=295)		CMHC 6 (N=567)		Overall (N=8,871)	
Measure	N	%	N	%	N	%	N	%	N	%	N	%
Baseline ANSA level												
1 (meds/skills)	3,267	64	1,035	63	1,149	88	235	80	462	81	6,143	69
2 (counseling)	420	8	93	6	53	4	6	2	29	5	601	7
3 (intensive)	1,154	23	435	27	99	8	54	18	67	15	1,809	20
4 (assertive community treatment)	225	4	68	4	11	1	0	0	6	1	310	3

.Abbreviations: ANSA indicates Adult Needs and Strengths Assessment; CMHC, community mental health center. ANSA levels designate the severity of need and the recommended level of care for a patient: 1=medication management or skills training; 2=counseling; 3=intensive services; 4=assertive community treatment.

As Table 4 shows, the majority of patients were assessed through ANSA as needing medication management and skills training, and about one-fifth of patients were assessed as needing intensive mental health services. The distribution of ANSA scores across sites was relatively consistent.

Substance use

Below, Table 5 shows ANSA screening results for substance use. Substance use-related disorders are common among populations with SMI (SAMHSA, 2015). Both severity of mental health conditions and substance use are associated with decreased treatment engagement and medication adherence (Cradock-O'Leary, Young, Yano, Wang, & Lee, 2002; Dixon, 1999). Hence, the study team used the ANSA substance use score in addition to the overall ANSA level of care score to characterize patient health conditions that might affect integration outcomes. One CMHC that was able to share overall ANSA level of care data was not able to share the substance use level data, so there is one less CMHC shown for substance use (Table 5) than for overall level of care (Table 4).

Table 5. Baseline Substance Use Indicated through ANSA Assessment

	CMHC 2 (N=5,066)		CMHC 3 (N=1,631)		CMHC 4 (N=1,312)		CMHC 5 (N=295)		Overall (N=8,304)	
Baseline substance use[a]	N	%	N	%	N	%	N	%	N	%
1 (none or subthreshold)	4,410	87	1,412	87	1,166	89	225	76	7,213	87
2 (use causing severe/dangerous problem, or notable/ significant use)	656	13	219	13	146	11	70	24	1,091	13

Abbreviations: CMHC, community mental health center.
[a] For these analyses, ANSA substance use scores of 0 (no evidence of substance use) and 1 (history or sub-threshold, watch/prevent) were mapped to 1 (none or subthreshold) and scores of 2 (substance use causing problems, consistent with diagnosable disorder) and 3 (substance use causing severe/dangerous problems) were mapped to 2 (use causing severe/dangerous problem, or notable/ significant use)

As Table 5 above shows, 13% of patients who received integrated care were noted to have substance use that caused significant problems. It is not uncommon for patients to withhold information regarding substance use. It is also difficult to obtain reimbursement for substance

abuse treatment in Texas. Both of these factors may contribute to underreporting in the numbers above.

Insurance status

Below, Table 6 shows that the majority (62%) of the patients receiving integrated care at the study sites were uninsured. Of those with insurance, about half had Medicaid. One CMHC noted that small private indemnity plans unrelated to commercial insurance and government programs were included in the "Insured—Other" category for their patients.

Table 6. CMHC Data on Insurance Status of Patients Receiving Integrated Care Services

	CMHC 1 (N= 8,444)		CMHC 2 (N= 5,323)		CMHC 3 (N= 2,295)		CMHC 4 (N= 1,335)		CMHC 5 (N= 416)		CMHC 6 (N=567)		Overall (N= 18,380)	
Insurance status	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Uninsured	5,900	70	2,300	43	1,694	74	851	64	290	70	376	67	11,411	62
Insured														
Medicaid	739	9	1,865	35	451	20	341	26	124	30	148	26	3,668	20
Medicare	575	7	1,015	19	84	4	62	5	0	0	19	3	1,755	10
Other	1,230	15	143	3	66	3	81	6	2	1	24	4	1,546	8

Abbreviations: CMHC indicates community mental health center.

The high percentage of patients receiving integrated care who had no insurance reflects the high prevalence of poverty in this population.

Focus group participants

Demographic characteristics of the 75 patients who participated in the focus groups are shown in Table 7. The racial/ethnic mix of the focus groups was similar to the counties that the projects served (Table 1), with 46% of the focus groups versus 48% of the service area base county being White, 20% versus 10% being Black, and 38% being Hispanic both among focus group participants and in the counties where they were served. One of the most prominent differences between focus group participants and the counties served by the CMHCs is the poverty level. As shown in Table 7, 97% of focus group participants reported income below $14,999, (below the federal poverty level for a household of 2) compared to 19% of the population living in poverty in counties served by the CMHCs (Table 1).

Table 7. Demographics for Patients Who Participated in Focus Groups (N=75 at 9 sites)

Characteristic	N	(%)
Age (N=74),years, mean±SD	49±9	
Sex (male)	42	56
Race/ethnicity (N=75)[a]		
White	34	45
Black	15	20
Hispanic	29	39
Other	3	4
Education (N=75)		
No GED / equivalent	11	15
GED	23	31
High school diploma	15	20
Some college	22	29
College degree or higher	4	5
Mental health diagnoses (N=75)[a]		
Bipolar	28	37
Schizophrenia	18	24
Depression	58	77
Other	24	32
Primary care diagnoses (N=75)[a]		
Hypertension	46	61
Diabetes	29	39
COPD	15	20
Asthma	9	12
Other	27	36
Self-reported overall health status (N=74)		
Excellent	2	3
Very good	21	28
Fair	44	59
Poor	7	9
Insurance status (N=74)		
Uninsured	46	61
Insured		
Medicaid	12	16
Medicare	5	7
Dual eligible (Medicaid + Medicare)	7	9
Other insured	5	7
Income (N=71)		
0 - $14,999	69	97
$15,000 - $34,999	2	3
Living situation		
Live alone (N=74)	26	35
Homeless within last year (N=72)	31	41
Reported reliable access to transportation (N=73)	54	74

Abbreviations: COPD, chronic obstructive pulmonary disease; GED, general education development test.
[a]Sums may > 100% because participants could select multiple responses to the question. For example, some participants self-identified as multiracial, or participants had several diagnoses for physical or mental health conditions.

Project Structures and Functioning

The CMHCs participating in this study had diverse histories of prior integration attempts, a variety of organizational structures, and differed considerably in facility layout, models used for integrating services, administrative processes, and ancillary services available on-site. Key attributes of integration projects are summarized below in Table 8.

Project attributes

Table 8. Key Attributes of Integration Projects (N=10).

	CMHC only (N=4)		CMHC + FQHC (N=4)		CMHC + other PC (N=2)		Overall (N=10)	
Project attributes	N	%	N	%	N	%	N	%
Prior integration attempt	1	25	2	50	1	50	5	50
Facility layout								
New building	0	0	0	0	0	0	0	0
Usual PC physical exam room	4	100	4	100	2	100	10	100
PC and MHC on same floor of same building	2	50	3	75	2	100	7	70
Ancillary services								
On-site lab sample collection	3	75	4	100	1	50	8	80
On-site pharmacy	2	50	0	0	0	0	2	20
Staffing	N	%						
PCP employed by CMHC	4	100	1	25	1	20	6	60
Behavioral health care liaison or care coordinator	3	75	4	100	2	100	9	90
Peer specialists on integrated team	2	50	0	0	0	0	2	20
Integrated team turnover								
# FTEs on project at time of 1st interview mean±SD, range	7±2	4–9	12±9	4–27	6±3	4–9	9±6	4–27
# FTEs on project at time of 2nd interview (after 1 year) mean±SD, range	14±13	4–37	13±8	7–-26	7±3	3–10	12±10	3–37
Growth in project team size between 1st and 2nd interviews, %		106		6		11		39
# FTEs departed between 1st and 2nd interview (including those replaced)	36		37		57		41	
Loss of PCP delayed/paused primary care	2	50	1	25	1	50	4	40
Other primary care turnover in first year	1	25	1	25	0	0	2	20
Administrative processes								
Modelled on Cherokee (Cherokee Health Systems)	2	50	3	75	0	0	5	50
Served non-CMHC patients	1	25	2	50	2	100	5	50

Abbreviations: CMHC, community mental health center; FQHC, federally qualified health center; FTE, full-time equivalent; PC, primary care; PCP, primary care provider

Nationally, the most common way CMHCs integrate primary care is through arrangements with FQHCs, probably in part because FQHCs receive higher payments than mental health care facilities do for primary care (Kern, 2015). In this study, four CMHCs partnered with FQHCs, four hired PCPs to see patients within the CMHC, and two partnered with other PCPs.

Four of the 10 sites reported previous failed attempts at integrating primary and mental health care, with those failures generally attributed to resource constraints. These experiences were perceived as helpful to leadership of the current projects in understanding the complex issues in this form of service improvement.

All projects renovated space within existing CMHC space rather than building new facilities to accommodate the new PCPs. All 10 integrated projects had physical exam rooms with standard equipment for primary care. However, sites differed considerably in facility layout and ancillary services available on-site. Most projects located primary care close to mental health care, with 7 CMHCs containing both on the same floor of one building. The three CMHCs that had mental health and primary care services in separate locations nonetheless had them in close proximity, such as on a different floor of the same building or in a mobile van in the CMHC's parking lot.

Most integrated projects had on-site laboratory draws, with only two referring patients to outside facilities for their laboratory work. By contrast, although having an on-site pharmacy and dental care were frequently cited by project leadership as needed by patients, out of 10 sites, two had an on-site pharmacy, and one had an on-site dental clinic.

Half the CMHCs modeled their integrated care projects on Cherokee's Blended Behavioral Health and Primary Care Clinical Model (Cherokee Health Systems), perhaps because of limited alternative exemplars of mental health and primary care service integration. The Cherokee Health Systems model includes a behavioral health consultant on the primary care team, behavioral health consultations available to PCPs, and behavioral interventions in primary care, and encourages patient responsibility for their health/lifestyle (Cherokee Health Systems).

Of the five projects modeled on Cherokee, one described making substantial adaptations to this model to fit their facility's capacity. Another project's leadership noted that their leadership participated in the Substance Abuse and Mental Health Services Administration (SAMHSA) webinars to learn about best practices in integrated care. Participating sites commonly attended conferences and webinars to learn about best practices, regardless of the model they eventually chose. Among projects not modeled on Cherokee, one CMHC described their model as collaborative care (according to the PCP) or integrated care (according to the mental health professional). One site described their model as the Four Quadrants model (SAMHSA) and another as based on medical homes principles.

Table 8 shows characteristics of integrated team staffing and changes in staffing levels between initial interviews (10/2014 – 1/2015) and the second set of interviews conducted a year later (10/2015 – 1/2016). The challenge of recruiting PCPs for mental health care initiatives is well known (Scharf et al., 2013), and was also specifically referenced by eight CMHCs in this study. Recruiting and retaining the "right kinds" of primary care personnel was a significant challenge for many sites. Four sites experienced either delayed or paused operations after losing a PCP. Two sites also reported some primary care turnover in the first several months of operations. Hence, overall, more than half the projects experienced significant non-operational periods because of PCP turnover; this affected projects both with and without external partners. Nevertheless, as Table 8 shows, CMHCs had a high average growth in integrated team size as projects matured, despite high levels of turnover. Some staff who left integrated teams were shifting to other roles within the CMHCs.

We're now on our third nurse practitioner, in a short period of time. That's been a difficult integration. Administrator at a project managed between a CMHC and a non-FQHC PCP

One thing is finding the right providers. We went through a couple of people who just didn't seem to be working out very well. You really need somebody that is a part of the whole team. Medical Director at a CMHC–FQHC site

Differing administrative processes challenged staff

As in previous research (Bao, Casalino, and Pincus, 2013), CMHC partnerships with independent PCPs contended with different payment practices as well as reporting requirements. For instance, although both CMHCs and PCPs charged on sliding scales, CMHC fees were per month, whereas PCPs charged per encounter, and appeared often to require higher out-of-pocket costs (Scharf, 2013). Such differing payment policies were confusing and sometimes off-putting to CMHC patients.

One common initial challenge for integration projects was an inability to bill Medicaid and/or Medicare because managed care contracts had not yet been approved. Another was integration of primary and mental health billing systems. This is in keeping with a recent study of programs with integrated primary-mental health programs that found only 18% to have integrated records (Scharf et al., 2013).

We're not worrying about billing right now, because right now we can't even share records with each other. CMHC Director

Another thing billing-wise was submitting the correct information on the claim forms. For our system it was developed based on the mental health side, and so there are definitely configuration changes needed to adhere to a primary care setting claim. Primary Care Administrator

When you go to bill, you have to change the diagnosis and then change it back after you bill. For billing purposes, it's not the best. Administrator

In fact, in some instances billing may be simpler when primary care is provided by a separate organization, thus obviating the need to reconcile separate billing systems and, with FQHC partners, allowing them to capture higher reimbursements:

With [primary care organization], it's very simple. If they go to primary care, [primary care organization] has a way to subsidize that medication. We don't have to do anything. They don't have to bill us. We don't have to bill them. They just make the referral. If the client needs primary care medication, [primary care organization] will provide that. Primary Care Administrator

The FQHC is billing at their enhanced rate. That helps. That's why I was more than glad, 'You guys do the billing. Go take responsibility for it.' Whatever you earn in third-party revenue will just come off their invoice to us. CMHC Director

Communication and information were pivotal

Integrated teams across the United States are using a variety of processes to maintain communication about patient needs, including sharing access to electronic health records between mental health and PCPs, as well as potentially with outside providers such as local hospitals; developing a single integrated treatment plan for each patient; using registries to track clinical outcomes for groups of patients with conditions such as hypertension and diabetes (Kern, 2015; Scharf et al., 2013); holding brief huddles about patients being seen on any given day; and conducting more extensive meetings about patients with particularly challenging needs (Kern, 2015). Behavioral health homes have also often sought to increase patient engagement in developing their health care plans (Scharf et al., 2013). In the current study, key informants were asked whether patients' goals for their health were available to PCPs. Such patient-centered planning is believed to improve integrated care outcomes (Minkoff & Parks, 2015).

As with co-location, Minkoff & Parks (2015, p. 183) note that electronic health records are "neither necessary nor sufficient" for integrated care , but do facilitate information sharing between physical and mental health care providers. In particular, access to data entered by providers informs the care of an individual, and integrated health care is best achieved when information is shared in a timely manner. A shared electronic health record is ideal. However, in this context, sharing data between providers can be challenging, in part because of 42 CFR Part 2, which protects the confidentiality of drug and alcohol use-related patient information. This may necessitate additional protections and consent for primary care and mental health care providers to share patient records. The mechanics of sharing may be further hindered by limited data infrastructures at collaborating agencies, which often use different computer and software systems. Improving information sharing between physical and mental health staff was also a major focus over time.

Table 9 below summarizes communication and information attributes of the integration projects in the sample, including medical record structures, strategies for population health management, and organizational aspects of providing team-based care.

Table 9. Information and Communication Attributes of Integrated Care Processes

	CMHC only (N=4)		CMHC + FQHC (N=4)		CMHC + other PC (N=2)		Overall (N=10)	
Characteristic	N	%	N	%	N	%	N	%
Health information technology								
EHR	4	100	1	25	2	100	7	70
EHR shared with external providers	0	0	0	0	1	50	1	10
Common health records between mental health and primary care	4	100	3	75	1	50	8	80
Population health management								
Data on patients' use of intensive and restrictive services	2	50	0	0	1	50	3	30
Review of performance data with PC and MHC staff	1	25	3	75	0	0	4	40
Patient registry (e.g. Cat 3) to track physical health and behavioral health	1	25	2	50	2	100	5	50
Team-based care and clinical integration								
Use team-based care	4	100	4	100	2	100	10	100
Team-based treatment planning with PC and MHC staff (single integrated treatment plan)		100		25	2	100	7	70
Morning huddles	3	75	3	75	2	100	8	80
Patient-articulated physical health goals information available to PCPs	4	100	0	0	1	50	5	50
Developed clinical pathways for co-occurring conditions	1	25	1	25	0	0	2	20
Clinical care more complex because of integrated care	0	0	2	50	2	100	4	40

Abbreviations: Cat indicates category; CMHC, community mental health center; EHR, electronic health record; FQHC, federally qualified health center; PCP, primary care provider.

As Table 9 shows, most projects had electronic health records and shared a single health record between mental health and PCPs, but did not share common health records with external organizations, such as hospitals. Common health records access was more common at sites run through a single organization, although that did not guarantee satisfaction with ease of use. Prior research has identified fewer but nonetheless substantial challenges when information systems were combined (Scharf et al., 2013).

> *[Our] worst frustration with the whole system is they have the worst EHR [electronic health record] I've ever seen … We think it probably came over here on Noah's Ark.* Primary Care Provider, CMHC-only site, with a common electronic health record

As the Meadows Mental Health Policy Institute staff have found in other settings, at sites with separate mental health and primary care health records, staff developed a variety of work-arounds to ensure that each discipline had adequate information when meeting with patients, even if this sometimes involved printing out hard copies of extracts from these records. One site added an insulin template to the electronic health record, allowing both primary and mental health care clinicians to monitor patient insulin status. Immediate access to all prescribed medications was also described as useful. At another site, the primary care registered nurse was able to look up a patient in the electronic health record immediately before seeing an individual referred from mental health care, and an administrator showed physicians how they could click a pending option that would cue other physicians to sign off on a single treatment plan.

When mental health care providers had no access to patient's primary care records, as happened at a site that collaborated with a non-FQHC organization to deliver primary care services, the lack of information was a major challenge:

> *The primary care physician kept saying, 'You need to give them access because I need to know the medications they're on for behavioral health.'* Administrator

> *… when [the mental health liaison] is out, or at training, or something like that, it's really annoying because I'll have to walk over here all the time and ask them [for patient records].* Primary Care Provider, CMHC-FQHC site

> *In the beginning we weren't integrating the medical records. We had a big problem there, because we were sending them, but not printing them out and getting them upstairs. Or then they were getting in the wrong hands, so we had to refine that and get it down to—okay, we're going to give it to the nurse who is going to give it to the provider, because it … wasn't getting there, or it was getting lost in translation. We had to really work on that process of getting the labs, the meds, and all that.* Administrator, CMHC-FQHC site

> *Now, we're getting copies of the labs. The problem is, we don't have a way to integrate them into the health record. We have a separate records system than [the primary care organization] does. We don't have access to their system, and so it makes it a little difficult for us because it's two separate records. We get these copies, but then I have to match these to the chart. That's a lot of work to do that.* Administrator at a CMHC-FQHC site

> *We can't necessarily always parse the substance abuse data from the other behavioral health data.* Administrator at a CMHC-FQHC project

At one site, the primary care organization was perceived as being "tight" with information about shared patients, especially at the onset of the integration project's implementation.

> *Our overall goal is to provide safe, useful, effective service to our consumers … Underneath that philosophy, though, there are people that are very worried about numbers, that we make a certain number of contacts and we meet our contractual agreements with the state and the milestones we've set.* CMHC Administrator

The use of population health management systems varied among projects. A third of the projects used data about patients' use of intensive and restrictive services and 4 of the 10 projects used aggregated outcomes data to track performance. Half of the projects maintained a patient registry to identify trends in health conditions for their clinical populations. Formalized clinical pathways for managing comorbid conditions, which take time to develop or adapt to new settings, appeared in few projects.

All of the integrated care projects used team-based processes to review diagnostic and treatment options for patients with particularly challenging or complex health needs. In half of the projects,

PCPs had access to the patients' articulated physical health goals. The majority of sites used morning huddles to communicate about patients being seen on any given day.

Both primary care and mental health care staff considered communication to be a key to successful integration of their services, as noted above in the section on communication and information attributes of projects, and below in the discussion on project adaptations over time. In interviews, CMHC staff members repeatedly stressed the importance of communicating actively between primary and mental health care to build trust and mutual understanding. At one site, instant messaging had been effective, whereas in others a close relationship between a mental health staff member and primary care staff member seemed to provide the principal communication bridge between the two disciplines. These findings are in keeping with prior research indicating that a sense of belonging is important to professionals in integrated programs (Scharf et al., 2013).

> *Communication is the number one thing because we're dealing with two separate entities in two separate systems of care.* Care Coordinator

> *We do team huddles, so coordinating those, making sure all the doctors and everyone's coming for those, making sure our milestones and metrics are met.* Administrator

> *I mean, because it gets down to communication. Where they're 'clients' here, I'm used to them as 'patients.' You're referring to the same thing, but it's like, 'Oh, wait, wait, wait.' Then when they say 'MI,' it's motivational interviewing. To me, that's myocardial infarction. It's like, 'Okay.' It's all the acronyms and stuff and just getting the communication down and terminology. It's been a learning curve for me. Like, 'What are you talking about?'* Administrator at a CMHC–FQHC site

Low initial volume allowed valuable additional time between clinicians and patients

As typifies new projects, PCPs frequently reported a low number of clients initially, which allowed for longer encounters with patients. Providers saw this as a chance to allow patients more time to ask questions and build rapport. This slower start-up time also appeared to enable PCPs to adapt to patient needs, for instance, simplifying communication to improve understanding.

> *Changes, they don't happen overnight. It takes time, especially for our clients.* Administrator

Sites varied in the specific ways staff capitalized on time available to communicate with patients. For instance, at one site, the primary care supervisor talked with patients while they were in the waiting room after checking in, to convey information about primary care services and the related costs so that the patients would know what to expect.

> *When I first started, a good day for us was six patients. Now we'll see 10 or 11 patients a day [on a good/busy day].* Primary Care Provider

> *Honestly, I don't see a stress level for the primary care side. I think if, let's say for instance, we were seeing 20, 30 patients a day, then, yes, that can be a*

> *stressful load. We're not handling that type a load, so it's more balanced where they're actually able to handle it easily.* Primary Care Administrator

Another site had an initial encounter rate nearly double that anticipated, which the research team attributed to patient pent up unmet need.

Some projects refined scope of practice over time

Two projects narrowed their scope of practice, in one instance as the PCP encountered unexpectedly common pain and sleep problems among patients, while another expanded their scope of practice over time beyond the initial "top ten" conditions such as diabetes and hypertension.

When integrated projects limited their scope of service, alternatives were not always available. For instance, when one integrated project started, their providers included gynecology. They then narrowed their scope of work to focus more on chronic conditions such as diabetes and hypertension, in part because their patients were sicker than they had anticipated. However, patients referred to specialists for conditions the integrated clinic was no longer treating were predominantly indigent and unable to afford visits to specialists.

Staff Experiences of Integrated Care

How primary care and mental health care providers perceived their coordination

Results of the Relational Coordination scale, which measures inter-disciplinary health care teamwork quality (Gittell et al. 2005; Noel et al., 2013), indicate that mental health care providers perceived somewhat less frequent need for PCPs (2.75, on a 0 – 4 scale) than PCPs
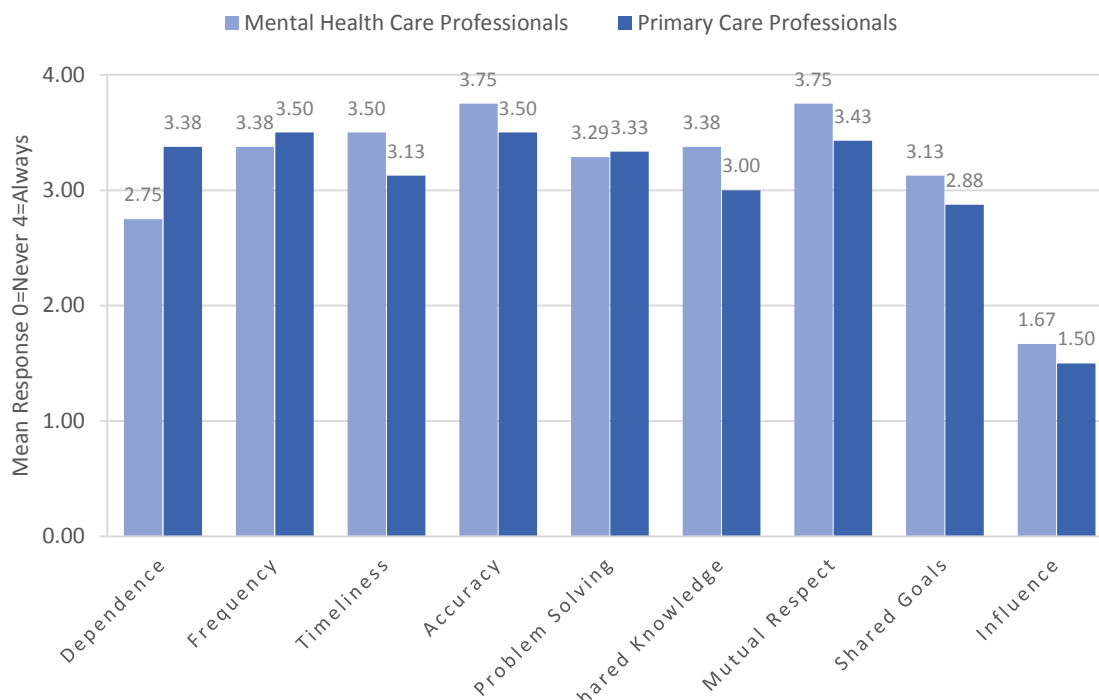

Figure 2. How Health Care Professionals Perceived Their Coordination

perceived for mental health providers (3.38). Because of the very small sample size, no tests were conducted for statistical significance. The overall quality of coordination between primary and mental health care providers was good, with a mean score just above 3 (most of the time) on the 0 (never) – 4 (all of the time) scale, relative to questions such as "When you need something from [specified key partner – e.g., primary care], how often do you get it?" and "When there is a problem, how often does [specified key partner] work with you to solve the problem?" The lowest scores were assigned to the extent to which each discipline had a say in what the other discipline did for patients, reflecting the differing foci of the two types of care. In other words, mental health and PCPs were often conferring with each other, but not necessarily seeking to control what the others did.

Staff members in both primary care and mental health care seemed to appreciate having ready access to colleagues with complementary expertise:

> *Something else that's really important to me, to help give some sense of security, so to speak, is that so many of our medications cause side effects. They drop your white count, your neutrophils. They can affect your liver function and so forth, and it was always good to have this doctor around, that we could sit down and say, 'What do you think about this white count? Is it getting low enough that we need to intervene, change mediations,' but work together with him on taking care of the patient, who is having some medical issues due to the medication.* Psychiatrist

> *I think the biggest issue for our more intense clients, the primary care docs, they get a little frustrated with them and they don't want to deal with them. Having the case manager in there with them, they can kind of work it as a team. That has really helped our truly chronically mentally ill population.* CMHC Director

> *Integration is about not missing things. It allows that the problem list of the patient becomes and continues to be updated and accurate...Again I'm not prescribing or I'm not practicing medicine blinded by some medical condition that I don't know about because the patient doesn't have a primary care doctor to investigate that. To me, that's what this is all about – that integration.* Psychiatrist

Prior to integration, psychiatrists had been frustrated with the inability to monitor patients' physical health conditions:

> *We can't get them to go get their labs. If they don't get their labs, then we're stuck in between this rock and a hard place of do we continue prescribing some very strong medications to them without any labs to inform that process?* CMHC Director

> *Especially if you have a psychiatric issue, there are lots of problems with that. Just multiple things. We get this, and then now we try to make some sense out of it. This is where getting with the internal medicine or the family physician is helpful. That's going to make a lot more sense. Here's a lady who has all of these medical issues, and she comes in and says, 'I'm fatigued.' Really? Why*

wouldn't you be? 'I just don't feel good. I can't explain why.' It could be the fact that you've got multiple medical issues going on, and it isn't all psychiatric. The patient comes in, 'I've been feeling dizzy. I think it's that Depakote.' Okay. What about the 14 other meds that you're taking? ... It turns out to be a lot better for them if they understand that, I know you're taking other meds and there's other things here, and maybe we need to address this medically and not psychiatrically. Mental Health Physician Assistant

In some respects such mutual recalibration between primary and mental health care appeared to make clinical practice more challenging.

Sometimes it seems like every time I see a patient, they're on a completely new set of meds... and that I'm having to re-deal with those side effects. Primary Care Provider

However, when asked, some project leaders reported that although the more frequent communication required for providing integrated care did increase the complexity of providing care, that information sharing led to faster recalibration of treatment, adjustment of medication, better care for patients, and higher satisfaction among patients receiving integrated care.

Cultural differences between primary and mental health care

Some participating sites recruited primary care doctors and nurses, only to lose them soon thereafter, as shown above in Table 8. One apparent reason was differences between physical and mental health care cultures, perhaps especially within public mental health care such as the CMHCs that led these projects. Cultural differences appeared somewhat more common at sites involving two organizations than at those in which CMHCs had hired primary care staff.

Although both primary and mental health care staff shared a strong commitment to quality health care, there sometimes appeared to be tension between the relatively slower pace of primary care and the greater pressure to meet patient encounter volume goals and higher general stress of mental health care. Regarding primary care:

They work with us, they're part of us. We don't see them as a program distinct from us. They're really not. We're all [name of CMHC]. Psychiatrist at a CMHC-only project

Providers perceived better access and more holistic care for patients

Professionals at participating sites perceived that given integrated care, some CMHC clients started receiving preventive care that they had not previously found truly accessible, even if it was theoretically available. For instance, prior to this integrated project, an administrator observed that patients "were recommended to other clinics… A lot of times these patients wouldn't go, or they'd end up in the ER."

Clinicians believed that comparing information across disciplines allowed for more accurate diagnoses. For example, for people with substance use-related issues, physicians believed that they were now more accurately diagnosing the root cause of requests for pain medication as dependency versus pain.

Nevertheless, providers still saw considerable unmet need among their patients with SMI. Services often unavailable to integrated care patients included specialty services and specialist diagnostic imaging. Providers also noted severe unmet dental health needs among their patients. Although one site provided on-site dental care, dental care was an otherwise frequently cited unmet need. Other unmet needs identified included transportation, specialty physical health care, imaging, and vision care.

Patient Experiences of Integrated Care

Although the physical layouts of integrated care varied because of constraints imposed by the structure of the existing facilities, patients' primary care processes were generally similar across sites; a typical path for a patient receiving integrated care is shown below in Figure 3.

Figure 3. Typical Path for a Patient Receiving Integrated Care

Given the challenges of coordinating between mental and physical health care, as well as sometimes external providers, some sites had staff members exclusively focused on care coordination. For instance, care coordinators at different sites followed up on referrals made by any other staff member, monitored patient progress, made additional referrals as needed (e.g., to primary care or a peer counselor), helped with transportation to medical appointments, and sometimes attended patients' primary care appointments for purposes of education and medication management and reconciliation. At another site, a primary care-based care coordinator reported working closely with the mental health physician assistant to educate people about disease self-management. As found in previous research, sites used different titles for similar coordinative positions (Scharf et al., 2013).

Although patients were unaware of many of the challenges of implementing integrated care, those who participated in focus groups echoed professionals' perceptions of improved communication with providers, reduced barriers to care, and improved health and well-being.

> *I have access to low cost/free medications.*

> *This integrated care program has affordable co-pays and payment assistance.*

Access

Having timely access to health care is particularly important to people with SMI, some of whom experience disorientation or agitation because of their mental health conditions (Kaufman, McDonell, Cristofalo, & Ries, 2012; Lester, Tritter, & Sorohan, 2005). Hence, in addition to asking key informants how quickly integrated care appointments were available, the study team also asked whether PCPs saw patients on a walk-in basis (Minkoff & Parks, 2015). All CMHCs were also asked about warm hand-offs during the second interviews, after some staff noted during initial site visits how important it was to personally escort patients between mental and physical health care, even when both were in the same building or on the same floor.

Table 10. Patient Access to Integrated Care

Integrated care processes: access	CMHC only (N=4)		CMHC + FQHC (N=4)		CMHC + other PC (N=2)		Overall N=10)	
	N	%	N	%	N	%	N	%
Days to physical health care appointment, mean±SD, range	3±2	1–7	5±4	0–10	19±12	7–30	7±8	0–30
Wait list	0	0	0	0	0	0	0	0
Walk-in physical healthcare	3	75	4	100	2	100	9	90
Warm hand-offs (MHC→PC)	2	50	4	100	2	100	8	80

Abbreviations: CMHC indicates community mental health center; FQHC, federally qualified health center; MHC, mental health care; PC, primary care.

Table 10 shows that all integrated projects provided timely and accessible integrated care. No integrated site had a waiting list for appointments, although the average number of days until an available appointment varied widely, from same-day to a month. All but one project provided care on a walk-in basis for patients, depending on the emergent nature of needs and facility capacity. Most projects also used warm hand-offs. Some project leadership commented, anecdotally, that providing same-day primary care and warm hand-offs increased patients'

attendance at primary care appointments and improved patients' follow-through with recommended self-care and medication use.

> *At first we took for granted that if you just said 'Hey, I'm going to send this patient down,' they walk around down here maybe, and then if they didn't find [the primary care office] right away, then they would leave ... We started examining the number of people we referred that actually penetrated into primary care. We were like, 'Ah, it's not good enough.' We took it down and said, 'Hey, you have to actually warm handoff them.'* Mental Health Director

Medication services were also the most common category of patient focus group responses about the types of services they received through integrated care: patients in seven of the nine focus groups mentioned medications as part of integrated care, and in those sessions an average of 45% of patients affirmed this as personally relevant to them.

Many focus group participants commented on the ease of accessing primary care located within their CMHCs. In addition to seeing providers, being able to pick up prescriptions for both physical and mental health at the same place was cited as a benefit of integration.

> *I'm not missing appointments now. It's easier to come to appointments in one place.*

> *The in-house pharmacy is convenient.*

> *They ordered my medicines here, and I really appreciate it.*

The most common response to the focus group question about what patients found most helpful about integrated care related to caring staff. This theme was reflected by comments in six of the nine focus groups, garnering an average 75% agreement relative to each specific example participants provided. A number of focus group participants commented on feeling more comfortable getting primary care at CMHCs than from providers in traditional primary care settings, in part because of familiarity and in part because of what the study team interpreted as a CMHC culture of caring. This feeling of comfort made the focus group participants more likely to turn up for appointments.

> *When I come in they know my name.*

> *I don't feel condemned or judged here.*

> *I look forward to my appointments.*

> *They feel like family.*

One PCP noted that one patient hadn't been following up because she was not comfortable with crowds or waiting for extended periods of time to see a primary care doctor. The research team believes that this was not so much due to the waiting time per se, (given that this was also common in CMHCs) as to waiting in an uncomfortable setting.

The most common area patients identified for improvement was increasing provider availability, which was mentioned in three of the nine sites' focus groups, and affirmed by an average of 33% of the participants in those groups.

Health coaching

Good nutrition and physical activity, both essential to health, are less common within the population with SMI than among the general population (Daumit et al., 2005; Osborn, 2007). In addition, the majority of individuals with SMI smoke (Dickerson et al., 2013), and tobacco-related conditions account for approximately half of deaths in this population (Callaghan et al., 2014).

Despite generally limited success helping people with SMI lose weight, some health homes have improved outcomes through specific programs such as InSHAPE (Bartels et al., 2013). Smoking cessation programs can also be effective for people with SMI (Gallagher, Penn, Schindler, & Layne, 2007; Williams et al., 2012). Among the mechanisms sometimes used to support health behavioral change are small tangible rewards, such as stickers and water bottles (Kern, 2015). Because of the potential utility of health behavioral coaching, especially using evidence-based practices, the study team asked key contacts about the presence and types of coaching provided, as well as the use of rewards for incremental progress (Minkoff & Parks, 2015).

Table 11. Health Coaching

	CMHC only N=4		CMHC + FQHC N=4		CMHC + other PC (N=2)		Overall N=10	
Coaching provided	N	%	N	%	N	%	N	%
Nutrition	4	100	3	75	1	50	8	80
Exercise	4	100	3	75	0	0	7	70
Used a specific exercise coaching model	0	0	1	25	0	0	1	10
Smoking cessation	4	100	3	75	2	100	9	90
Used a specific smoking cessation coaching model	2	50	2	50	1	50	5	50
Tangible rewards for progress	1	25	1	25	1	50	3	30

Abbreviations: CMHC indicates community mental health center; FQHC, federally qualified health center; PC, primary care.

As Table 11 above shows, health coaching played a prominent role in integrated care at the study sites. Adherence to a single coaching or behavioral modification model was much less frequent, as staff often drew elements from different models or tailored their coaching to fit the needs and skills of particular patients. Half of the projects did use specific smoking cessation coaching models, from motivational interviewing developed by the Centers for Disease, to digital behavioral modification phone applications (e.g., myStrength), and curricula developed for group coaching by the Tobacco Recovery Resource Exchange and Learning About Health Living: Tobacco and You. Some projects used nicotine patches or gum. Three projects used tangible rewards for progress toward health behavioral goals, although other staff also noted offering frequent affirmation.

In keeping with prior research (Chwastiak et al., 2013), providers noted that most of the physical diseases experienced by patients were at least in part a product of lifestyle, so health behavioral coaching was an important aspect of providing integrated care. Both patients and some providers reported benefits extending beyond clinical indicators to quality of life factors such less anxiety about obtaining primary care, better engagement in self-care, and better sleep. For instance, several providers reported that patients receiving integrated care were making lifestyle changes:

We have seen patients' sugar level come down to normalcy; levels of 100 from 600. Some no longer have headaches, and they're eating better and making changes. Primary Care Provider

We have stories of patients that have improved so much that some of them are back home with their families that they had been away from because of their behavioral health conditions, but because we're addressing their health needs they're feeling better and they're doing better. We have patients that are now back at work that for years have been out of work. The housing assistant, the job employment assistance that we have here have been able to get them back to work because they want to. Director of Primary Care

Some patients reported taking better care of themselves because of partnerships with their new PCPs.

My physical health needs are now met; it had been years since I'd seen a doctor.

I am keeping medication consistent, and am able to get refills so that I don't have to come back to the doctor all the time.

My doctor really interacts with me and I really like it and I'm taking better care of myself as a result [eating better; taking steroid shot].

The most common change patients reported making in response to their integrated care was improving their diet. Patients in five of the nine focus groups mentioned something relating to this topic, and in those groups 53% of patients indicated that this change applied to them. Patients in all nine focus groups attributed a range of physical and mental health improvements to integrated care, each specific example being noted as relevant by an average of 52% of the patients in these groups. Patients commented that integrated care alleviated their anxiety about physical health conditions as well as reduced physical symptoms and they felt able to live fuller, more positive lives.

When you don't know what's going on with your body it's scary. Just being able to get the information about my medical needs has been great.

I'm sleeping better now.

I'm eating better.

I'm getting out more. I'm walking more. All around I'm doing more because I feel better.

They give me hope.

Patient poverty limited the use of prescription medications for physical health conditions as well as recommended follow-up with primary health care specialists. One site estimated that about 20% of their patients followed through with referrals. Reasons cited included hesitance of specialists to accept uninsured patients or even those with Medicaid, patient lack of transportation, inability to meet out-of-pocket expenses, and patient skepticism about the need

for recommended care. Often chronic health conditions were not under control, despite provision of primary care. One administrator literally called every area specialist from the yellow pages to ask if they would see their patients. Very few said yes, but they now had one or two for most specialties who have agreed. They have also discovered that some specialists who had not committed in generic terms would agree to see a specific patient when told of that situation. When a participant at another site was asked if specialists were declining to see patients because of their mental illness, he said no, that they were declining based on insurance status even before mental health status was discussed.

> *$5 is hard for a lot of people. If there's a bigger problem and they have to see a specialist ... then everything comes to a screeching halt.* Behavioral Health Consultant

> *They got the care that they needed, but they didn't have the funds for the medication... Even if it was $3.* Administrator

> *… and she's unfunded, and I can't do anything for her. I try to optimize her medication, try to keep her on all medicines she's supposed to be on, give her a nitro pill. If the pain gets bad, go to the emergency room.* Primary Care Provider

> *I've seen noticeable differences in things like blood pressure control, blood sugar control has gotten better, that type of thing. Pain management? Not so well because we don't do that. That gets referred out, and I don't know what happens to that.* Mental Health Physician Assistant; the PCP at this site also reported success in blood pressure control

Secondary Data on Quality, Health, and Cost

The research team used two outcome measures of process quality: rates of screening for chronic disease conditions and risk factors, and results of patient satisfaction questionnaires. Because data on patient satisfaction was available for so few patients at the participating CMHCs, those data are presented below as descriptive data; with such a small sample size a pre/post comparison of patient satisfaction was not possible. Results for each outcome measure are reported below for the CMHCs able to provide those data; some outcome measures are reported for fewer than seven CMHCs when not all collected those particular measures in the course of providing integrated care.

Resource utilization was measured as number of hospital encounters and length of stay. Cost implications of changes in hospital use were calculated using THCIC charge data multiplied by Medicare payment rates for each case by hospital by year, matched to each patient's discharge DRG and payer type, and adjusted up to 2016 levels using the Consumer Price Index for medical care (BLS, 2016).

Integration practices expected to improve quality

The research team used bivariate correlations to test associations between various facets of integration structure and outcomes. The only consistent pattern identified was CMHC direct employment of PCPs, which was associated with higher screening rates for body mass index and

blood pressure (p < .05), and, for patients with hypertension at baseline, more decreases in diastolic blood pressure (p < .10), as well as higher proportions of patients with both diastolic (p < .10) and systolic (p < .05) blood pressure under control.

### Risk factor screening as a quality measure

People with SMI are at increased risk of chronic diseases such as diabetes, cardiovascular disease, and hypertension (De Hert et al., 2011). Experts suggest regularly monitoring patients with SMI for physical health indicators, including weight (e.g., through body mass index), smoking, blood pressure, and blood tests for risk of diabetes (e.g., hemoglobin A1c) (Mitchell et al., 2013). However, research has found that patients with SMI have lower rates of preventive screening than other patients (Morrato et al., 2009). Table 12 below shows the numbers of patients at the seven CMHCs where such data on screening were available for the year before each patient received integrated care as well as the first year in which each patient received such care. The year before integration and the first year of integration were measured using each patient's date of first integrated care visit as the set point, and looking back through each patient's record for screening during the year before that date and forward for screening done during the year after that date.

Table 12. Screening for Chronic Disease Conditions and Related Risk Factors

	CMHC 1 (N=8,444)		CMHC 2 (N=5,323)		CMHC 3 (N=2,295)		CMHC 4 (N=1,335)		CMHC 5 (N=416)		CMHC 6 (N=567)		CMHC 7 (N=125)		Overall (N= 18,505)	
Screening for risk factors	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Overweight/BMI																
During Year Pre-Integration	12	0	1,039	20	1,389	61	836	63	317	76	5	1	97	78	3,695	20
During 1st year	7,911	94	3,889	73	2,103	92	1,083	81	383	92	413	73	91	73	15,873	86
Smoking																
During Year Pre-Integration	9	0	182	3	906	40	N/A		N/A		N/A		N/A		1,097	6
During 1st year	7,833	93	2,005	38	1,808	79	N/A		N/A		N/A		N/A		11,646	63
Hypertension																
During Year Pre-Integration	13	0	1023	19	1389	61	872	65	316	76	5	1	77	62	3,695	20
During 1st year	8,301	98	3,913	74	2,102	92	1,133	86	415	100	436	77	101	81	16,401	89
Diabetes--HbA1c																
During Year Pre-Integration	1	0	N/A		1	0	3	0	N/A		N/A		13	10	20	0
During 1st year	992	10	N/A		472	21	81	6	N/A		N/A		16	13	1,561	8

Note: Samples for the year before integration were sometimes much smaller than the samples for the same measures during integration because this table shows the numbers of patients who were screened in the year before integration, whereas the baseline values used for measures of change included the first day of integrated services.
Abbreviations: BMI indicates body mass index; CMHC, community mental health center; HbA1c, glycated hemoglobin A1c (a clinical value used for diabetes screening).
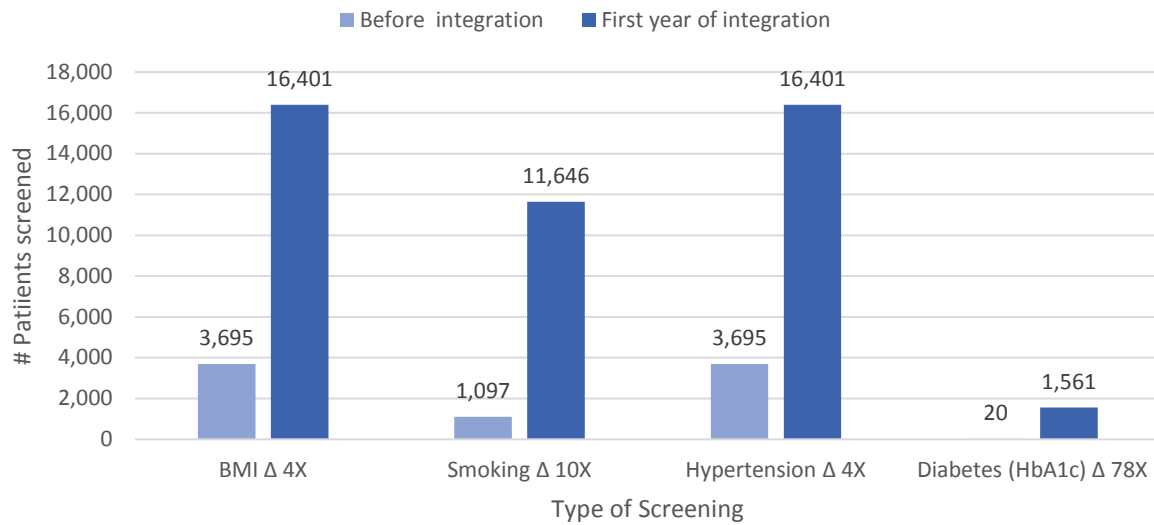
Figure 4. Change in Risk Factor Screening Rates during Study Period

As Table 12 and Figure 4 show, CMHC screening for disease risk factors increased dramatically in the first year of integrated care for patients served by these projects, with the numbers of patients screened increasing 4-fold for body mass index and hypertension, 10-fold for smoking, and 78-fold for HbA1c.

Patient satisfaction

Patient satisfaction is a commonly used quality measure; in this study, satisfaction data were available for too few of the patients receiving integrated care to make it possible to compare patient satisfaction before and after patients received integrated care. Because of the very small sample size, no tests were conducted for statistical significance.

Table 13. Patient Visit-Specific Satisfaction at CMHC 3 (N=257)

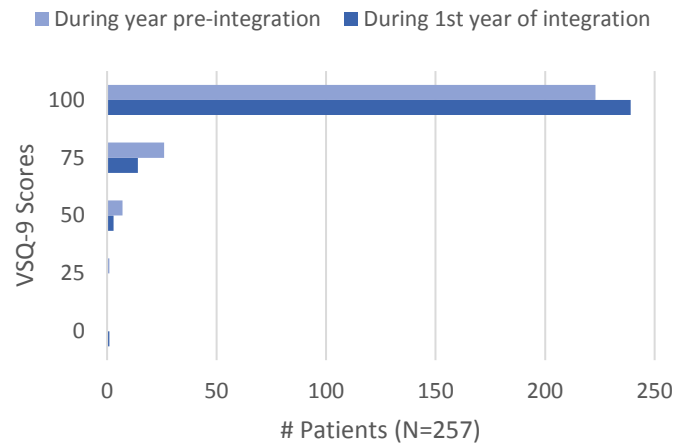| VSQ-9 Score[a]	During year before integration		During 1st year of integration	
	N	%	N	%
0	0	0	1	0
25	1	0	0	0
50	7	3	3	1
75	26	10	14	5
100	223	87	239	93

Figure 5. Change in Distribution of VSQ-9[a] Scores during the Study Period

Abbreviations: VSQ-9, 9-item Visit-Specific Satisfaction Instrument (http://www.rand.org/health/surveys_tools/vsq9.html)
[a]VSQ-9 asks patients to score 9 items on a 5 point Likert scale (0=poor, 1=fair, 2=good, 3=very good, 4=excellent) their experience during a visit with a physician or health care professional, about: 1) how long the patient waited to get an appointment; 2) the convenience of the location of the office; 3) ability to get through to office by phone; 4) length of time waiting at the office; 5) time spent with the provider; 6) explanation of what was done; 7) technical skills of provider; 8) personal manner (courtesy, respect, sensitivity, friendliness of provider); and 9) visit overall. Each response is converted to a value that can range from 0 (poor) to 100 (excellent), with intermediate potential values of 25, 50, and 75 for each person.

As Table 13 and Figure 5 show, data on patients' visit-specific satisfaction were available for 257 (11%) of the 2,295 patients at one center who received integrated care during the study period. During the year before this site began providing integrated care, the mean satisfaction score was 96 on a 0 (poor) to 100 (excellent) scale, and during the first year after the site began providing integrated care, the mean score was 98. The very high level of patient satisfaction before integration left little room for scores to increase during integration.

Two other CMHCs measured patients' overall satisfaction with the quality of care they received through the CSQ-8 Client Satisfaction Questionnaire. The CSQ-8 was developed by mental health professionals to estimate clients' general satisfaction with human service organizations (Atkinson & Zibin, 1996). Responses are scored on a 4-point scale, in which 1=Quite dissatisfied, 2=Indifferent or mildly dissatisfied, 3=Mostly satisfied, and 4=Very satisfied. The simplest scoring, shown below, entails adding the response values for each item, yielding a total of between 8 (8 x 1) and 32 (8 x 4).

Table 14. CSQ-8 Measurement of Patient Overall Satisfaction

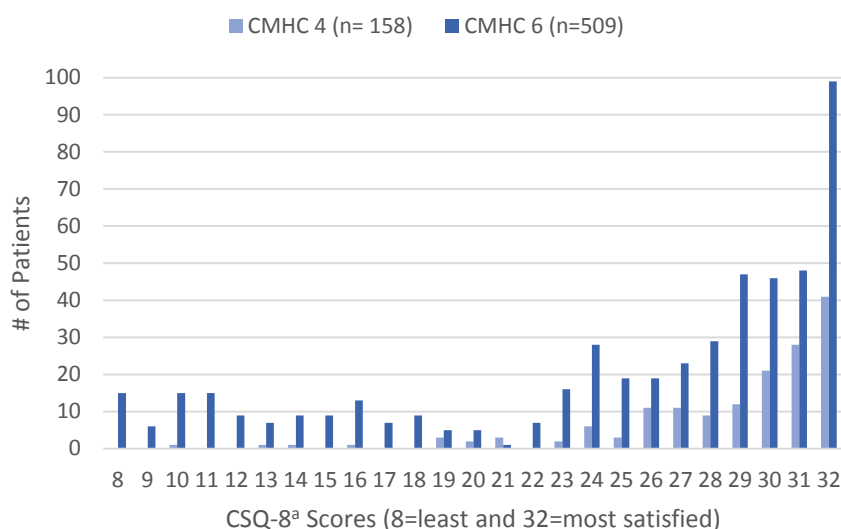| Raw Score[a]	CMHC 4 (N= 158)	CMHC 6 (N=509)
8	0	15
9	0	6
10	1	15
11	0	15
12	0	9
13	1	7
14	1	9
15	0	9
16	1	13
17	0	7
18	0	9
19	3	5
20	2	5
21	3	1
22	0	7
23	2	16
24	6	28
25	3	19
26	11	19
27	11	23
28	9	29
29	12	47
30	21	46
31	28	48
32	41	99

Figure 6. Distribution of CSQ-8 Patient Satisfaction Scores[a] from CMHC 4 and CMHC 6.

Abbreviations: CMHC indicates community mental health center; CSQ-8, 8-item Client Satisfaction Questionnaire.
[a] The CSQ-8 Patient Satisfaction Survey asks 8 questions, with responses scored on a 4-point scale, in which 1=Quite dissatisfied, 2=Indifferent or mildly dissatisfied, 3=Mostly satisfied, and 4=Very satisfied. The simplest scoring entails adding the response values for each item, yielding a total of between 8 (8 x 1) and 32 (8 x 4).

At CMHC 6, 509 patients who received integrated care completed a CSQ-8 questionnaire anonymously. Although the date of questionnaire administration was recorded, the anonymity of each questionnaire made it impossible to determine if patients completed the questionnaire before receiving integrated services and/or after. The larger bars for CMHC 6 in Figure 6 reflect the larger sample for that CMHC; however, the shapes of the distributions are similar for both CMHCs, skewed heavily toward high scores.

Patient satisfaction with care is potentially very useful for centers to track in the future, both because the patient's experience is intrinsically important and because greater satisfaction may facilitate more patient engagement in care and therefore lead to better health outcomes (Price et al., 2014).

Change in clinical indicators as a measure of health outcomes

Changes in health outcomes were measured as changes in clinical test results, using data from the seven CMHCs that were able to provide that data. Table 15 below shows the clinical conditions for patients at the seven centers where screening data for body-mass index and hypertension were available. Because patients began receiving integrated care on different dates, each measure was constructed for each patient, anchored on that individual patient's first date of integrated care. The evaluation team selected each patient's baseline value to be that recorded on the patient's first integrated care date or the most recent observation in the 90 days before that visit. In order to allow some time for exposure to integrated care, each patient's clinical values during integration were taken from the first available value between 31 and 90 days after the patient began integrated care.

Table 15. Changes in Patients' Clinical Conditions, Descriptive Statistics

	CMHC 1		CMHC 2		CMHC 3		CMHC 4		CMHC 5		CMHC 6		CMHC 7		Overall	
Clinical measure	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
BMI	2,143		699		1,314		313		206		92		51		4,818	
<25 at baseline	489	23	140	20	196	15	67	21	52	25	20	22	8	16	972	20
≥25 at baseline	1,654	77	559	80	1,118	85	246	79	154	75	72	78	43	84	3,846	80
Blood pressure	2,453		707		1,308		360		275		96		38		5,237	
Systolic																
≤140 mmHg at baseline	1,827	74	476	67	1,064	81	270	75	219	80	66	69	29	76	3,951	75
>140 mmHg at baseline	626	26	231	33	244	19	90	25	56	20	30	31	9	24	1,286	25
Controlled to ≤140 mmHg during integration	298	48	116	50	162	66	41	46	31	55	18	60	4	44	670	52
Diastolic																
≤90 mmHg at baseline	2,040	83	450	64	1,115	85	276	77	226	82	70	73	29	76	4,206	80
>90 mmHg at baseline	413	17	257	36	193	15	84	23	49	18	26	27	9	24	1,031	20
Controlled to ≤90 mmHg during integration	247	60	120	47	138	72	34	40	31	63	12	46	4	44	586	57

Abbreviations: BMI indicates body-mass index; CMHC, community mental health center; HbA1c, glycated hemoglobin.
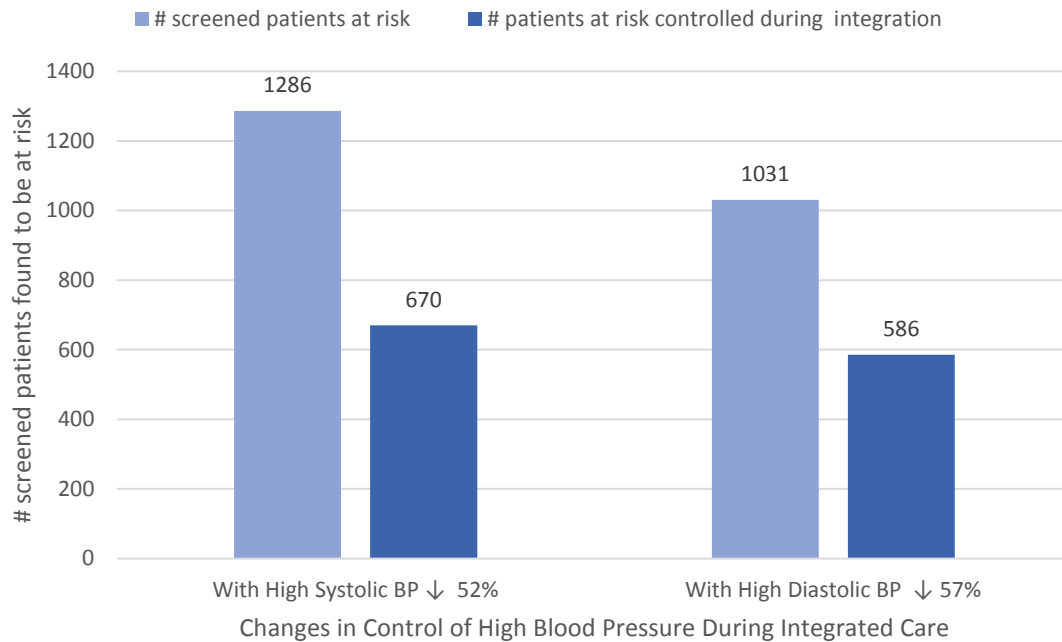
Figure 7. Improvements in Patients' Blood Pressure Control during First Ninety Days of Integration

Table 16 shows associations between receipt of integrated care and blood pressure, controlling for additional factors expected to affect these outcomes, such as the duration of integrated care before each patient's outcome value was measured, patient demographics, health insurance status (Chwastiak et al., 2012; Gleason et al., 2014), and CMHC.

As noted previously, the evaluation team selected each patient's baseline value to be that recorded on the patient's first integrated care date or the most recent observation in the 90 days before that visit. In order to allow some time for exposure to integrated care, each patient's clinical values during integrated care were taken from the first available value between 31 and 90 days after the patient began integrated care.

Table 16. Regression Results for Changes in Key Outcomes during Integrated Care

Measure	Clinical measures of disease control			
	SBP N=2,532	p-value	DBP N=2,028	p-value
Key independent variables				
Receipt of integrated care	-14.51	***	-9.41	***
Duration of integrated care before post measure	-0.01		0.00	
Covariates				
Sex (male)	0.94		0.40	
Age	0.24	*	0.00	
White	-0.91		-1.94	*
Insured	-0.28		-0.36	
CMHC 2	-1.16		1.39	*
CMHC 3	-6.42	***	-2.94	***
CMHC 4	-0.82		1.12	***
CMHC 5	-4.45	***	-0.75	*
CMHC 6	-0.47		0.24	

Abbreviations: BP, blood pressure; CMHC, community mental health center; DBP, diastolic blood pressure.
There are sometimes different sample sizes for SBP and DBP because sometimes someone had only one value that was uncontrolled at baseline.
 * $p < .05$, ** $p < .01$, *** $p < .001$. All models use robust standard errors to account for potential heteroscedasticity and correlated outcomes within study sites.

On average, systolic blood pressure decreased 15 points for initially hypertensive patients who received integrated care and diastolic blood pressure decreased 9 points, controlling for patient and project-specific attributes that might also affect changes in these values. Additional analyses showed that neither overall ANSA level nor ANSA substance abuse indication affected the coefficient for receipt of integrated care. Because those values were not available for a large number of patients, the final models shown here omitted those measures.

Hospital use as a cost-related outcome

Integrating mental health and primary care for people with SMI is intended to reduce the need for emergent care by improving disease prevention and management. One key indication of success is how often people need any hospital care. In addition, length of hospital stay is a commonly used indicator of inpatient-related resource use. Prior studies have generally, although not always (Pirraglia et al., 2012), found the integration of primary health care into mental health care services to be associated with fewer emergency department visits (Boardman, 2006; Druss, Rohrbaugh, Levinson, & Rosenheck, 2001; HealthNet, 2013).

Tables 17 - 21 descriptively profile patients who had a hospital encounter during the study period, beginning with demographic information. Despite the differences in samples between the analyses of hospital use and the analyses focusing on quality and health outcomes, patient demographics were generally similar between summary statistics derived from CMHCs (Tables 3 - 6) and hospital discharge data from THCIC (Table 17, Table 18, and Table 20). The most notable difference was a lower percentage of White patients represented in the discharge data (Table 17), with 58% White in the discharge data sample versus 70% among all patients reported by the CMHCs as receiving integrated care (Table 3).

Table 17. THCIC Demographic Data for Patients with a Hospital Encounter during Study Period

	CMHC 1 (N=1,165)		CMHC 2 (N=1,301)		CMHC 3 (N=868)		CMHC 4 (N=374)		CMHC 5 (N=77)		CMHC 6 (N=114)		CMHC 7 (N=44)		Overall (N=3,943)	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Sex, n (%)																
Male	366	31	596	46	441	51	165	44	46	60	47	41	25	57	1686	43
Female	799	69	705	54	427	49	209	56	31		67	59	19	43	2257	57
Age, years mean±SD	43±16		44±13		40±13		42±12		46±11		41±115		45±12		43±14	
Age range	18-101		18-101		18–96		18-72		22-65		22-64		21-80		18-101	
Race																
White	724	62	460	35	643	74	289	77	48		89	78	23		2276	58
Non-white	441	38	841	65	225	26	85	23	29		25	22	21		1667	42
Ethnicity																
Hispanic	414	36	136	10	751	87	216	58	2	3	1	1	15		1535	39
Non-Hispanic	751	64	1,165	90	117	13	158	42	75		113	99	29		2,408	61

Abbreviations: CMHC, community mental health center: SD, standard deviation; THCIC is Texas Health Care Information Collection.

Data on patient health insurance status, shown in Table 18, were drawn from primary and secondary payer fields within the THCIC data. When more than one payer source appeared in a patient's record, Medicare was coded to override private insurance, on the basis that the private coverage was likely to be supplemental. Medicaid was coded to override Medicare, as this was considered an indicator of dual eligibility; patients with dual eligibility tend to have very low incomes, making these individuals in that respect generally more similar to the Medicaid than the Medicare population. Charity care, indigent, THCIC/uninsured, and self-pay were all categorized as uninsured. The final category, "Other insured" includes all categories of private insurance or similar coverage, e.g., Aetna, non-Medicaid Amerigroup, Blue Cross Blue Shield of Texas, and CHAMPUS.

Table 18. THCIC Insurance Status for Patients with a Hospital Encounter during Study Period

	CMHC 1 (N=1,165)		CMHC 2 (N=1,301)		CMHC 3 (N=868)		CMHC 4 (N=374)		CMHC 5 (N=77)		CMHC 6 (N=114)		CMHC 7 (N=44)		Overall (N=3,943)	
Insurance status	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Uninsured	403	53	348	27	591	68	275	74	48	62	75	66	7	16	1749	44
Insured																
Medicaid	313	27	437	34	72	8	15	4	5	6	9	8	3	7	854	22
Medicare	148	13	308	24	53	6	19	5	1	1	10	9	10	23	549	14
Other insured	299	26	208	16	152	18	65	17	23 (30)	30	20	18	24	55	791	20

Abbreviations: CMHC indicates community mental health center; THCIC is Texas Health Care Information Collection.

More than 40% of patients represented in the THCIC data were uninsured (Table 18). Although much higher than the Texas 16% average uninsured rate, this is also much lower than the 62% derived from CMHC data (Table 6). The CMHC data better fit the general perceptions of CMHC leadership that the majority of their patients are uninsured. It is possible that hospitals are less likely to admit uninsured patients.

In order to compare hospital encounters before and during integration, the research team measured hospital encounters in the year just before each patient began receiving integrated services and during the first year of these services. Each patient's most recent hospital encounter within the year prior to the first integrated care encounter was used to indicate pre-integration hospital use. The first hospital encounter after at least 30 days of receiving integrated care was used to measure hospital use during integrated care. The 31 day minimum duration of integrated care was used to allow integrated services time to affect patient need for emergent care.

Referral sources for hospital encounters (Table 19) were categorized as physician; clinic; another health care facility (hospital, skilled nursing facility, psychiatric hospital, substance abuse facility, rehabilitation hospital, or critical access hospital); courts or law enforcement; or unknown. As there could be multiple referrals for a single hospital encounter, the total number of referrals in the two-year study period was larger than the number of unique patients who experienced hospital encounters in each year.

Table 19. Hospital Referral Sources Shown in THCIC Data

	CMHC 1 (N=1,165)		CMHC 2 (N=1,301)		CMHC 3 (N=868)		CMHC 4 (N=374)		CMHC 5 (N=77)		CMHC 6 (N=114)		CMHC 7 (N=44)		Overall (N=3,943)	
Total hospital encounters with referrals source	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
During year pre-integration	694		945		690		249		68		87		37		2,770	
During 1st year	679		647		504		195		26		40		16		2,107	
Types of referral sources, n (% of total referrals that year)																
Physician																
During year pre-integration	453	65	362	38	368	53	188	76	41	60	35	40	11	30	1,458	53
During 1st year	467	69	309	48	320	63	144	74	19	73	22	55	12	75	1,293	61
Clinic																
During year pre-integration	103	15	258	27	28	4	13	5	7	10	7	8	7	19	423	15
During 1st year	74	11	174	27	29	6	9	5	4	15	5	13	1	6	296	14
Transfer from another health care facility																
During year pre-integration	85	12	115	12	103	15	26	10	17	25	2	2	12	32	360	13
During 1st year	121	18	80	12	49	10	20	10	3	12	1	3	1	6	275	13
Courts/law enforcement																
During year pre-integration	50	7	196	21	189		21	8	3	4	43	49	1	3	503	18
During 1st year	16	2	78	12	104		16	8	0	0	12	30	0	0	226	11
Information not available																
During year pre-integration	3	0	14	1	2		1	0	0	0	0	0	6	16	26	1
During 1st year	1	0	6	1	2		6		0		0	0	2	13	17	1

Abbreviations: CMHC is community mental health center; THCIC is Texas Health Care Information Collection.

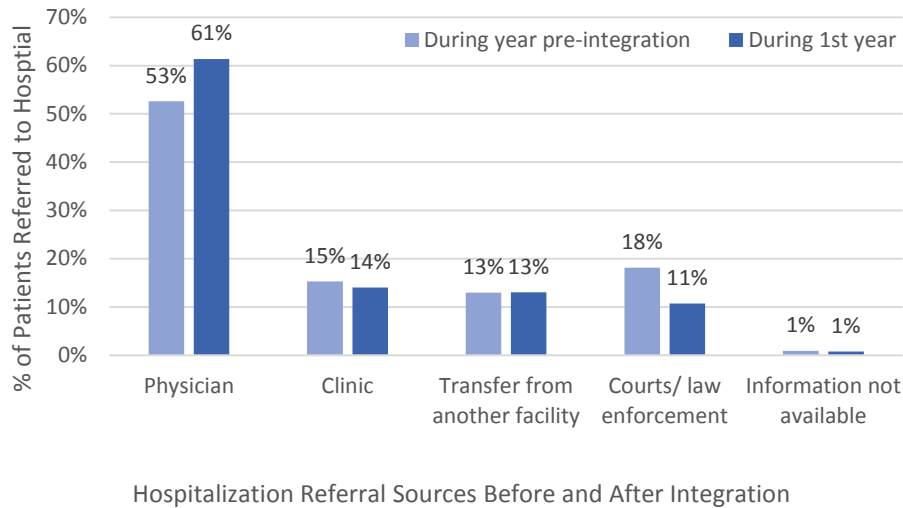Hospitalization Referral Sources Before and After Integration

Figure 8. Referral Sources for Hospital Encounters during Study Period

Figure 8 shows a shift in the distribution of referral sources into hospitals during the first year of integration, with an increasing percentage coming from physicians and a decreasing percentage from courts or law enforcement.

The best proxy available in discharge data for patients' severity of illness is the 3M™ All Patient Refined Diagnosis Related Groups (APR-DRG). Unlike previous patient classification systems that used only facility resources needed to treat different categories of patients, the APR-DRG adjusts disease-specific diagnostic groups by patient age, four levels of illness severity, and four levels of mortality risk. The four Diagnosis Related Group levels, with examples from diabetes, are:

Level 1: Minor. *Example*: Uncomplicated Diabetes

Level 2: Moderate. *Example*: Diabetes with Renal Manifestation

Level 3: Major. *Example*: Diabetes with Ketoacidosis

Level 4: Extreme. *Example*: Diabetes with Hyperosmolar Coma

Source for examples: Lyons, 2012 (slide 12).

3M™ APR-DRGs are widely used for risk adjustment by providers, payers, and for public reporting (Goldfield, 2010). Below in Table 20, the descriptive statistics show the levels of severity associated with hospital encounters for CMHC patients receiving integrated care. The statistics shown are from the year before each patient began receiving integrated care as an indication of patients' baseline hospital-related severity.

Table 20. Patients' 3M™ All Refined Diagnosis Related Groups Levels

	CMHC 1 (N=1,165)		CMHC 2 (N=1,301)		CMHC 3 (N=868)		CMHC 4 (N=374)		CMHC 5 (N=77)		CMHC 6 (N=114)		CMHC 7 (N=44)		Overall (N=3,943)	
Baseline 3M™ APR-DRG Level	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Level 1 (Minor)	486	42	554	43	366	42	144	39	22	29	53	46	17	39	1,642	42
Level 2 (Moderate)	458	39	586	45	439	51	178	48	40	52	53	46	21	48	1,775	45
Level 3 (Major)	180	15	136	10	48	6	42	11	12	16	6	5	6	14	430	11
Level 4 (Extreme)	41	4	25	2	15	2	10	3	3	4	2	2	0	0	96	2

Abbreviations: *3M*™ APR-DRG is All Patients Refined Diagnosis Related Groups; CMHC, community mental health center.

Consistent with previous research (Shen, 2003), this study found that among patients receiving integrated care for whom discharge data were available, most hospital encounters were for minor to moderate severity conditions.

The key cost-related outcomes for the current report were hospital encounters and length of stay. In general, hospital encounters indicate either a patient's poor health or an inappropriate setting for care when a patient with minor or moderate illness severity is treated in a hospital. Hospital encounters are also costly. Hence, one intention of integration was to reduce hospital encounters for non-emergent illness that could be better treated in an outpatient setting. Length of stay was measured as the mean number of days per hospital encounter.

Table 21. Hospital Encounters and Length of Stay during Study Period

Characteristic	CMHC 1 (N=1,165)	CMHC 2 (N=1,301)	CMHC 3 (N=868)	CMHC 4 (N=374)	CMHC 5 (N=77)	CMHC 6 (N=114)	CMHC 7 (N=44)	Overall (N=3,943)	p-value for change
Hospital encounters, n									
During year pre-integration	0.85	1.37	1.32	1.01	1.23	1.14	1.52	1.16	
During 1st year	0.80	0.91	1.25	0.83	0.64	0.45	0.68	0.92	***
Mean length of stay per hospitalization, days									
During year pre-integration	3.43	9.55	6.36	4.44	7.75	9.72	6.66	6.50	
During 1st year	2.17	4.31	3.07	2.42	3.61	2.52	2.00	3.14	***

Abbreviations: CMHC indicates community mental health center.
* $p < .05$, ** $p < .01$, *** $p < .001$.

The descriptive statistics in Table 21 above show decreased frequency of hospital encounters and shorter lengths of hospital stays for patients receiving integrated care. Independent sample t-tests indicated that these changes were statistically significant ($p < .001$).

As shown below in Table 22 and Table 23, the decrease in hospital use found in prior studies among patients with SMI receiving integrated care was replicated in the current diverse sample of Texas CMHCs, relative to both overall hospital encounters and length of stay. The coefficient for the key predictor in each model represents the effect of receiving integrated care on hospital use (Buntin & Zaslavsky, 2004). Each model also controls for other factors likely to affect hospital use, such as illness severity and patient demographics, in order to isolate the effect of integrated care.

Table 22. Logit Regression Predicting Hospital Encounters in 1st Year of Integrated Care (N=3,943 patients)

	Hospital encounters during 1st year of integration	
	Coefficient	p-value
Key independent variable		
Receipt of integrated care	-0.76	***
Covariates		
3M™ APR-DRG Level (severity of illness and risk of mortality)		
Level 2 (Moderate)	0.09	***
Level 3 (Major)	0.05	
Level 4 (Extreme)	0.07	
Sex (male)	0.15	***
Age	0.00	
Race—Non-White	0.05	
Ethnicity—Hispanic	-0.02	
Insurance		
Medicaid	0.05	
Medicare	0.22	
Other insurance	-0.01	
CMHC #		
1	-0.18	***
3	0.30	***
4	-0.08	
5	-0.12	*
6	-0.21	***
7	0.00	

Abbreviations: Abbreviations: 3M™ APR-DRG is All Patients Refined Diagnosis Related Groups; CMHC, community mental health center. 3M™ APR-DRG levels correspond to a patient's illness severity and risk of mortality: Level 1=minor severity of illness and risk of mortality; Level 2=moderate severity of illness and risk of mortality; Level 3=major severity of illness and risk of mortality; Level 4=extreme severity of illness and risk of mortality.
$* p < .05, ** p < .01, *** p < .001$.

As Table 22 above shows, patients were less likely to have a hospital encounter during their first year of integrated care. Translating the logit coefficient into an average marginal effect enables us to speak in terms of probabilities. An average marginal effect estimates the population-averaged marginal difference in the probability of an outcome associated with a one unit change in a predictor. The difference in probability was estimated using the margins command in Stata. Because the initial probability of a hospital encounter (expressed as a percentage) is compared to a second probability (also expressed as a percentage), that decrease in probability of a hospital encounter in the first year of receiving integrated services is reported as a decrease of 18 percentage points (p < .001) (Wooldridge, 2003, pp. 681-682).

Table 23. Ordinary Least Squares Regression Predicting Length of Stay in 1st Year of Integrated Care (N=3,943 patients)

	Length of stay during 1st year of integration	
	Coefficient	p-value
Key independent variable		
Receipt of integrated care	-0.39	***
Covariates		
3M™ APR-DRG Level (severity of illness and risk of mortality)		
Level 2 (Moderate)	0.02	
Level 3 (Major)	0.05	
Level 4 (Extreme)	0.45	***
Sex (male)	0.15	***
Age	0.00	
Race—Non-White	0.03	
Ethnicity—Hispanic	0.03	
Insurance		
Medicaid	-0.22	***
Medicare	0.10	*
Other insurance	-0.16	***
CMHC #		
2	0.44	***
3	0.36	***
4	0.08	*
5	0.35	***
6	0.43	***
7	-0.39	***

Abbreviations: Abbreviations: 3M™ APR-DRG is All Patients Refined Diagnosis Related Groups; CMHC, community mental health center. 3M™ APR-DRG levels correspond to a patient's illness severity and risk of mortality: Level 1=minor severity of illness and risk of mortality; Level 2=moderate severity of illness and risk of mortality; Level 3=major severity of illness and risk of mortality; Level 4=extreme severity of illness and risk of mortality.;
* $p < .05$, ** $p < .01$, *** $p < .001$.

Length of stay was modeled using ordinary least squares regression, with this outcome log-transformed to reduce skew in its distribution (Manning & Mullahy, 2001). As Table 23 shows, patients who received integrated care had shorter lengths of stay. This effect size was calculated as $100*(\exp^{(-0.39}-1))$, incorporating an adjustment necessary when the predictor is a binary measure and the outcome is log-transformed (Halvorsen & Palmquist, 1980). The resulting estimated effect of receiving integrated care was a decrease of 32% in average length of stay during the first year of integration.

In the current sample, patients who had hospital encounters during the two year study period had an 18 percentage point average decrease in the likelihood of such events in the year after beginning integrated services. To estimate the associated cost savings, we treated the estimated mean pre-integration hospital encounter cost for patients in the sample of $7,898 as 100% of the

baseline cost per hospital encounter. This enabled us to treat the 18 percentage point decrease in likelihood as an 18% decrease.[1]

Then, we multiplied $7,898 x 0.18 to get $1,442 for the average estimated price savings due to patients' reduced likelihood of having hospital encounters after beginning integrated care. There was substantial variation around that 18 percentage point estimate, with a 95% confidence interval of 9 – 26 percentage points, so we decided to characterize the average related savings conservatively, as exceeding $1,000.

Hospital costs tend to be higher in the first day than in subsequent days, so the additional price savings related to the 32% reduction in length of stay during integration were less than a third of the cost of an encounter. Nonetheless, given a mean decrease of 3 days (0.32 x 9.36 days pre-integration), savings from avoided accommodation costs alone were estimated at $1,324 (0.32 x $4,138 average pre-integration accommodation cost per hospitalization). The distribution of hospital stays in these data was very skewed, ranging from 1 to 295 days. As a result, the median length of stay of 4 days was much shorter than the mean of 9 days, in the year before integrated services began. Hence, the most frequent length of stay before integrated services was 4 days. However, we used the 9 day mean to estimate cost savings because the savings derived largely from individuals who had had atypically long hospital stays. As there was some variation around the 32% decrease in length of stay, with a 95% confidence interval of 30 – 35%, we characterized the average length of stay savings modestly as exceeding $1,200 per hospitalization.

Thus, overall, results show significant improvements at the participating CMHCs in screening patients for risk factors, controlling hypertension, and reducing hospital use. However, leadership expressed concerns about the ability of CMHCs to maintain these improvements for their patients in the future.

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[1] The same percentage point change can translate into very different % changes depending on the baseline %. For instance, an 18 percentage point decrease from 100% is 18%, but an 18 percentage point decrease from 50% = 0.5 – 0.18, that is, a 32% decrease. We chose the 100% both because it was a reasonable representation of an event that had occurred, and because the resulting % decrease yielded the most conservative cost savings estimate possible.

Concerns about Sustainability

Although some executives outlined plans to sustain at least some integrated services through earned income if the Texas 1115(a) Medicaid waiver funding ends, the majority saw a need for continued government support.

> *This project is at risk because indigent clients simply can't pay for their care. So someone, Medicaid, or the state, or the federal government, needs to pay.* Administrator

> *I think our schedule breaks out $0.00, and then the next step up is $3.00, and then $5.00, and then $10.00, which is probably not exactly sustainable at those rates.* Administrator

> *In the absence of some sort of Medicaid roll out, it's going to be difficult for anybody who has one of these projects.* Medical Director

Such concerns about sustainability appear to be common for integrated primary-mental health programs nation-wide (Scharf et al., 2013), especially in light of continuing uncertainty about the future of Medicaid.

CONCLUSIONS

Project Structure and Functioning

As planned, the projects in the study sample grew substantially during the year between initial and second interviews, despite the high turnover that characterizes public mental health care and other challenges. The increased numbers of patients served is especially impressive given frequently persisting difficulties recruiting patients at other behavioral health homes around the country (Scharf et al., 2013).

Common elements of integration included physically escorting patients between mental and physical health care, shared integrated health records, staff responsible for coordinating between mental and physical health care providers, and health coaching. Few CMHCs were able to provide on-site pharmacy or dental services, which would further improve holistic care for this underserved population.

The process of extracting patient data for this study helped clarify which data each CMHC had and how to translate them into use within analyses. In a prior study of SAMHSA-funded behavioral health homes, data management was cited more frequently as problematic after a year than at baseline (Scharf et al., 2013), suggesting that other CMHCs as well may learn more about data-related constraints as they seek to employ these systems more fully. Some ways of building CMHC data capacity may include increasing IT staffing and using external consultants for help with data standardization, interoperability, and governance. Next steps might include a series of very small pilot projects scheduled so as not to coincide with reporting to the Texas Department of State Health Services and the Texas Health and Human Services Commission.

Staff Experiences of Integrated Care

The overall quality of coordination between primary and mental health care providers was good, with mental health care providers perceiving somewhat less frequent need for input from PCPs than vice versa. Staff members in both primary care and mental health care appreciated having ready access to colleagues with complementary expertise and found that comparing information across disciplines allowed for more accurate diagnoses and appropriate treatment plans. Although the more frequent communication required for providing integrated care sometimes increased the complexity of providing care, that information sharing led to faster recalibration of treatment and medication adjustment, better care for patients, and higher satisfaction among patients receiving integrated care.

Patients Experiences of Integrated Care

Access to integrated care was generally quick and included the option of walk-in appointments. Common elements of integration included physically escorting patients between mental and physical health care, and providing care coordination and follow-up with patients. Patients commented on being more comfortable receiving primary care in a familiar setting, and found that integrated care helped them better understand their health and medications and increased their engagement in self-management of health behaviors and disease conditions.

Outcomes: Quality, Health, and Costs

Consistent with prior research, screening rates for body mass index, blood pressure, smoking, and HbA1c increased very substantially for patients receiving integrated care (Boardman, 2006; HealthNet, 2013; Kilbourne et al., 2011; Pirraglia et al., 2012). Patient and provider satisfaction with integrated care was high.

Of the patients initially identified as having high blood pressure, more than half had subsequent values demonstrating controlled blood pressure within 90 days after beginning integrated care. CMHCs that employed PCPs directly tended to have higher screening rates for body mass index and blood pressure, as well as more improvement in blood pressure for patients with hypertension.

One purpose of the current analyses was to determine whether integrating primary health care into mental health care for patients with SMI reduced hospital use. The results indicate that, as hypothesized, in the first year of receiving integrated care, these patients' probability of hospital encounters decreased by 18 percentage points ($p < .001$) and on average, patient length of stay decreased by 32% ($p < .001$). While some hospital encounters are planned, i.e., for medication recalibration, in general, reduced hospital use suggests better quality of life for patients because of fewer acute illness-related episodes and fewer hospital encounters for non-emergent illnesses, as well as reduced costs for the system. For these patients with hospitalizations, less frequent hospital use after receiving integrated care was associated with cost savings exceeding $1,000 per patient per year and the one third reduction in length of stay during integration yielded additional savings of more than $1,200 per hospitalization.

Study Strengths and Limitations

Although a comparison study of patients who received integrated mental health-primary care with those who did not would be the optimal method for isolating the effects of integrated care on outcomes, pre/post studies such as this one are commonly used (Pirraglia et al., 2012; HealthNet, 2013). The magnitudes and statistical significance of changes in screening rates, blood pressure levels, and hospital use also bolster the credibility of the current study.

The CMHCs in this study have made substantial progress in providing holistic health care for their patients and have demonstrated their capacity to quantify outcomes. Participating and other CMHCs may build on lessons learned during the patient data extraction and analysis stage of this study to build capacity for internal process improvement and to demonstrate value to external stakeholders.

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APPENDIX

CMHC Current and Potential Program Evaluation Data Capacity

The CMHCs that participated in this study have a wealth of raw data, which currently appear to be used to inform individual treatment planning and for specific aggregate reporting, such as to the Texas Department of State Health Services and to the Texas Health and Human Services Commission for Delivery System Reform Incentive Payment projects. This section of the report draws on experiences in the current study to identify options for enhancing capacity for future program evaluations within and across CMHCs beyond current requirements.

Specific conclusions from this study

The first data management task was developing rosters of patients who had received integrated care. CMHC identifier, in some instances site and sometimes also unit within site, case number, patient first name, middle name, last name, date of birth, gender, and age were used collectively to build rosters of patients who had received integrated care. The primary challenges in roster construction related to identifying which variables to use; where and how these variables were stored; and how, when, and by whom these could best be attained and transferred for data cleaning and analyses. There were no notable issues with gender.

Perhaps the data with the greatest capacity for improvement were race and ethnicity, which were generally inconsistently recorded across CMHCs. For example, a CMHC may use race and ethnicity data collection for other reasons, such that a code of "W" or "H" has different meanings across centers. Coding for race and ethnicity is also complicated by instances in which a patient is White and Hispanic or identifies with multiple races or ethnicities. Due to the varied nature of data collection among the sites, the study team classified race for this study simply as White and not White, and ethnicity as simply Hispanic and not Hispanic. In the staff interviews and patient focus groups, staff and patients self-identified as White, Black, Hispanic, other, or more than one category, so those designations were used for those study populations.

There were several variations of ANSA measures across CMHCs, but the differences were minor and easy to manage. The study team believes that overall ANSA levels of care, as well as the ANSA substance use level, are the best available ways to examine services within relatively comparable levels of patient behavioral health. This makes ANSA a prime candidate for including in records for all patients and to pilot data pulls from sites to include these measures in future analyses.

All CMHCs had health insurance classifications for their patients. Two CMHCs had already broken out insurance status into Medicaid, Medicare, and other. The other sites worked with Dr. Kite to generate these categories. Breaking out the type of insurance in this manner, as opposed to the simpler insured/uninsured categorization required for Delivery System Reform Incentive Payment reporting, may be useful for analyses of programs that may be affected by patient access to other providers, which can differ across insurance types.

Variables related to screening included CMHC visit codes, visit descriptions, visit indicators, dates of service, lab results, and clinical values. Establishing each patient's initial date of integrated care depended on the CMHC visit codes and descriptions. Further classifications were necessary pertaining to the classification of clinical values to visit type, and of lab results to visit dates of service and visit type. Most sites determined the answers to these questions by

navigating the situations as they arose during data cleaning in preparation to share data with the study team.

The clinical variables utilized were body mass index, smoking status, blood pressure, and HbA1c. Several CMHCs had reliable data for these measures; a next step for these CMHCs could be establishing parameters for identifying out-of-range values.

The last categories of variables were outcomes related to patient satisfaction, quality of life, and health status. These variables were generally used for operations management within sites. A next step might be to standardize at least one of these variables for analyses of patients across sites.

Key take-aways

- Delivery System Reform Incentive Payment has been the first statewide opportunity to fund CMHC development of physical health data systems. In the future, as payers support physical and behavioral health integration, the recommendations outlined here may guide such information system advancement.
- CMHCs collect and keep data for operational purposes, as well as for reporting to such entities as the Texas Department of State Health Services and the Texas Health and Human Services Commission. This capacity might be expanded for additional internal quality improvement as well as for demonstrating value to payers. For example, several CMHCs have patient baseline clinical data, and all have the ability to establish these data. These could be standardized and future analyses of change related to new variables could then control for potential confounding related to patient attributes.
- A next step could be data cleaning based on small pilot data pulls. A practical starting point would be focusing first on data access and transforming data from unstructured to structured formats.
- Data capacity for future comparative analyses could be enhanced by listing the clinical variables CMHCs use in current operational reports, and how and by whom these are accessed. Given that most CMHC personnel are already heavily tasked, it might be worth hiring an outside consultant to draft plans addressing what data are collected, who collects these data, the logistics of data storage, who owns the data, who has access, for what purposes the data are used and by whom, and a process for updating data. Such data governance plans can be developed with third party tools such as IBM's InfoSphere Information Governance Catalog. Another option would be to hire a single biomedical informatician or a business consultant to work with multiple CMHCs.
- As new regulations and reporting opportunities arise, these data governance plans could be the starting place for additional pilot data pulls to catch any problematic issues before requiring major personnel time under the pressure of deadlines.
- It may also be useful to compile cross-CMHC comparable measures of interest to both CMHCs and external stakeholders, such as the state and other payers.
- Finally, articulating workflow charts with mapped data points can show relationships between workflows and data to reveal opportunities for improvement. For example, nurses may collect raw clinical data for patients at the end of their workflow, and then physicians may use these data at the beginning of their workflow to compare new data to patients' prior values. Articulating such processes opens the door for discussion of how to collect new integrated information. This may in turn make information retrieval easier for

clinicians as well as show aggregate patient care patterns and thus inform additional clinical improvement. On a larger scale, such processes may also allow for comparison of trends and best practices across sites.