Can People Who Have Experience with Serious Mental Illness Help Peers Manage Their Health Care?

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Abstract

Background. The physical health of individuals with serious mental illness is severely compromised. Consistent evidence shows that individuals with a serious mental illness have higher rates of morbidity for common health conditions compared with those of people who are not mentally ill, and they are dying 10-30 years before their non–mentally ill peers. This early mortality is largely due to preventable and treatable physical health conditions in this population.

Objective. To address the disparity in early mortality rates, the seriously mentally ill population needs interventions that improve self-management of health and health care. The Bridge is a comprehensive health care engagement and self-management intervention that teaches outpatient mental health participants the skills they need to improve their access to and use of health care. The intervention lasts approximately 6 months and is delivered by trained mental health peers. It is manualized and uses motivational and behavioral strategies as well as psychoeducation to activate and engage participants in their health and health care. The intervention is delivered primarily in the community settings in which participants receive physical health services.

Methods. Participants were recruited from a large community mental health agency in Southern California that did not provide onsite primary health care. A total of 151 consumers with serious mental illness were randomized to receive either usual mental health care plus the Bridge intervention (n = 76) or usual mental health care while on a 6-month waitlist (n = 75). The waitlist group received the intervention after 6 months. The mean age of the sample was 46.9 years old; the gender balance was roughly equal (54% female). Race/ethnicity was Hispanic/Latino (60%), Caucasian (25%), African American (8%), and other/mixed race (7%).

Data were collected in 3 waves, with 6-month intervals between assessments. Change score comparisons were conducted for baseline (pretreatment) to 6 months (posttreatment) for the treated versus usual care group. Direct primary outcomes included use of routine health care services, use of emergency and urgent care services, preferred locus of health care, global satisfaction with health care, quality of relationship with primary care provider, attitudes about health care self-management, and self-management behaviors. Indirect primary outcomes included health screenings, detection of undiagnosed medical conditions, global health rating, health symptoms, pain levels, physical health medications, and interference with daily activities. Secondary outcomes included mental health and

functional status, use of psychiatric medication, health habits, internalized and provider stigma, and life satisfaction.

   Results. The 6-month attrition rate was 18.5%: 123 subjects participated in the 6-month posttreatment assessment. In terms of outcomes, change score comparisons (difference of differences) of the treatment versus the waitlist group revealed that the former showed significantly greater improvement in the primary outcomes of access to and use of primary care health services, decreased preference for emergency or urgent care or avoiding health services altogether, increased preference for primary care clinics, higher quality relationship with the primary care provider, improved detection of medical conditions, reductions in pain, and increased confidence in self-management of health care. No significant changes were found in number of health screenings, number of health symptoms, use of emergency/urgent care services, satisfaction with health care, interference with daily activities, behaviors of self-management, or in the secondary outcomes for the treated group in comparison with the waitlist group.

   The gains in the immediate intervention group had not significantly declined at 6 months after the end of the intervention. In fact, 2 indicators reflected further improvement: members of this group reported significantly fewer emergency room/urgent care visits and significantly more behavioral self-management than they had immediately after the intervention. After both groups (immediate treatment and waitlist) had completed the intervention, we combined the effects and found statistically significant improvements from pretreatment on most of the primary outcomes and some secondary outcomes.

   Conclusions. The Bridge intervention is a promising peer-delivered intervention to address the physical health and health care needs of individuals with serious mental illness. Future work should optimize this intervention so that its effects can be improved.

Introduction

The physical health of individuals with serious mental illness (SMI) is severely compromised. Systematic reviews show evidence that individuals with a SMI die 10-30 years before their non–mentally ill peers. [1-3] There are many reasons for this early mortality, but it is primarily due to preventable and treatable physical health conditions that are more prevalent and undertreated in this population. Individuals with SMI have higher rates of multiple chronic health conditions such as diabetes, high blood pressure, high cholesterol, obesity, viral hepatitis, chronic obstructive pulmonary diseases, and cancer.[4] It is essential that we address these conditions in the seriously mentally ill population, not only because of their reduced quality of life and early mortality but because the cost of care for chronic conditions is increasing rapidly. In 2002, treatment for chronic conditions cost approximately \$331.9 billion; by 2013, costs had nearly doubled to \$623.8 billion.[5] The higher rates of these conditions among those with SMI are attributable to poor health care and lifestyle habits, taking psychoactive medications, and disparities in health care at the system, provider, and patient levels.[2]

A critical need exists to address the factors that hinder effective treatment of the physical health of individuals with SMI. Numerous strategies are being employed to coordinate the care of this population, but only a few include self-management as a critical ingredient in the interventions[6] , and many focus on the management of specific diseases rather than on access to and use of routine health care services across medical conditions. One commonality among integrated care models[7] is that they require an activated patient who can navigate a productive relationship with care providers. The purpose of this study is to assess the effectiveness of an intervention designed to help individuals with SMI connect with high-quality and appropriate physical health care services and to increase their self-management of health and health care. We predicted that those who received the intervention would show improvement on primary outcomes such as preference for and use of primary care services, less use of emergency and urgent care services, connection with and improved relationship with a primary care provider, improved self-management, higher rates of screening and disease detection, higher global satisfaction with health and health care, less pain, and better mobility and activity levels. We also examined the intervention's impact on several secondary outcomes, such as mental health functioning, satisfaction with life, stigma, and lifestyle health habits.

Description of the Bridge Intervention

Theoretical framework for peer health navigation. Improving the physical health of people living with SMI is a complex undertaking owing to numerous factors at the individual, provider, and health care system levels and the broader geographic and sociopolitical environment. Our conceptual model[8] tailors Gelberg, Andersen, and Leake's Behavioral Model of Health Service Use for Vulnerable Populations to individuals with SMI.[9] Gelberg and colleagues posit that health services use is determined by a combination of *predisposing characteristics* (demographic, health beliefs), *enabling resources* (personal/family), *need for care* (perceived and evaluated), and *personal health care habits* (diet, exercise). This model includes not only factors that lead to health care use but also factors that impact the effectiveness of those services. To tailor this model for people with SMI, we considered some important factors that suppress the use of health services in this population; namely, severe psychiatric symptoms and their treatment, stigma, and system bifurcation.

The adapted model's *predisposing* domain indicates that even if services are accessed, clients with SMI may be predisposed to have negative experiences with physicians because cognitive defects and symptoms of their disorders can make communication difficult and stressful[10] and can make it hard to adhere to treatment regimens or follow a physician's instructions. In the *need* domain, clients' perceptions and clinicians' evaluations of their physical health status can be influenced by the presence of SMI.[8-9,11] Physical health treatment and preventive care might be less of a priority than dealing with active psychiatric symptoms, financial security, and maintaining stable housing.[12-14] Personal health behaviors play an important role in service needs.[8-9] Diet, exercise, self-care habits, and substance use can have a powerful effect on health status.[15] Even if health habits are not poor, second-generation antipsychotic medications have been linked to weight gain, dyslipidemia, diabetes, insulin resistance, metabolic syndrome, and increased mortality.[10,16-19] Finally, some physical health providers exhibit stigmatizing attitudes and avoidance behaviors toward individuals with SMI,[20] which can result in those individuals avoiding health care or receiving a poor quality of physical health care.[20]

System bifurcation—the separation of physical and mental health services—is a serious issue for those with chronic mental and physical health issues. At the system level, 4 types of bifurcation can create hardships for persons with SMI: (1) *geographic*, or lack of accessible medical services; (2) *financial*, including but not limited to separate funding streams for medical and mental health services; (3) *organizational*, or difficulty in sharing information and expertise across these systems; and (4) *cultural*, whereby providers focus on particular symptoms or disorders rather than on the persons with

those problems.[21] Bifurcation discourages people with a mental illness from accessing and using services,[22] and current insurance systems reinforce this bifurcation: neither Medicare nor Medicaid will pay for 2 services during the same visit. Mental health professionals cannot provide health services, as physical health care is beyond their scope of practice or training and is not reimbursable through mental health funding streams.[23] Differences between physical and mental health care provision also exist in terms of information storing and sharing, software compatibility, privacy rules, and professional standards.[12]

Using peer health navigators. A promising alternative to linking professional mental and physical health care is the use of peer providers. Peer providers make up one of the most rapidly growing segments of the mental health workforce in the United States,[24-25] and peer-run interventions are becoming prominent in the recovery literature. Peers can be trained to work in a variety of settings to promote recovery and wellness by bringing their experience to bear on problems faced by others and by facilitating a strong bond and alliance based on that shared experience.[25-28] Peers are cost-effective compared with other options,[24,29-32] and becoming a peer provider can mean training and employment opportunities. This option also allows persons with SMI to have a stronger voice and to play a stronger role in health care systems, which is a key goal of the recovery movement.[29-30] Only a few studies have included self-management skills training from peer-delivered interventions to address physical health care, but promising signs of efficacy have emerged from interventions that include these components.[6]

Peer-based health interventions build on the experience and sensitivities of clients and focus on practical issues of access to and use of health services. For example, individuals with a history of cancer help women with breast cancer access services,[33-35] and HIV/AIDS services have applied this model to improve service use.[35] Such models are thought to be an effective strategy for addressing obstacles to accessing health care services, but few evidence-based interventions have been validated for improving the physical health of individuals with SMI and even fewer use peers to address those challenges.[6] So far, only 2 randomized pilot trials (not including our own) have been completed in which trained peers led manualized group psychoeducation classes on chronic disease management among persons with SMI.[25,36] Compared with participants who received treatment as usual, participants who completed the course showed higher rates of using primary care services, more patient activation, better health care efficacy, and enhanced physical health. These results, while promising, also suggest that patients may require significantly more individualized assistance than is routinely offered if they are to experience substantial and sustainable improvements in well-being. Our understanding of the multifaceted

challenges involved in integrating physical and mental health care for the SMI population inspired the development of the Bridge peer health navigator intervention.

The intervention. We developed the Bridge intervention using a collaborative stakeholder approach that included members of our research team, service providers, and peers. Unlike specific disease management models, through which clients are taught to deal with a single disorder such as diabetes or cancer, the Bridge is a comprehensive health care engagement and self-management model, in which clients are taught the skills to effectively access and manage their health care.[8,11] The intervention is comprehensive—it connects people to preventive, primary, and specialty health care services, including eye and dental care. It is an engagement model, because many persons with SMI have been unable to engage with a consistent primary health care provider or have given up trying to access outpatient primary care. *Self-management* means that participants are trained to be assertive and empowered managers of their own health care, so their interactions with care providers can be more effective. Compared with models that primarily use a classroom training approach,[25,36] the Bridge features an individualized approach that develops self-management skills in real-world health care settings. This approach is important because these settings are ideal for teaching sustainable self-management skills. Finally, the Bridge is designed as a peer-delivered model. Peers were trained not only to deliver the intervention but also to train and supervise other peer navigators. Peers in this intervention offer the strengths of shared recovery experience and alliance building that have been central to other peer-delivered interventions.

The Bridge intervention is manualized and consists of 4 components: (1) engagement, assessment, and planning; (2) coordinated links; (3) patient education; and (4) cognitive-behavioral strategies. The engagement, assessment, and planning component consists of a comprehensive assessment of the client's health status and health care service use history, the development of health care and wellness goals, and a health navigation plan. The coordinated links component consists of several activities that help clients navigate the health care system, including helping them make appointments, communicating with medical care providers, and ensuring follow-up care and adherence to medical treatment plans. The patient education component includes the provision of education pertaining to the health care system, partnering with medical providers, treatment compliance, self-advocacy, appropriate interaction skills, health and wellness issues, health benefits and entitlements, and the use of a personal health record at their doctor's office. The cognitive-behavioral component
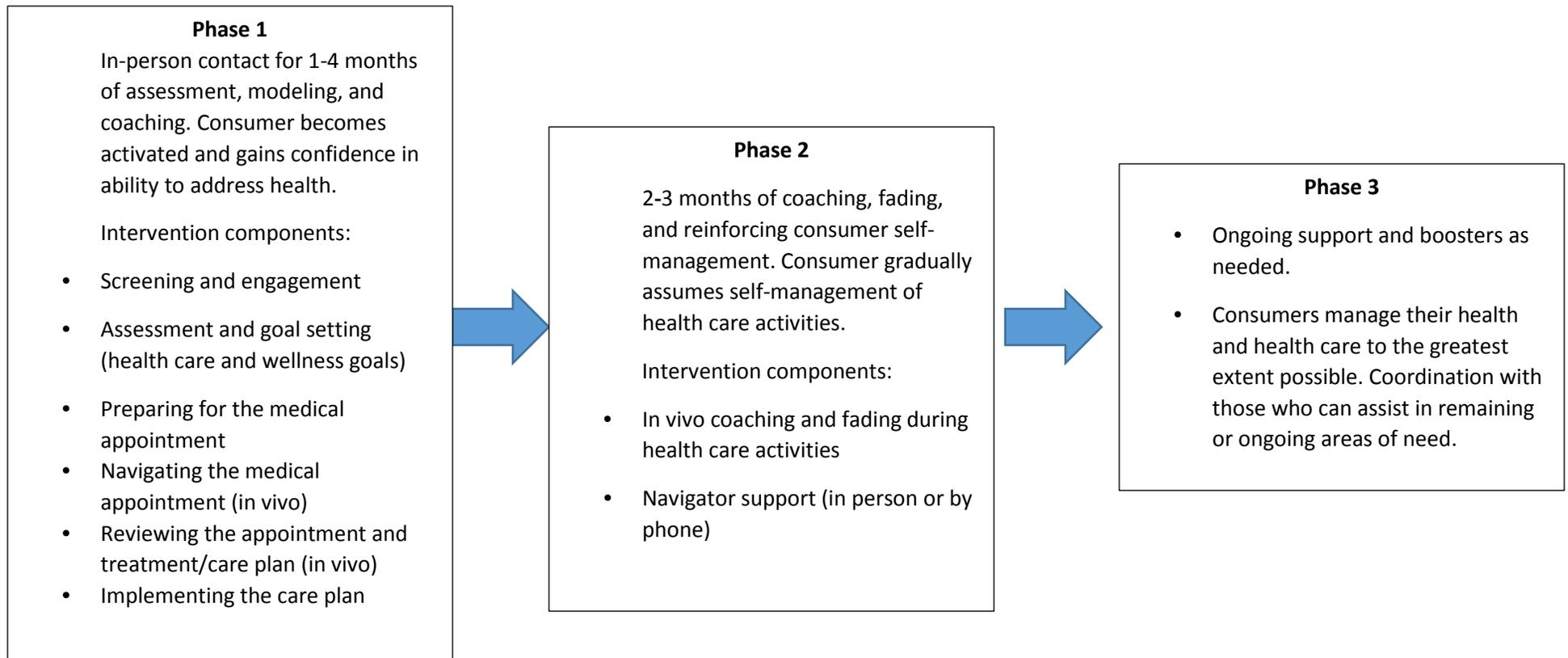
entails the use of modeling, coaching, prompting, reinforcement, role playing, and fading to build efficacy and behavioral competence in health care access and use.

A final aspect of the intervention is the use of an *in vivo* (in the real world) approach to learning, empowerment, and skill building. Much like the Assertive Community Treatment approach to mental health services,[37] the Bridge specifies that learning complex skills such as communicating with medical providers is best done in the real-world environments where the learned behaviors will be used. This approach facilitates learning and maintenance of change once the intervention ends. The Bridge is a more intensive intervention than is routinely provided in case management services. Navigators are expected to accompany their clients to the doctor's office, the lab, and the pharmacy so that skills can be modeled and learned in the environments where they will be used. In vivo training enables clients to learn complex skills that have the probability of being sustained over time as the intervention fades.

Intervention timeline. The Bridge is implemented in 2 phases over 6 months, with a final optional phase of ongoing support as needed (Figure 1). Navigators routinely accompany clients on doctor, lab, and pharmacy visits to build their competence and help with the transition to self-management. Using behavioral strategies of modeling ("for them"), coaching ("with them"), and fading ("by them"), the navigators help clients build the skills they will need to achieve maximum independence in managing their health care over time.

The intervention is meant to be individualized. The phases will vary by person, as clients progress at different rates in learning the skills. Some clients need as little as 1 month of intensive navigation before they are ready to self-manage, while others require up to 5 months. A small percentage of clients might need fairly intensive navigation activities for a prolonged period.

Figure 1. Phases of Health Navigation and Intervention Components

Phase 1

In-person contact for 1-4 months of assessment, modeling, and coaching. Consumer becomes activated and gains confidence in ability to address health.

Intervention components:

- Screening and engagement
- Assessment and goal setting (health care and wellness goals)
- Preparing for the medical appointment
- Navigating the medical appointment (in vivo)
- Reviewing the appointment and treatment/care plan (in vivo)
- Implementing the care plan

Phase 2

2-3 months of coaching, fading, and reinforcing consumer self-management. Consumer gradually assumes self-management of health care activities.

Intervention components:

- In vivo coaching and fading during health care activities
- Navigator support (in person or by phone)

Phase 3

- Ongoing support and boosters as needed.
- Consumers manage their health and health care to the greatest extent possible. Coordination with those who can assist in remaining or ongoing areas of need.

This study. Participants were randomly assigned to an immediate treatment group or a waitlist; those on the waitlist received the intervention after 6 months (see Figure 2). We hypothesized that, compared with those in the waitlist group (n = 75), the subjects in the immediate intervention group (n = 76) would show greater improvement on the primary outcomes. Data were gathered on secondary outcomes to explore whether the intervention would affect those as well. We hypothesized that participants in the waitlist group would show improvements on the primary outcomes after they received the intervention. We also hypothesized that all gains from the intervention would be maintained for the immediate intervention group 6-months postintervention.

Stakeholder engagement. The Bridge intervention was developed using a strong participatory process that involved stakeholders (peers, line staff, administrative staff) within and outside Pacific Clinics. This process is described in Brekke et al.[8] It included significant and consistent consumer, peer, and staff involvement in the development of the intervention and the intervention manual, field testing the intervention, and choosing the measures that would be used to assess its outcomes. We have a history of using participatory stakeholder processes that include patients, providers, and administrators; for example, in the development of a computerized client-centered outcome system at Pacific Clinics.[38] For the current study, we built on this history by creating a Governance Advisory Council (GAC) to provide guidance and oversight of the project during its implementation at Pacific Clinics/El Camino Clinic. The GAC met every month during the project period to assist with decision making, review status updates on all phases of the project, and help resolve implementation concerns. On the basis of the results of the study, the council also anticipated issues related to the dissemination, implementation, and sustainability of peer health navigation.

The GAC was co-chaired by John Brekke, project PI, and Laura Pancake, corporate director of wellness and recovery services at Pacific Clinics. It included the project manager, 2 consumers recruited from Pacific Clinics' existing Consumer Council, 1 peer health navigator who was not participating in the project, a staff nurse, a case manager, the peer health navigator supervisor, the El Camino Clinic director, and the Pacific Clinics business manager. The council's makeup ensured representation from critical stakeholder levels within Pacific Clinics and the El Camino site, as well as open communication lines among consumer, staff, and administrative levels in Pacific Clinics. Decision making was based on a consensus-preferred model, with votes taken on action items.

Figure 2. Timeline for the Waitlist Study Design

	Baseline		6 Months		12 Months
Immediate treatment group	O	X	O		O
Waitlist group	O		O	X	O

O = assessment; X= Bridge intervention

The research team members who served on the GAC provided regular updates and status reports on the project and responded to issues raised by the council. The other members of the GAC provided guidance, participated in decision making, and operated as active communicators between the project and the stakeholders they represented. The council addressed several important issues. First, it had oversight and decision-making responsibility for the scientific and logistical aspects of the study, which included design, measures, recruitment, timetable, analyses, and budgeting. Second, the project hired 3 peer health navigators. We have interviewed other health navigators hired by Pacific Clinics regarding the impact of being a peer navigator on their personal and professional lives, and the results have been very positive. Just to be sure, the GAC was available to provide ongoing guidance and problem-solving expertise on any issues that arose among the peer navigators involved in this project. Third, the GAC provided guidance and assistance in resolving any patient-based issues. Fourth, the council oversaw the Implementation and Sustainability Assessment Plan.

We also had a Consumer Advisory Group (CAG), a volunteer group that provided ongoing feedback and problem solving related to the implementation of the project. One member of the CAG also participated on the Governance Advisory Council; this ensured that consumers had a communication link with project governance and that consumer-based issues were easily reported to the GAC. The members of the GAC met individually and as a group with the project staff throughout the study period. The project health navigators also held group meetings with participants to facilitate the intervention and to obtain feedback about any issues they encountered.

After the conclusion of the study, results were presented in multiple meetings with consumer, staff, and administrator stakeholder groups at Pacific Clinics and the El Camino site; comments and insights about the findings were solicited from these groups.

Methods

Setting. The study was conducted at the El Camino Clinic, which is one site of the Pacific Clinics community mental health agency in California. Pacific Clinics provides services to adults with SMI at several sites throughout Southern California.
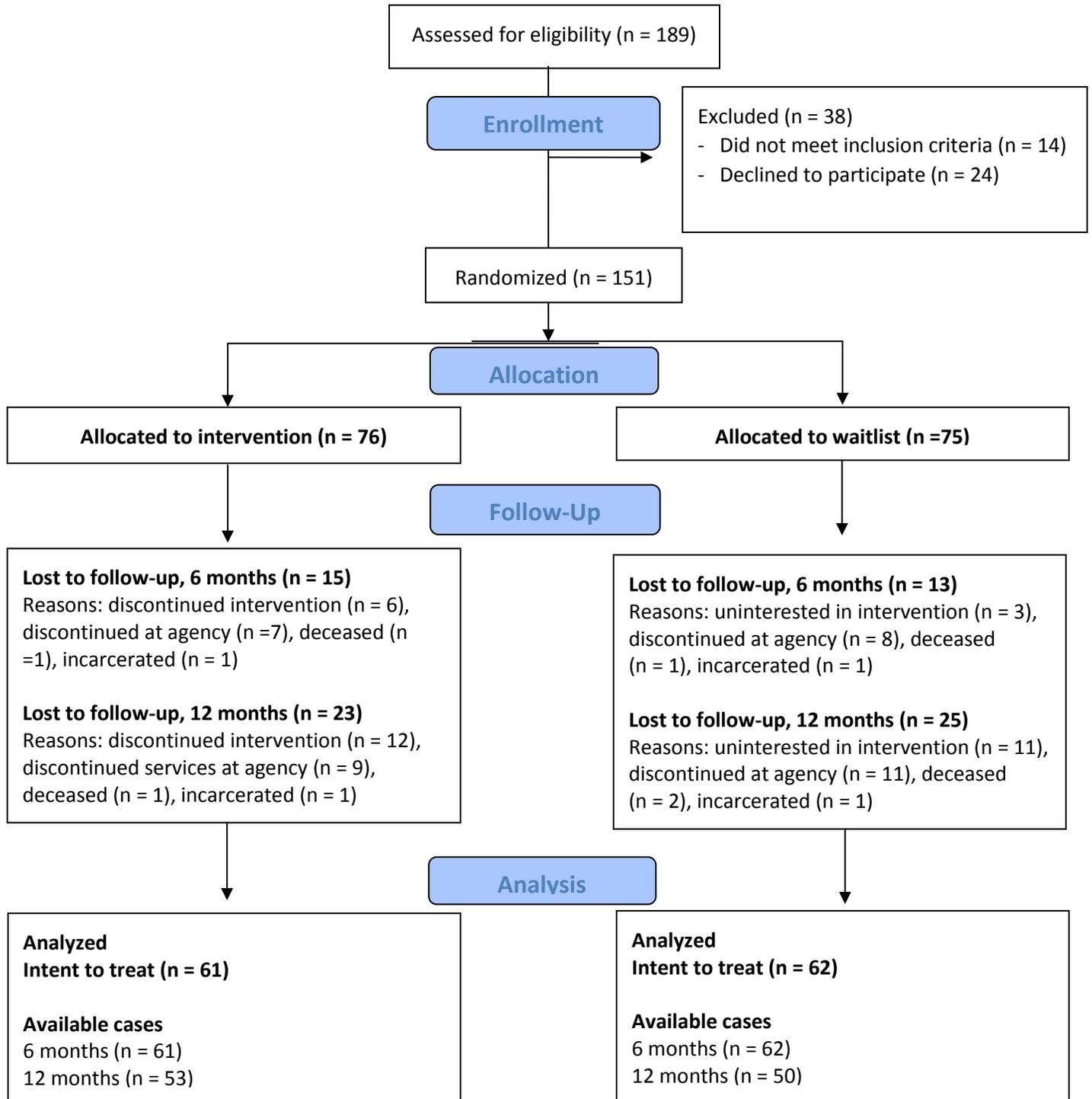
Sample. The sample was recruited from the El Camino Clinic using a short screening form (6 items) designed to determine whether individuals were connected to medical care or had unaddressed medical issues. An affirmative response to any of the items was a positive screen. Referrals came from treatment teams using their existing mental health caseloads or from information sessions held for agency consumers. Inclusionary criteria were (1) over 18 years old; (2) admitted to one of the programs at the study site; (3) local residence for at least 3 months; (4) English fluency; (5) capacity to give informed consent; and (6) diagnosed with schizophrenia, schizoaffective disorder, bipolar disorder, or major depression. The exclusion criteria were (1) under conservatorship, (2) unable to give informed consent, or (3) currently hospitalized. Participants received insurance coverage through Medicaid (97%) or Calworks (3%). A CONSORT diagram of randomization and attrition over time is presented in Figure 3.

Design. We used a randomized waitlist design (see Figure 3). Once a subject had been consented and interviewed at baseline by a study interviewer, the project manager used a computer-generated random number table to randomize the subject to immediate health navigation coaching or to a 6-month waitlist. (The intervention commenced at 6 months for the waitlist group.) Allocation concealment was maintained as both interviewers and participants were blind to the randomization status during the baseline assessment. Because this is a psychosocial intervention, interviewers were not assumed to be blind to participant status for subsequent assessments. The purpose of using interviewers was to maintain the interview schedule and reduce attrition, and to read questions aloud to facilitate clarity in the self-report data-gathering protocol. The interviewers did not provide study data in terms of client ratings or judgments about client functioning.

Procedures. Data were collected in 3 waves, with 6-month intervals between assessments. The choice of a 6-month period between assessments was based on the fact that the Bridge intervention generally lasts 6 months. The same outcome measures were assessed each time in a face-to-face

interview conducted by 2 trained research assistants. Several features of this design are notable. First, the waitlist design ensured that all participants eventually received the full health navigation intervention. Second, mental health services to subjects were not diminished because of their participation in the study—they all received the full array of services to which they were entitled. Thus, the comparator was treatment as usual, which primarily consisted of mental health services and some case manager assistance with making medical appointments and transportation to them. Third, we did not exclude any potential participants on the basis of diagnosis, functional level, symptomatology, or medical history, which strengthens the generalizability of our findings to an unselected group of individuals receiving services at this agency who needed health navigation services. Fourth, treatment teams in the waitlist group were instructed to maintain routine care with every consumer, including whatever they typically did to facilitate health care for these consumers.

Figure 3. CONSORT Flow Diagram

Assessed for eligibility (n = 189)

Enrollment

Excluded (n = 38)
- Did not meet inclusion criteria (n = 14)
- Declined to participate (n = 24)

Randomized (n = 151)

Allocation

Allocated to intervention (n = 76)

Allocated to waitlist (n =75)

Follow-Up

Lost to follow-up, 6 months (n = 15)
Reasons: discontinued intervention (n = 6), discontinued at agency (n =7), deceased (n =1), incarcerated (n = 1)

Lost to follow-up, 12 months (n = 23)
Reasons: discontinued intervention (n = 12), discontinued services at agency (n = 9), deceased (n = 1), incarcerated (n = 1)

Lost to follow-up, 6 months (n = 13)
Reasons: uninterested in intervention (n = 3), discontinued at agency (n = 8), deceased (n = 1), incarcerated (n = 1)

Lost to follow-up, 12 months (n = 25)
Reasons: uninterested in intervention (n = 11), discontinued at agency (n = 11), deceased (n = 2), incarcerated (n = 1)

Analysis

Analyzed
Intent to treat (n = 61)

Available cases
6 months (n = 61)
12 months (n = 53)

Analyzed
Intent to treat (n = 62)

Available cases
6 months (n = 62)
12 months (n = 50)

Diffusion and imitation across conditions. Randomization to the intervention occurred at the individual level, from existing caseloads to the immediate treatment or waitlist conditions. This approach raises the issue of treatment contamination across groups; it was addressed in several ways. First, the intervention was developed because mental health staff (including psychiatric nurses) were unable to deal with health issues beyond those directly associated with mental health practice, owing to scope-of-practice and billing considerations, which are common issues in mental health clinics. Mental health staff did not have time to deal with physical health care issues in depth, were not trained to provide them, and were not trained in how to bill for them. Our preliminary work with staff and administrators confirmed that they had little interest in trying to provide health navigation services. The addition of health navigators to the treatment teams was universally welcomed by staff, because they believed health navigation would solve these problems. Health navigators have the time to address physical health issues, the training to write appropriate notes in the electronic health record, and training in how to bill for their services (see job description in Figure 4).

Specific practices were introduced during the study to reduce potential contamination or diffusion across the conditions. The study was introduced to all staff in group meetings to raise awareness of the intervention at their agency and with their client caseloads. Mental health staff were asked to continue providing their services as usual, doing anything they routinely did to advance the health care of their clients; for example, scheduling appointments. Peer health navigators were asked not to discuss their specific strategies or share the intervention manual or its contents with any of the staff until after the study was complete. We specifically explained the importance of avoiding contamination to the navigators. Both navigators and staff supervisors were asked to report whether any staff members seemed to be altering their routine practice, and this did not appear to occur during the study.

Measures

Demographics. Participants self-reported their age, gender, and race/ethnicity. Additional clinical details of participants, such as treatment program and primary mental health diagnosis, were drawn from their electronic mental health records.

Figure 4. Job Description for Peer Health Navigator

Job title: **Peer Health Navigator**

Classification/grade: **Nonexempt/Grade 4**

POSITION SUMMARY

Under the general supervision of a director or team leader, a peer health navigator is an individual who has experience with the health and mental health system and who has been trained to provide support and/or self-help services to clients with their health care and wellness needs as needed, requested, or directed.

ESSENTIAL DUTIES AND RESPONSIBILITIES

- Helps recovery model team conduct initial assessment with each participating consumer to assess his or her health and wellness status and experience with the health care system.
- Coaches the consumer to help him or her achieve and maintain identified goals through behavioral strategies such as shaping, reinforcement, modeling, and fading. Other defined strategies, such as role playing and problem solving, may be used.
- Advocates within the medical system on behalf of the consumer for the receipt of services requested and required. Coaches the consumer in appropriate communication with the medical provider, pharmacists, and staff and administrators at primary care clinics.
- Facilitates consumer's health care, including helping with scheduling medical appointments, accompanying consumer to appointments, ensuring accurate and timely communication with medical personnel regarding diagnostic and health maintenance tests and procedures, and creating follow-up care plans to facilitate medical and medication adherence and collaboration with the consumer's mental health provider.
- Under direct supervision, provides supportive assistance to the client and models self-advocacy to help the client research and access needed and desired community resources.
- Works cooperatively with others to ensure the smooth and seamless delivery of comprehensive services to members.
- Under direct supervision, completes documentation and other paperwork in a timely and accurate manner, and in accordance with defined standards and funding source requirements.
- Tracks consumers' progress, including conducting follow-along assessments.
- Maintains caseload files and progress notes for up to 25 consumers.
- Provides health and mental health education.
- Reports to work on time and maintains reliable and regular attendance.
- Models Pacific Clinics' approach, mission, and core values in all communication and correspondence.
- Communicates effectively in a culturally competent and diverse consumer population and promotes favorable interaction with managers, coworkers, and others.

- **Initiates and maintains professional interactions and communication with Pacific Clinics employees and others.**
- **Performs other duties as assigned.**

QUALIFICATIONS/SKILLS

To perform this job successfully, an individual must be able to perform each essential duty satisfactorily. The requirements listed below represent the knowledge, skills, and ability required. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

- **High school diploma or GED preferred but not required.**
- **Lived experience with mental illness or the mental health system preferred.**
- **Must have a valid California driver's license and a driving record that is insurable under the Clinics' liability policy or demonstrated ability to use public transportation.**
- **Must know or quickly acquire basic computer/word processing skills.**
- **Must be available for a flexible work schedule, including occasional evenings, weekends, and holidays.**

Character of the Intervention

Intervention intensity. The intensity of the intervention was measured through electronic contact logs maintained by the health navigators. Navigators recorded the number and length of in-person contacts and of phone calls in which they spoke directly to the participants.

Service engagement and working alliance. Health navigators measured the degree to which participants were engaged in the intervention using the Service Engagement Scale.[39] Participants used the Working Alliance Inventory short form[40] to measure and report on the quality of their relationship with the health navigator.

Intervention fidelity. Intervention fidelity was measured using a 20-item instrument developed in our pilot work that uses interviews, role play, and case records. A supervision team made up of the principal investigator, a supervisor who is also a mental health peer navigator, and a nurse provided weekly supervision and evaluated navigators on their skills development and fidelity to the intervention. Health navigators maintained an electronic contact log of detailed notes to track the nature of their contacts with consumers. The fidelity measure rated navigators on their skills, and the supervision team observed them in the field. Oversight of the study progress and findings was discussed at both

Governance Advisory Council and Consumer Advisory Group meetings to ensure that stakeholder involvement was maintained throughout the study. We conducted a limited number of qualitative interviews with mental health and medical providers to ascertain how well the intervention was implemented within the mental health agency and how well it was folded into the workflow of medical providers.

Primary and secondary outcomes. Few interventions for people with SMI target disease and health generally; most address specific diseases. Measure selection for this study required the adaptation of some scales designed for other populations and the creation of novel measures. We also explored whether different types of measures were appropriate for use with an SMI population. For these reasons, our menu of measures was larger than those for studies that have well-established measures for the population of interest.

We classified outcomes targeted by the Bridge intervention into primary and secondary domains. Primary outcomes were those we expected to be most directly affected by the intervention. Secondary outcomes were downstream outcomes that could be affected by the intervention through changes in the primary outcomes. The primary outcomes include direct and indirect outcomes. Direct primary outcomes are those that best reflect the intent and design of the intervention as delivered by the peer health navigators: use of routine health care services, use of emergency and urgent care services, preferred locus of health care, quality of relationship with primary care provider, global satisfaction with health care services, attitudes about health care self-management, and self-management behaviors. The indirect primary outcomes depend on the actions of an engaged health care provider; they include the detection of medical diagnoses, pain, global health rating, health symptoms, interference with daily activities, physical health medications, and health screenings.

The secondary outcomes include general life satisfaction, mental health and functional status, psychiatric medications, internalized and provider stigma, and health habits. As per PCORI methodology standards, the selection of these outcomes was based on both clinically relevant and patient-centered domains. Measures are self-reported, as it is critical to test whether participants can recognize changes in their self-management abilities and in their health and health care use. We used validated scales throughout the study whenever possible; details are provided in the following sections.

Direct Primary Outcomes

Health service use. Health service use and preferred locus of care were assessed using 2 scales from an adapted version of the UCLA CHIPTS health care and health utilization survey.[11,41] First, participants identified where they usually sought care (emergency room, urgent care, primary care provider, clinic, or nowhere). Second, participants reported how often they visited each type of provider (0 = *never*, 1 = *once or twice*, 2 = *3 to 5 times*, 4 = *more than 5 times*). For analytic purposes, providers were classified as emergency/urgent care if they were located in an emergency room or urgent care facility and as routine care providers if they were primary care, specialty care, dentists, optometrists, or alternative medicine practitioners. Scaled means were calculated for routine care and emergency/urgent care services used.

Global satisfaction with health care. We developed a Satisfaction with Physical Health Care scale along the lines of the EuroQol visual analog scale.[42] Like the EuroQol, our scale consists of a vertical axis with the end points labeled *most satisfied with physical health care* at the top and *least satisfied with physical health care* at the bottom (100 and 0, respectively). The respondent circles a single point on the continuum.

Quality of relationship with primary care provider. We asked participants whether they had a primary care provider (yes/no). Those who had a regular primary care provider or were able to rate a provider whom they had recently seen completed the Engagement with the Health Care Provider scale[43] regarding their relationship with him or her. A scaled mean for the total scale was calculated for analytic purposes. The scale demonstrated excellent reliability (Cronbach's $\alpha_{baseline}$ = .96; Cronbach's $\alpha_{6\text{-month}}$ = .96; Cronbach's $\alpha_{12\text{-month}}$ = .95).

Self-management. We evaluated participants' ability to self-manage health care in terms of confidence and behaviors, which are considered to be 2 distinct but related aspects of self-management. Participants rated how confident they were about managing their health (1 = *not at all confident* to 10 = *very confident*) on a scale created for this study. The items were based on health navigation skills participants were expected to develop; these skills should precede behavioral changes. The scale had excellent reliability (Cronbach $\alpha_{baseline}$ = .90; Cronbach $\alpha_{6\text{-month}}$ = .90; Cronbach $\alpha_{12\text{-month}}$ = .88). The behavioral self-management scale was adapted from the Mental Health Confidence Scale.[44] This 14-item scale covers skills such as appointment making, pharmacy visits, establishing a medical home, and feeling that health care needs are heard and addressed. Participants estimated the frequency of these experiences on a 3-point scale (1 = *never* to 3 = *3 or more times*). The scale's reliability was good for this study (Cronbach $\alpha_{baseline}$ = .83; Cronbach $\alpha_{6\text{-month}}$ = .78; Cronbach $\alpha_{12\text{-month}}$ = .81).

Indirect Primary Outcomes

Health screenings. Using a tool created for this study, participants were asked to check off any of a list of 11 health screenings they had had in the past 6 months or since their last assessment. The items on the list ranged from a routine annual physical to rarer screenings such as a sigmoidoscopy. Health screening variables were calculated in 2 ways: (1) a count of all possible screenings, and (2) presence of an annual physical or a dental or eye exam.

Medical diagnoses*.* We created a checklist for this study of 10 chronic health diagnoses common among those with SMI, (eg, diabetes, high blood pressure, heart disease). Participants reported whether they had been diagnosed with any of the conditions (*ever* at baseline; *in the past 6 months* in subsequent assessments).

Health symptoms. Participants selected *yes* or *no* for whether they were currently experiencing any of 24 common health symptoms (on a list created for this study). A count of the number of health complaints will be used in analyses. In our pilot study, participants reported an average of 8 current symptoms at baseline.[11]

Pain. Participants rated the severity of their pain and the extent to which pain interfered with their functioning using 2 items drawn from the SF-12.[45] A *z*-scored overall pain index was created from the 2 items. The scales had good reliability (Cronbach $\alpha_{baseline}$ = .85; Cronbach $\alpha_{6\text{-month}}$ = .85; Cronbach $\alpha_{12\text{-month}}$ = .86).

Global health ratings. We used the visual analog scale of the EuroQol to obtain a score for the participant's perception of his or her health status. The respondent circles a single point on a continuum from zero to 100. The EQ has acceptable reliability and validity.[46-47] We also used an item from the SF-12 to estimate global health status. Participants rated their health on a 5-point scale (1 = *excellent* to 5 = *poor*).

Interference with daily activities. We assessed interference with mobility, accomplishments, and social interactions owing to physical health with items drawn from the SF-12.[45] We assessed mobility with 2 items from the SF-12 (limits on moderate activities, limits on climbing stairs) and 2 additional items (limits on bathing or dressing, limits on vigorous activities). Mobility items were rated on a 3-point scale (1 = *yes, limited a lot* to 3 = *no, not limited at all*). We assessed limitations on participants' abilities to accomplish tasks owing to health with 2 items from the SF-12 that were rated on a 5-point scale (1 = *all the time* to 5 = *none of the time*). We used a single item from the SF-12 to

estimate the extent to which physical health issues interfered with social interactions. Participants rated the degree of interference on a 5-point scale (1 = *not at all* to 5 = *extremely*).

Prescribed physical health medications. Participants self-reported their prescription medications for physical health issues. They were asked to identify the name, dosage, frequency, and purpose of any prescribed or over-the-counter medication or supplement. We created a count variable for medications for physical health.

Secondary Outcomes

Mental health and functional status*.* We measured functional outcomes of the participants' clinical psychiatric status using the BASIS-24 (Behavior and Symptom Identification Scale),[48] which was designed to assess a client's perception of difficulty owing to psychiatric symptoms and problems in functional areas (daily living skills, work, and socializing) over the past week. The BASIS-24 includes a total score and 6 subscales (depression, relationships, self-harm, emotional liability, psychosis, and substance use). Scoring is normed and standardized.

Psychiatric medications. We recorded psychiatric medications using the same procedure as that for physical health medications. Participants self-reported their medications, and we also surveyed the electronic medical record system at the mental health agency. We created a count variable for all officially recorded psychiatric medications prescribed during the treatment period.

Health habits. Using 5 items adapted from the National Leisure Time Survey,[49] participants rated the frequency with which they engaged in healthy behaviors. We created and *z*-scored 2 scales to address different item scaling: one for diet and one for exercise.

We used 10 items created for this study to survey participants about their engagement in unhealthy behaviors such as smoking, alcohol consumption, use of substances, and possibly risky sexual behaviors. For substance use, we asked participants whether they had ever used a substance and, if so, whether they had used it in the past 30 days. We created a count of the substances currently used for analyses. For sexual activities, we asked participants whether they were sexually active, how many partners they had, the frequency of sexual relations, and whether they had used a barrier method (0 = *no*, 1 = *yes*). Individuals who had multiple sexual partners and did not use protection were considered to have risky sexual behaviors. We coded participants dichotomously for the presence of risky behaviors (1 = *risky behaviors*, 0 = *no risky behaviors*).

Internalized stigma. We used the Internalized Stigma of Mental Illness scale[50] to measure the internalized stigma of the clients along 5 dimensions: alienation, stereotype endorsement, discrimination experience, social withdrawal, and stigma resistance. In previous research the subscale alphas ranged between .58 to .80 and test–retest reliability ranged from .68 to .94.[50] The scale's reliability for this study was excellent (Cronbach $\alpha_{baseline}$ = .90; Cronbach $\alpha_{6-month}$ = .92; Cronbach $\alpha_{12-month}$ = .93). We computed a total scaled mean for analyses.

Provider-level stigma. We measured provider-level stigma using a scale adapted from one created for people with HIV/AIDS.[51] This 7-item scale measures the extent to which clients experience stigma when they interact with health care providers, with items adapted to reflect SMI rather than HIV/AIDS. Participants rated their experiences with their provider on a 5-point scale (1= *strongly disagree* to 5 = *strongly agree*). A scaled mean was calculated for the total for analyses and the scale's reliability for this study was acceptable (Cronbach $\alpha_{baseline}$ = .79; Cronbach $\alpha_{6-month}$ = .82; Cronbach $\alpha_{12-month}$ = .79).

General life satisfaction. The Satisfaction with Life scale (SWL)[52] is an 18-item Likert scale that measures participants' satisfaction with life in 4 domains: living situation, social relationships, work, and self and present life. The scale has shown good interim reliability (alpha = .88) and factorial validity in studies of people with SMI. We computed the mean total score for analyses, and the scale's reliability for this study was excellent (Cronbach $\alpha_{baseline}$ = .92; Cronbach $\alpha_{6-month}$ = .90; Cronbach $\alpha_{12-month}$ = .93).

Peer Health Navigators

All the peer navigators met the criterion of *lived experience* as defined by the agency setting: personal recovery from a mental illness or recovery by a close family member or loved one. Agency and research staff conducted hiring interviews for peer navigators and established their eligibility. Two of the navigators were African American females and 1 was a bilingual Latino male. All 3 had a high school education and 2 were taking college-level courses. None had previous experience delivering mental health or psychosocial interventions. Each had a caseload of approximately 20 clients during both treatment phases of the study. The navigators were not required to bill for their activities during the course of the study owing to the other burdens of participation in a research study. The collaborating mental health agency has identified billing codes that are used to fund health navigation services provided by other supervised peer health navigators. (See the job description for a peer health navigator in Figure 4.)

Training of the 3 peer health navigators took place over the course of several days using material from our health navigation certification course. The peer supervisor observed the first few sessions with study participants and provided detailed feedback to optimize the fidelity of the intervention. After the intensive training (usually 16 hours), individual supervision, including field observation with clients, continued for about 2 months. Ongoing supervision was conducted in weekly 90-minute group meetings.

Treatment As Usual

All study participants received treatment as usual mental health services, with no attempt to alter those services. The services are on a continuum from field-based outpatient services to office-based outpatient services. Individuals move through this continuum according to need and capability, with a focus on symptom stabilization, functional outcomes such as living situations, meaningful activity such as employment or volunteer work, and socialization activities. Onsite psychiatric services are provided. Treatment teams routinely offer some minimal support with physical health care when time permits; for example, arranging appointments, providing reminders, and helping with transportation. However, these activities are typically deferred to other pressing issues such as mental health functioning, housing, legal issues, and benefits.

Statistical Analyses

All participants who completed the 6-month follow-up assessment were analyzed by intent-to-treat. All participant data were used, regardless of how much or how little of the intervention a participant received. To optimize the use of the data, we examined the intervention effects in 3 ways. First, we conducted change score comparisons (difference of differences) from baseline to 6-month follow-up between the immediate treatment and waitlist groups. Second, after both groups had completed the intervention, we combined the preintervention and postintervention scores of the 2 groups and conducted within-person comparisons to see whether outcomes improved over time. Third, we compared the 6-month and 12-month follow-up scores of the immediate treatment group to see whether the intervention effects were sustained.

In the first analysis, we calculated the mean change scores between baseline and 6-month assessments for the treated and waitlist groups. In the second analysis, we combined the data from the intervention period for the immediate intervention group (baseline to 6 months) and for the waitlist group (6 months to 12 months). We did this to maximize power to detect effects for all those who

received the intervention and to present the changes the waitlist group experienced when they received the intervention. For the waitlist group, we included the preintervention scores from the 6-month assessment rather than the initial baseline for 2 reasons: (1) the 6-month period over which the waitlist group received the intervention is comparable to the 6-month period over which the immediate treatment group received the intervention, and (2) we found few significant changes in the waitlist group between the baseline and 6-month assessment periods. Only emergency room visits, health symptoms, and social support changed significantly. On the basis of this information, we determined that the 6-month assessment was most appropriate as a preintervention estimate for the waitlist group. In the third analysis, the immediate treatment group was examined after they received the treatment, using the mean change in scores from the 6-month to the 12-month assessments for that group.

We used independent *t* tests, paired *t* tests, or chi-square tests to address the research questions. In addition, to examine sensitivity to missing data, we performed linear mixed-effect models, and multiple imputation using fully conditional specification (also known as imputation by chained equations) was performed on the original data; 20 imputed data sets were generated. The results from all approaches were compared. The results using the proc mixed analytic approach, with and without imputation, did not differ from our difference of differences analyses in terms of statistically significant or nonsignificant findings for our primary outcomes. We chose to present the results based on *t* tests for ease of interpretation, since all approaches had very similar findings and our attrition rate was the one we had prepared for in our power analyses. To adjust for multiple comparisons, we corrected for the family-wise error in each separate analytic domain (.05/Number of outcomes per domain). Cohen's *d* was included as an index of effect size. Finally, using a linear mixed-effect model approach, we tested for any important demographic differences (gender, Latino versus non-Latino) in response to the intervention.

Results

Sample baseline characteristics. Table 1 presents demographic and clinical characteristics of the full sample and immediate treatment and waitlist groups at baseline. There were no significant differences between groups at baseline for any demographic or clinical characteristics; therefore, randomization appeared to be successful (CI-4 identifying potential confounding variables). In the 6 months before the study, 28% of the participants had not seen a primary care doctor and 42% had sought emergency/urgent care.

Sample retention. The attrition rate was 18.5% at 6 months and 31% at 12 months (see Figure 1). On the basis of previous studies, we had projected a 30% attrition rate over the 12-month course of the study. No demographic or clinical characteristics predicted whether participants were retained across the follow-up periods.

Intervention character and fidelity. The Bridge intervention is an individualized program, so the number of contacts varies according to need and engagement. Details of in-person contacts and phone calls that made contact were noted in electronic logs. The average number of in-person contacts during the first 6 months for the immediate intervention group was 4.91 (SD = 5.02) and the average number of phone calls was 6.27 (SD = 6.70). The average length of in-person visits was 61 minutes (SD = 57 minutes) and the average call lasted 3 minutes (SD = 13 minutes). The large standard deviations for these contact variables reflect the individualization of the intervention; this individualization was also apparent in the weekly supervision sessions.

The average service engagement score (range 0-3) was 2.1 (SD = 0.86), and the average working alliance score (range 1-7) was 5.9 (SD = 1.3), suggesting that participants were well engaged and developed positive working alliances with their peer navigators. Fidelity was rated using the protocol described above. Ratings were completed after all 3 peer navigators had been active in the field for more than 4 months. We used 2 raters who were intervention trainers; the average fidelity scores were above the "good" range.

Table 1. Baseline Descriptives of Immediate Treatment and Waitlist Groups (n = 151)

	Full Sample			Immediate Treatment			Waitlist		
	M (SD)	n	%	M (SD)	n	%	M (SD)	n	%
Gender									
Female		81	53.6%		35	46.1%		46	61.3%
Male		70	46.4%		41	53.9%		29	38.7%
Age	46.88 (10.96)	151		45.12 (11.35)	76		46.72 (10.58)	75	
Race/ethnicity									
White		37	24.5%		17	22.4%		20	26.7%
Black		12	7.9%		7	9.2%		5	6.7%
Hispanic		90	59.6%		46	60.5%		44	58.6%
Other		12	7.9%		6	7.9%		6	8.0%
Mental health diagnosis									
Schizophrenia		28	18.5%		18	23.7%		10	13.3%
Schizoaffective		28	18.5%		14	18.4%		14	18.7%
Bipolar		29	19.2%		14	18.4%		15	20.0%
Depression		57	38.5%		25	32.9%		33	44.0%
Other		8	5.3%		5	6.6%		3	4.0%
Income source									
SSI		91	60.3%		48	63.2%		43	57.3%
SSDI		1	0.7%		1	1.3%		0	0.0%
General relief/public assistance		39	25.8%		20	26.3%		19	25.3%
No income		20	13.2%		7	9.2%		13	17.3%
Chronic medical disease diagnosis									
High blood pressure		42	27.8%		26	34.2%		16	21.3%
High cholesterol		40	26.5%		21	27.6%		19	25.3%
Lung disease		21	13.9%		14	18.4%		7	9.3%
Diabetes		20	13.2%		9	11.8%		11	14.7%
Hepatitis C		19	12.6%		10	13.2%		9	12.0%

Between-group comparisons of primary and secondary outcomes. We conducted change score comparisons during the first 6 months of the intervention between the immediate treatment and waitlist groups. Outcomes were grouped into primary and secondary outcomes. Direct primary outcomes are presented in Table 2, and indirect primary outcomes are presented in Table 3. Secondary outcomes are presented in Table 4.

Direct Primary Outcomes

Preferred locus of care. To test changes in preferred care locus toward primary care at 6-month follow-up, we coded participants dichotomously as either retaining/developing a preference for primary care clinics or as not preferring primary care clinics/lost their preference for primary care clinics. In chi-square comparisons, those in the immediate treatment group were significantly more likely to stay connected or become connected to primary care (80%) than those in the waitlist group (63%) after 6 months of the intervention ($p = .03$).

Health service use. At baseline, we found no differences in the rates at which participants in the immediate treatment and waitlist groups saw routine care providers (see Table 2). However, at the 6-month follow-up, participants in the immediate treatment group had increased their visits to routine care providers in terms of the scaled mean of visits more than the waitlist group ($p = .012$ below the familywise corrected threshold of $p = .025$). There were no between-group differences in the rates of using the emergency room at baseline or at the 6-month follow-up.

Relationship with primary care provider and satisfaction with health services. At baseline, we found no differences in how participants in the immediate treatment and waitlist groups rated the quality of their relationship with their primary care provider (see Table 2). However, the immediate intervention group reported a better quality of relationship with their primary care provider ($p = .019$, familywise correction $p = .025$). Global satisfaction with health care services was rated on a 0-100 scale. There were no differences in global ratings of health care satisfaction at baseline or over time.

Table 2.

Direct Primary Outcomes: Independent *t* Test Change Score Comparisons of Immediate Treatment and Waitlist Groups From Baseline to 6-Month Follow-up[a]

Variables	Immediate Treatment Group (n = 76)			Waitlist Group (n = 75)			*t*	*p*	*d*
	M	SD	n	M	SD	n			
Health care relationships									
Relationship quality with primary care provider									
Baseline	1.70	0.77	60	1.76	0.81	64	−0.443	.659	
Follow-up	1.36	0.52	54	1.80	0.90	50	−3.008	.004	
Change score	−0.32	0.81	44	0.08	0.75	46	−2.396	.019	−.51
EuroQol global rating of health care									
Baseline	60.39	34.95	70	67.15	31.85	72	−1.210	.230	
Follow-up	76.81	28.43	58	68.71	29.36	59	1.515	.132	
Change score	6.32	28.76	47	2.71	34.43	51	0.561	.576	.11
Service use									
Number of ER/urgent care visits									
Baseline	1.36	0.53	p76	1.33	0.45	75	0.359	.720	
Follow-up	1.35	0.51	61	1.40	0.54	62	−0.450	.655	
Change score	−0.01	0.53	61	0.02	0.52	62	−0.343	.732	−.06
Number of routine care visits									
Baseline	1.34	0.35	76	1.41	0.35	75	−1.180	.240	
Follow-up	1.46	0.39	61	1.38	0.33	62	1.306	.194	
Change score	0.14	0.37	61	−0.02	0.33	62	2.546	.012	.46
Preferred locus of care	None/ER	PCP/clinic		None/ER	PCP/clinic		χ2		
Baseline	25 (33%)	51 (67%)	76	23 (31%)	51 (69%)	74	0.057	.862	
Follow-up	12 (20%)	49 (80%)	61	23 (37%)	39 (63%)	62	4.586	.045	
Self-management attitudes									
Confidence for self-management									
Baseline	6.91	3.20	76	8.20	2.44	75	−2.795	.006	
Follow-up	7.74	2.69	61	7.60	3.03	62	0.273	.786	
Change score	0.33	1.65	61	−0.28	1.78	62	1.986	.049	.36
Self-management activities									
Self-management behaviors									
Baseline	1.88	0.54	70	1.96	0.49	75	−0.990	.322	
Follow-up	1.99	0.43	61	2.00	0.51	62	−0.190	.842	
Change score	0.06	0.44	55	0.02	0.55	58	1.172	.244	.08

[a] Groupings in bold reflect distinct comparisons that have a familywise error correction for that group. For relationship quality with primary care provider, lower scores indicate a higher quality relationship. Higher scores indicate more satisfaction with health care for the EuroQol global rating of health care variable. For the number of routine and ER/urgent care visits, lower scores indicate fewer visits to each of these services. For confidence for self-management and behaviors of self-management, higher scores indicate greater confidence and behaviors of self-management.

Table 3.
Indirect Primary Outcomes: Independent *t* Test Change Score Comparisons of Immediate Treatment and Waitlist Groups From Baseline to 6-Month Follow-up[a]

Variables	Immediate Treatment Group (n = 76)			Waitlist Group (n = 75)			*t*	*p*	*d*
	M	SD	n	M	SD	n			
Health screenings									
Total health screenings									
Baseline	2.47	2.27	76	2.13	2.25	75	0.930	.356	
Follow-up	2.89	2.16	61	2.61	2.08	62	0.710	.477	
Change score	0.44	2.35	61	0.45	2.29	62	−0.022	.983	.00
Number of routine screenings									
Baseline	0.86	0.90	76	0.76	0.89	75	0.649	.517	
Follow-up	1.33	1.04	61	0.95	0.95	62	2.092	.038	
Change score	0.48	1.10	61	0.15	0.94	62	1.788	.076	.32
Diagnoses									
Medical diagnoses									
Baseline	1.30	1.58	76	1.00	1.23	75	1.312	.191	
Follow-up	1.41	1.56	61	1.02	1.32	62	1.508	.134	
Change score	0.23	0.69	61	−0.08	0.91	62	2.123	.036	.38
Global health									
EuroQol global rating of health									
Baseline	57.20	26.49	76	53.47	28.44	75	0.830	.406	
Follow-up	60.92	26.81	61	56.37	28.20	62	0.920	.361	
Change score	3.70	21.78	61	3.29	30.55	62	0.087	.931	.02
Health status SF-12									
Baseline	3.70	1.11	76	3.68	1.15	75	0.094	.925	
Follow-up	3.46	1.07	61	3.61	1.01	62	−0.817	.415	
Change score	−0.20	1.12	61	−0.05	1.00	62	−0.774	.440	.14
Health symptoms									
Baseline	9.78	5.37	76	9.19	6.56	75	0.604	.547	
Follow-up	8.11	5.83	61	8.45	5.57	62	−0.328	.744	
Change score	−1.07	4.48	61	−1.35	4.81	62	0.345	.731	.06
Pain									
Bodily pain severity SF-12									
Baseline	3.55	1.54	76	3.56	1.60	75	−0.029	.977	
Follow-up	3.25	1.69	61	4.06	1.48	62	−2.856	.005	
Change score	−0.20	1.47	61	0.32	1.40	62	−2.007	.047	−.36
Bodily pain index SF-12									
Baseline	−0.02	0.95	76	0.02	0.92	75	−0.237	.813	
Follow-up	−0.22	0.92	61	0.22	0.89	62	−2.652	.009	

Variables	Immediate Treatment Group (n = 76)			Waitlist Group (n = 75)			t	p	d
	M	SD	n	M	SD	n			
Change score	−0.16	0.75	61	0.11	0.86	62	−1.808	.073	−.33
Self-reported physical health medications									
Baseline	1.74	3.26	76	1.51	2.13	75	0.513	.609	
Follow-up	1.54	2.96	61	1.16	1.39	62	0.914	.363	
Change score	0.16	3.13	61	−0.43	1.97	62	1.266	.208	.23
Interference with daily activities									
Activity interference SF-12									
Baseline	2.24	0.64	76	2.35	0.63	75	−1.060	.290	
Follow-up	2.34	0.61	61	2.37	0.60	62	−0.308	.759	
Change score	0.11	0.66	61	0.07	0.58	62	0.389	.698	.06
Accomplishment interference SF-12									
Baseline	3.29	1.34	76	3.17	1.32	75	0.536	.593	
Follow-up	3.42	1.37	61	3.21	1.38	62	0.840	.403	
Change score	0.12	1.42	61	0.08	1.24	62	0.176	.861	.03
Social interference SF-12									
Baseline	2.55	1.52	76	2.58	1.50	74	−0.115	.908	
Follow-up	2.05	1.42	61	2.57	1.66	61	−1.877	.063	
Change score	−0.41	1.59	61	−0.18	1.30	60	−0.860	.392	.16

[a] Groupings in bold reflect distinct comparisons that have a familywise error correction for that group. For relationship quality with primary care provider, lower scores indicate a higher quality relationship. Higher scores indicate more satisfaction with health care for the EuroQol global rating of health care variable. For the number of routine and ER/urgent care visits, lower scores indicate fewer visits to each of these services. For confidence for self-management and behaviors of self-management, higher scores indicate greater confidence and behaviors of self-management.

Table 4.

Secondary Outcomes: Independent *t* Test Comparisons of Immediate Treatment and Waitlist Groups From Baseline to 6-Month Follow-up[a]

Variables	Immediate Treatment Group (n = 76)			Waitlist Group (n = 75)			*t*	*p*	*d*
	M	SD	n	M	SD	n			
Mental health and functional status									
BASIS-24 total score									
Baseline	1.58	0.82	74	1.63	0.82	74	−0.374	.709	
Follow-up	1.37	0.77	61	1.42	0.76	61	−0.340	.734	
Change score	−0.23	0.50	60	−0.15	0.62	60	−0.787	.433	.14
Psychiatric medications									
Self-reported psychiatric medications									
Baseline	2.29	1.37	76	2.11	1.39	75	0.812	.418	
Follow-up	2.21	1.37	61	2.21	1.45	62	0.014	.989	
Change score	−0.05	1.16	61	0.10	1.40	62	−0.629	.530	−.12
Officially recorded psychiatric medications									
Baseline	1.79	1.91	76	1.48	1.68	75	1.058	.292	
Follow-up	3.25	1.93	61	2.73	1.43	62	1.701	.091	
Change score	1.43	1.93	61	1.24	1.69	62	0.565	.573	.10
Health habits									
Diet									
Baseline	0.06	0.61	76	0.04	0.56	75	0.195	.845	
Follow-up	0.04	0.63	61	−0.09	0.56	62	1.223	.224	
Change score	0.02	0.56	61	−0.10	0.52	62	1.211	.228	.22
Exercise									
Baseline	−0.33	0.90	76	−0.10	0.92	75	−1.573	.118	
Follow-up	−0.24	0.91	61	−0.13	0.90	62	−0.684	.495	
Change score	0.18	0.95	61	0.04	0.79	62	0.851	.396	.16
Count of current substances used									
Baseline	0.88	1.11	76	1.00	1.13	75	−0.651	.516	
Follow-up	0.79	1.02	61	0.81	0.81	62	−0.118	.906	
Change score	−0.08	0.81	61	−0.13	0.84	62	0.265	.792	.06

Table 4.

Secondary Outcomes: Independent *t* Test Comparisons of Immediate Treatment and Waitlist Groups From Baseline to 6-Month Follow-up[a]

Variables	Immediate Treatment Group (n = 76)			Waitlist Group (n = 75)			*t*	*p*	*d*
	M	SD	n	M	SD	n			
Stigma and life satisfaction									
Provider stigma									
Baseline	3.80	0.59	60	3.74	0.64	66	0.530	.597	
Follow-up	3.76	0.48	54	3.70	0.71	50	0.563	.574	
Change score	0.06	0.62	44	−0.12	0.75	46	1.283	.203	.26
Internalized stigma									
Baseline	2.72	0.53	75	2.70	0.52	74	0.251	.802	
Follow-up	2.74	0.48	60	2.77	0.54	61	−0.353	.724	
Change score	0.07	0.38	60	0.06	0.33	61	0.133	.894	.03
Satisfaction with life									
Baseline	1.77	0.70	75	1.78	0.66	73	−0.052	.959	
Follow-up	1.81	0.75	58	1.90	0.72	60	−0.630	.530	
Change score	0.11	0.61	58	0.12	0.54	59	−0.129	.897	.02

[a] Groupings in bold reflect comparisons that have a familywise error correction within them. Higher scores on the BASIS-24 indicate a higher degree of clinical symptomology. Medication variables are a count of the number of medications. Higher *z* scores of diet and exercise indicate better eating habits and more exercise. Higher counts of substances used indicate a greater variety of substances used. Higher internalized stigma and provider stigma scores reflect less stigma. Higher satisfaction with life scores indicate greater satisfaction.

Self-management. We examined self-management of health care in terms of attitudes (confidence) and behaviors (actions). We hypothesized that changes in attitudes would precede changes in behaviors, but it was unclear whether those behaviors would change within the first 6 months or whether collaboration with the health navigator would reduce participants' feelings that they were managing care on their own. As we construed these as distinct constructs for change, we did not adjust for multiple comparisons with these variables. At baseline, individuals in the waitlist group were significantly more confident than those in the immediate treatment group about their ability to self-manage their health care (see Table 2). However, at 6-month follow-up, the change in confidence was significantly higher among those in the treated group than those in the waitlist group (*p* = .049). There were no between-group differences in ratings of self-management behaviors at baseline or after 6 months.

Indirect Primary Outcomes

Health screenings. Health screenings are important to everyone's health. We found no differences between the 2 groups in the total number of routine health screenings at baseline. However, the treated group had more routine health screenings after 6 months compared with the waitlist group, although the difference in differences was not statistically significant ($p < .08$).

Medical diagnoses and physical pain. Chronic diseases were common among participants at the beginning of the study; more than a quarter of participants were diagnosed with high blood pressure and high cholesterol (see Table 1). Underdetection of existing health conditions is a concern for this population.[2] We anticipated that the intervention would lead to higher rates of diagnosis for the immediate treatment group compared with the waitlist group, which was confirmed (mean change score $p = .036$; see Table 3). Those in the treated group reported significant reductions in the severity of bodily pain compared with the waitlist group, although the change score for the pain index was not statistically significant ($p = .07$).

Other indirect primary outcomes. We found no differences at baseline or after 6 months for any outcomes related to activity interference, accomplishment interference, or interference in social functioning owing to medical issues. Nor were there any differences at baseline or for changes in the number of self-reported physical health symptoms, self-perception of global health, or self-reported number of physical health medications used.

Secondary Outcomes

Secondary outcome change scores are presented in Table 4. Mental health functioning was assessed using the BASIS-24. At baseline, we found no differences in the total scores or any subscale. After 6 months, we found a significant reduction in emotional lability in the treatment group compared with the waitlist group. The familywise correction for multiple comparisons was $p < .007$, so this was not interpreted as significant. There were no differences at baseline or over time between the immediate treatment and waitlist groups in the self-reported use of psychiatric medications.

We found no significant health habit differences between the immediate treatment and waitlist groups at baseline in terms of diet, exercise, or number of substances used. After 6 months, we still found no significant differences between the groups. At baseline we found no differences between the 2 groups in being sexually active, the likelihood of using a barrier method, or the number of sexual partners. We did not conduct additional analyses on risky sexual behavior, as the rates of such behavior were too low.

We found no differences at baseline or after 6 months between the 2 groups in social functioning and well-being, which were evaluated in terms of stigma (self-perceived or from a medical provider) and satisfaction with life.

Enduring and Delayed Changes in the Treated Group

The immediate treatment group was assessed again 6 months posttreatment to determine whether the participants had retained the effects of the intervention or had experienced any delayed effects. We found no statistically significant declines in any of the health or health care use indicators for the immediate treatment group from the end of the intervention to 6 months postintervention (see Tables 5 and 6 for primary outcomes). The percentage of participants whose preferred locus of treatment was a primary care provider/clinic increased from 80% to 91%, but this change was not statistically significant: Fisher exact test $\chi2(1,53)$ = 1.61, *p* = .24. However, at the 12-month follow-up, the immediate intervention group reported statistically significantly fewer emergency room/urgent care visits compared with their use from baseline to the 6-month assessment. The immediate treatment group also reported significantly more self-management behaviors from the 6-month to the 12-month assessment. Secondary outcomes of the intervention are presented in Table 7. After adjusting for the familywise error, we found no significant changes for the secondary outcomes of the intervention during this period.

Table 5.

Paired *t* Tests of Change Score Mean Differences for Direct Primary Outcomes
6 Months Postintervention (Immediate treatment group only)[a]

| Variables | Time 2 (6 months) to Time 3 (12 months) | | | | | |
| | (n = 61) | | | | | |
	M	SD	n	*t*	*p*	*d*
Health care relationships						
Primary care provider relationship quality	0.05	0.66	42	−0.515	.609	.08
EuroQol health care	−1.06	33.89	48	0.217	.829	.03
Service use						
Number of ER/urgent care visits	−0.17	0.49	54	2.522	.015	.35
Routine care visits	0.04	0.35	54	−0.864	.392	.12
Self-management attitudes						
Confidence for self-management	0.29	1.67	54	1.265	.211	.17
Self-management activities						
Self-management behaviors	0.13	0.35	48	2.494	.016	.37

[a] Groupings in bold reflect comparisons that have a familywise error correction within them. For relationship quality with primary care provider, positive change scores indicate a decrease in the quality of the relationship. Negative change scores indicate more satisfaction with health care for the EuroQol global rating of health care. For the number of routine and ER/urgent care visits change scores, negative change scores indicate fewer visits to each of these services. For confidence for self-management and behaviors of self-management, positive change scores indicate greater confidence and behaviors of self-management.

Table 6.

Paired *t* Tests of Change Scores Mean Differences for Indirect Primary Outcomes 6 Months Postintervention (Immediate treatment group only)[a]

| Variables | Time 2 (6 months) to Time 3 (12 months) | | | | | |
| | (*n* = 61) | | | | | |
	M	SD	n	*t*	*p*	*d*
Health screenings						
Total health screenings	0.17	1.95	54	−0.629	.533	.08
Number of routine screenings	−0.17	0.97	54	1.267	.211	.17
Diagnoses						
Medical diagnoses	0.02	1.00	54	0.136	.892	.02
Global health						
EuroQol health	−6.43	24.34	54	1.940	.058	.27
Health status: SF-12	0.08	0.93	52	0.599	.552	.09
Health symptoms	0.29	1.67	54	1.265	.211	.17
	0.78	3.60	54	1.587	.118	.22
Pain						
Bodily pain severity: SF-12	0.17	1.65	53	−0.749	.457	.10
Bodily pain index: SF-12	0.19	0.91	53	−1.876	.066	.26
Medications						
Self-reported physical health medications	0.24	2.07	54	0.853	.397	.12
Interference with daily activities						
Activity interference: SF-12	−0.03	0.07	53	0.375	.708	.06
Accomplishment interference: SF-12	−0.14	0.2	53	0.705	.484	.10
Social interference: SF-12	0.25	1.24	53	1.441	.155	.20

[a] Groupings in bold reflect comparisons that have a familywise error correction within them. Positive change scores of screenings, symptoms, chronic diseases detected, and medications reflect reductions of each from immediately postintervention to 6 months postintervention. A negative change in the EuroQol global rating of health indicates greater satisfaction with health status. Negative change scores on the SF-12 items indicate greater severity of issues.

Table 7.

**Paired *t* Tests of Change Score Mean Differences for Secondary Outcomes 6
Months Postintervention (Immediate treatment group only)ᵃ**

| Variables | Time 2 (6 months) to Time 3 (12 months) | | | | | |
| | (n = 61) | | | | | |
	M	SD	n	*t*	*p*	*d*
Mental health and functional status						
BASIS-24 total	0.01	0.52	54	−0.081	.936	.02
Psychiatric medications						
Self-reported psychiatric medications	−0.13	1.27	53	−0.747	.458	−.10
Officially recorded psychiatric medications	−0.04	0.70	54	−0.389	.699	−.06
Health habits						
Diet	−0.10	0.60	53	−1.207	.233	−.17
Exercise	0.07	1.03	53	0.503	.617	.07
Count of current substances used	0.04	0.55	53	0.496	.622	.07
Stigma and life satisfaction						
Provider stigma	−0.06	0.59	43	−0.712	.480	−.10
Internalized stigma	0.01	0.46	53	0.088	.930	.02
Satisfaction with life	0.01	0.48	51	0.123	.903	.02

ᵃ Groupings in bold reflect comparisons that have a familywise error correction within them. Positive change scores on the BASIS-24 indicate a reduction of clinical symptomology. Negative medication change scores indicate an increase in the number of medications. Positive change *z* scores of diet and exercise indicate better habits. Positive change counts of substances used indicate a smaller variety of substances used. Positive internalized stigma and provider stigma change scores reflect an increase in stigma. Positive satisfaction with life change scores indicate less satisfaction.

Within-group Changes for Both Treated Groups Combined

Because the waitlisted group also eventually received the intervention, it was important to determine whether they also responded to it. We did this by combining the change scores for both groups at the end of the 6-month period during which each one received the intervention. The combined treatment effects on the direct primary outcomes are presented in Table 8. After 6 months of the intervention, both treated groups showed improved relationships with their primary care providers, more visits to routine care providers, and more health care self-management confidence. There was also a change in preferred locus of care, as 19% of participants became connected to a routine care provider (79% of the full sample) after the intervention: $\chi 2(1,109) = 22.90$, $p < .001$. However, after the familywise correction for multiple comparisons, more visits to routine care providers were not statistically significant ($p < .055$).

The indirect primary effects are presented in Table 9. After adjusting for the familywise correction, the significant indirect effects included reductions in the pain index, fewer health symptoms, a higher global rating of health, and more routine health screenings.

The secondary effects are presented in Table 10. From pretreatment to posttreatment, after adjusting for the familywise error, participants reported significantly lower depression, psychosis, and total BASIS-24 scores. Finally, social interference owing to physical health—measured using the SF—was significantly reduced postintervention. Perceived stigma and satisfaction with life were not significantly different after the intervention.

Potential moderators of the intervention. We did not hypothesize moderation effects, nor was the study powered to detect them, but we did explore the data for potential moderator effects owing to ethnicity or gender. We found no baseline demographic differences between those in the immediate treatment and waitlist groups, but we wanted to identify subgroups that might have responded differentially to the intervention. The sample was predominantly Latino (60%) and the distribution of gender was approximately equal. We conducted some exploratory t tests with the change scores to look for evidence of systematic differences with these groups, using linear mixed-effects models for direct and indirect primary outcomes.

Latino Versus non-Latino. We completed linear mixed-effects models to determine whether Latinos responded differentially to the intervention on the primary outcomes and explored the main and interactive effects of the intervention (Latino x study group x time point). For these analyses, we focused

on immediate treatment versus waitlist comparisons for the first 6 months of the study (baseline to 6 months).

Table 8.

Paired *t* Tests of Collapsed Direct Primary Outcomes for the Full Sample Over 6 Months[a]

	Treatment Time 1			Treatment Time 2				
	M	SD	n	M	SD	*t*	*p*	*d*
Health care relationships								
Primary care provider relationship	1.66	0.76	81	1.41	0.62	2.947	.004	.34
EuroQol global rating of health care	71.97	25.01	91	78.48	24.46	−2.125	.036	.22
Service use								
Number of ER/urgent care visits	1.31	0.44	111	1.25	0.36	1.394	.166	.13
Routine care visits	1.42	0.39	111	1.51	0.39	−2.245	.027	.21
Self-management attitudes								
Confidence for self-management	7.52	2.09	111	7.96	1.89	−2.669	.009	.26
Self-management activities								
Self-management behaviors	1.95	0.52	111	2.01	0.44	−1.543	.126	.05

[a] Groupings in bold reflect comparisons that have a familywise error correction within them. For relationship quality with primary care provider, lower scores indicate a higher quality relationship. Higher scores indicate more satisfaction with health care for the EuroQol global rating of health care variable. For the number of routine and ER/urgent care visits, lower scores indicate fewer visits to each of these services. For confidence for self-management and behaviors of self-management, higher scores indicate greater confidence and behaviors of self-management.

Table 9.

Paired *t* Tests of Collapsed Indirect Primary Outcomes for the Full Sample Over 6 Months[a]

	Treatment Time 1			Treatment Time 2				
	M	SD	n	M	SD	t	p	d
Health screenings								
Total health screenings	2.58	2.15	111	2.85	2.15	−1.209	.229	.12
Number of routine screenings	0.92	0.92	111	1.20	0.99	−2.569	.012	.24
Diagnoses								
Medical diagnoses	1.14	1.40	111	1.29	1.40	−1.996	.048	.19
Global health								
EuroQol global rating of health	56.63	27.72	110	61.87	26.30	−2.587	.011	.25
Global rating of health, SF-12	3.62	1.10	111	3.45	1.03	1.714	.089	.18
Health symptoms	8.77	5.60	111	7.76	5.35	2.468	.015	.24
Pain								
Bodily pain severity	3.74	1.52	111	3.44	1.68	2.189	.031	.21
Bodily pain index	0.07	0.92	111	−0.10	0.95	2.274	.025	.22
Medications								
Self-reported physical health medications	0.85	1.71	111	0.97	1.89	−1.185	.238	−.09
Interference with daily activities								
Activity interference, SF-12	2.29	0.63	110	2.34	0.61	−0.954	.342	.10
Accomplishment interference, SF-12	3.32	1.33	111	3.46	1.31	−1.131	.260	.12
Social interference, SF-12	2.49	1.53	110	2.12	1.42	2.542	.012	.24

[a] Groupings in bold reflect comparisons that have a familywise error correction within them. Screenings, symptoms, chronic diseases detected, and medications are count variables of the number of each. Higher scores on the SF-12 items indicate greater severity of issues. Higher ratings of EuroQol global rating of health indicate greater satisfaction with health status.

Table 10. Paired *t* Tests of Collapsed Treatment Period of the Full Sample With Secondary Outcomes Over 6 Months[a]

Variables	Treatment Time 1			Treatment Time 2				
	M	SD	n	M	SD	*t*	*p*	*d*
Mental health and functional status								
BASIS-24 total	1.49	0.79	107	1.28	0.75	4.427	<.001	.43
Psychiatric medications								
Self-reported psychiatric medications	1.30	2.39	111	1.60	2.62	−1.278	.204	−.12
Officially recorded psychiatric medications	2.22	1.78	111	3.00	1.73	−5.079	<.001	−.48
Health Habits								
Diet	−0.06	0.61	111	0.01	0.61	−1.315	.191	.12
Exercise	−0.27	0.92	111	−0.25	0.93	−0.281	.779	.02
Count of current substances used	0.81	0.98	110	0.78	0.98	0.307	.760	.03
Stigma and life satisfaction								
Provider stigma	3.74	0.63	82	3.83	0.53	−1.403	.164	.16
Internalized stigma	2.73	0.52	108	2.77	0.48	−1.294	.198	.12
Satisfaction with life	1.78	0.72	101	1.86	0.74	−1.351	.180	.14

[a] Groupings in bold reflect comparisons that have a familywise error correction within them. Higher scores on the BASIS-24 indicate a higher degree of clinical symptomology. Medication variables are counts of the number of medications. Higher *z* scores of diet and exercise indicate better eating habits and more exercise. Higher counts of substances used indicate a greater variety of substances used. Higher internalized stigma and provider stigma scores reflect less stigma. Higher satisfaction with life scores indicate greater satisfaction.

We did not find evidence that Latinos responded differentially for health services (relationship with their primary care provider, emergency care visits, global health care rating, total or routine health screenings), self-management (confidence or behaviors), or health issues (EuroQol and SF-12 global rating of health, detection of chronic diseases, pain severity, symptoms, number of physical health medications, interference with daily activities, accomplishments, or social functioning) We did find a significant 3-way interaction for use of routine care health services ($p_{\text{time-point*study-group*Latino}}$ = .04). Specifically, compared with non-Latinos, Latinos in the immediate treatment group had a significantly greater increase in visits to routine care providers after 6 months of the intervention. The scaled mean number of visits was greater among Latinos after 6 months compared with non-Latinos in the immediate treatment and waitlist groups at baseline. It is possible that Latinos may have responded particularly well to the intervention, but a larger sample size is required to detect the effects of the intervention across race/ethnicity. We also found interactions for Latino by time point (p = .02) and by study group (p = .02) for the pain index, but not a 3-way interaction. Among those in the immediate treatment group, Latinos reported significantly more pain at baseline. Although we found no differences related to race/ethnicity at baseline between the waitlist and immediate treatment groups for pain, after 6 months in the intervention non-Latinos reported less pain than Latinos and non-Latinos in the waitlist group at baseline and after 6 months.

Male versus female. Using linear mixed-effects models, we explored whether gender influenced the response of participants to the intervention for primary outcomes, using the same procedures we used with Latinos. We found a main effect for the immediate treatment group to experience improvements in their global health care after controlling for gender ($p_{\text{time-point*study-group}}$ = .03) but no gender or gender interaction effect. There was a significant 3-way interaction among gender, time point, and study group for the provider relationship quality (p = .02). Specifically, relationship quality with the primary care provider improved for both males and females in the immediate treatment group over the first 6 months. However, we found no significant changes among females in the waitlist group (p = .18), and relationship quality worsened among waitlisted males (p = .01). We found no gender differences related to use of the emergency room, routine health care, or self-management behaviors. Men tended to report significantly more confidence about their abilities to self-manage (p = .05), but we found no interactive effects with time or study group.

Regarding indirect outcomes, we found no evidence of a gender main effect or a treatment by gender interaction for health screenings, detection of chronic diseases, global rating of health from the

SF-12, self-reported medical medications, health symptoms, or interference with accomplishments. We did find significant main effects that males rated their health higher than females did on the EuroQol (p = .01), reported less pain (severity: p = 02; index: p = .008), and reported less mean interference with activities (p = .02) or social functioning (p = .003).

Discussion

Improving the physical health care of individuals with SMI is vital to their well-being and to decreasing their morbidity and mortality. The Bridge intervention demonstrated improvements for the health care and health of individuals with SMI in several key areas, and those gains remained 6 months after the intervention. We also found indications of delayed improvement (after the intervention period) in 2 key areas: self-management behaviors and reduced emergency room use.

Turning to specific outcomes, self-management is a core principle of this intervention and key to the maintenance of gains in health and health care use. Confidence in medical care self-management improved significantly more in the immediate intervention group after 6 months in the intervention. The health navigators also helped consumers move from using the emergency room and urgent care facilities to seeking medical care in a primary care setting, increased their visits to routine providers, and improved the quality of their relationships with their providers; these are all important aspects of improving health care and health outcomes. These changes are notable given that the majority of subjects had seen a primary care provider in the 6 months prior to enrollment in the study. The use of emergency services declined over a longer period in the intervention group (significant reduction in the 6 months postintervention), which suggests that reducing dependence on emergency services might require special attention for this population.

The increased detection of previously undiagnosed diseases during the treatment period was likely a reflection of persistent under-detection of diseases in this population.[2] The finding that self-management attitudes increased even though participants received more chronic disease diagnoses supports the strength of this intervention and the importance of having an active health care intervention for individuals with SMI. We saw evidence of attitudinal and then behavioral changes in the self-management of health and health care by those in the treated group, which indicates a logical progression of self-management adoption. Changing self-management behaviors might require more emphasis earlier in the intervention.

Our data on self-reported health symptoms showed improvement for both groups, which could be explained in 2 ways. First, the measure itself is highly temporal in that it includes current symptoms that can vary quickly over time in response to colds, flu, or seasonal illnesses. Thus, it might not be a good measure for the impact of an intervention over 6 months. Second, the measure could be highly sensitive to the expectancy effect of being in a waitlist group and knowing that you will receive a health care intervention. Although this measure performed better in our pilot work, it appears that future research should use another, more stable indicator of self-reported health status.

Overall, this intervention had its strongest effects in the immediate treatment group (compared with the waitlist group) on the direct primary outcomes, less impact on the indirect primary outcomes, and no impact on the secondary outcomes, which suggests that further research is needed on the intended impact of the intervention. First, we need to modify the intervention so that more of the direct outcomes are improved. For example, we might need to do a better job of teaching consumers to rely on their preferred outpatient provider rather than going to emergency or urgent care out of habit. Confidence in self-management improved during the intervention, but improvement in self-management behaviors in the treated group did not appear until after the intervention ended. Navigators might need to take a more active approach to improving behaviors, or these behavioral changes might just take longer to materialize. Some of the indirect primary outcomes depend on the behavior of an engaged health care provider. It is possible that the navigators could monitor this area more closely; for example, coaching and encouraging consumers to schedule regular health screenings. A clear impact on secondary outcomes might be too much to expect from a modestly intense 6-month intervention; such impacts could emerge in a study with a larger sample.

The intervention demonstrated some consistent effects on secondary outcomes when we combined the intervention period of both study groups (within-group changes only), which suggests that more power was required to detect effects on mental health and overall functioning. The lack of impact on stigma variables might reflect the difficulty of evaluating and addressing this concept. Although this intervention showed improved relationships with primary care providers, participants might have had lingering concerns about whether they were treated differently because of their mental illness. The lack of change in the health habits variables might reflect the limited resources available to this population beyond their clinical care. Satisfaction with life includes satisfaction with housing, food, privacy, self-esteem, and relationships, which are well beyond the scope of this intervention. Improvements in these areas would require longer time frames and supports from other programs; however, it is encouraging

that interference with social activities because of medical issues appeared to decrease when the treatment period for both groups was combined. It is also possible that seeing changes in these secondary outcomes is unlikely in a modestly intensive intervention over just 6 months.

A recent meta-analysis of peer-delivered interventions found that they showed generally small to modest effect sizes.[53] The current peer intervention fits this pattern. Given recent reports that advocate for the use of peers in mental health and health services, these findings are encouraging.[54-55] This study also showed evidence of improvements in a greater range of domains than previous pilot trials in which trained peers used group-based strategies to target similar outcomes.[25,36] In addition to the higher rates of primary care use and health care self-efficacy (also found in previous research), the Bridge improved relationships and connections with primary care providers, improved detection of medical diagnoses, and showed reductions in pain. The intervention also showed sustained effects: an increase in self-management behaviors and reduced emergency room use. Given the dearth of interventions that address the physical health of individuals with SMI[6] and the variable extent to which mental health and physical health services are coordinated throughout the United States,[56] this intervention could fill an important gap in many systems nationally.

Generalizability. Data on the character of the intervention suggest that subjects were well engaged with the intervention and developed positive alliances with the peer navigators. Data on intervention intensity suggest that it is a modestly intensive intervention with about one in-person and one phone contact per person per month over 6 months but with large variation across individuals. The navigators noted this variability in supervision, reporting that some participants moved very quickly with health navigation and others moved more slowly and needed more contacts. Health navigation is an individually tailored intervention, and future research should explore whether particular subpopulations respond differentially to the intervention or whether specific strategies used by navigators are more strongly associated with improvement. The overall modest intensity of the intervention bodes well for its widespread utility.

The majority of participants in the study were racial or ethnic minorities, mostly Latino. This suggests that the intervention has implications for addressing health disparities owing to race and ethnicity, although the study was not powered to detect subpopulation differences.

In this study, health navigators were not required to bill for their services. However, in developing this intervention with our agency partners, we identified certain billing codes that can be

used for health navigation services. Peer health navigators using this intervention are currently billing for their services across California. This has notable implications for the sustainability of the intervention when it is implemented in usual care settings by agency providers.

Implementation of study results. Throughout the study we conducted interviews and held meetings with agency executive staff, the health navigator supervisor, health navigators, mental health providers, and physical health providers to ensure that our intervention was implemented smoothly. With funding from the UniHealth Foundation, we created an implementation manual and fidelity measures, and conducted interviews with multiple agencies to evaluate how well the intervention was adopted at those sites. Through these interviews and other discussions with our training partners, we identified barriers to the successful implementation and fidelity of the intervention. Critical issues included a lack of resources for agencies to educate their staff about the physical health and health care of their clients, a disconnect between agency leaders and line staff about physical health care treatment goals, limited supervisor support for prioritizing health issues, scope-of-practice issues at mental health agencies, lack of dedicated time for health navigation activities (which weakened fidelity), and challenges around how to integrate peer health navigators into treatment teams. These lessons, while valuable, did not constitute a systematic evaluation of the implementation process. To improve our implementation, we will have to formally evaluate the process and conduct real-time troubleshooting of that process in mental health agencies that are unfamiliar with the intervention.

Performance of measures. No well-established menu of measures exists for studies of integrated health care interventions for the seriously mentally ill, especially interventions that are not focused on a specific disease. In this study we used a wide array of measures, some adapted from other populations and some designed for use with non–mentally ill populations. Overall, we found 3 kinds of issues with some of the measures that are relevant to future studies: (1) extreme variation in scores between and within participants, (2) expectancy effects, and (3) sensitivity to change related to statistical power. The EuroQol measures are scaled from zero to 100; this resulted in very large variances in the scores, which precluded detecting between-group differences. Indications suggested that the treatment group fared better on quality of health care, but the variances on both items were very large in both groups. It is possible that 1-10 scoring would reduce this problem for this population. The measure of health symptoms also showed effects owing to time for both the treated and untreated groups (they both improved significantly compared to baseline) but no differential effect owing to the intervention. This measure might be susceptible to temporality and expectancy effects. Finally, we saw

more improvement in the treatment group than in the waitlist group on measures such as the SF-12 item on social functioning and the EuroQol measure of global health status, but the difference was not statistically significant. These measures might not be sensitive to change in this population, or the effects might be statistically significant with a larger sample size. While we did find some measures that worked well with this population in important areas, more work is needed to provide a menu of measures that can capture self-reported outcomes in studies of integrated health care interventions.

Response to intervention in subgroups. Given that the majority of participants in this study were ethnic minorities, these findings have particular relevance to health disparities for ethnic minority populations who are also diagnosed with a mental illness. The study was completed in Southern California and the sample was 60% Latino, which is a very similar rate to Los Angeles County estimates of the percentage of Latino clients needing mental health services for serious mental illnesses (64%). Like most mental health samples of Latinos in Los Angeles, the individuals are predominantly of Mexican heritage, with some Central and South American representation. Far fewer tend to be Native American or from Puerto Rico and other Caribbean countries. Males and Latinos appeared to have better health and health care than females and non-Latinos in this study, but we found no clear evidence that these demographic differences affected the response to the Bridge intervention. The lack of variation in response to the intervention by gender and race/ethnicity could suggest that this intervention has generalizability to these groups. Differential reactions to the intervention might be detected in a trial with a larger sample, but the highly individualized approach of the intervention was likely well adapted to the spectrum of participants. Future studies can confirm that theory.

Study limitations. The data on the health and health status of participants in this study are from self-reports. Future analyses will evaluate whether insurance claims data support the improvements in health and health care and will enable us to evaluate the impact of this intervention on health care costs. We had no measures of health status, such as laboratory and medical diagnostic tests. These outcomes are hard to retrieve in an intervention that seeks to improve overall health rather than a single chronic disease. Lab measures are important for future research, but recent analyses attest to the importance of subjective measures of health status as well.[6] The data from the collapsed treatment period indicated that more effects might have been detected if the study had had a larger sample size. However, because we had no control group for the within-group changes, these analyses should be considered as primarily descriptive. The analyses of the immediate treatment group for the 6 months postintervention were also within-person only and should be further evaluated as part of a future study

that includes a control group that does not receive the intervention. Finally, while we included the waitlist group's second assessment for the baseline, it is also possible to include the preintervention scores from baseline, which could encapsulate some of the variations the waitlist participants experienced while they waited to receive the intervention. However, we would consider these unequal comparisons, as they would encapsulate 6 months for the immediate treatment group and 12 months for the waitlist group. Therefore, the minor differences we found should not be interpreted as clinically meaningful.

Conclusions

Individuals diagnosed with SMI have experienced dramatic disparities in health care access and health outcomes compared with the general population. The aim of this study was to test the effectiveness of a peer-delivered intervention designed to increase the strategic use of health care services by persons with SMI who are in the public outpatient mental health system. We found evidence that the Bridge was effective, compared with usual care, in increasing the number of persons with SMI who were connected to primary health care and in improving the quality of participants' relationships with their primary health care providers. The intervention also led to increased use of routine outpatient health care services, a preference for outpatient care, an increase in medical diagnoses, reductions in pain, and increased confidence among participants regarding self-management of their health care. This study was one of very few to include a postintervention follow-up period for the treated group,[6] and we found evidence that not only did this group maintain these effects for 6 months after treatment ended, but participants made additional improvements in terms of reducing their use of the emergency room and increasing self-management behaviors. We saw indications (in the collapsed within-intervention comparisons) that if this intervention were used on a larger sample it could be associated with improvements in other domains, including routine health screenings, satisfaction with health care, overall perceptions of health, the number of medical symptoms, use of emergency/urgent care services, interference with social activities, and overall better mental health, although these results require further research before they can be stated with any confidence. Given the paucity of interventions and the severity of need for this population, our results suggest that the Bridge should be considered for use by other community mental health agencies.

We believe the Bridge could be implemented at other mental health agencies and that it merits consideration by agencies and policymakers interested in addressing the physical health of the SMI population. First, we employed mental health peers to deliver the services, which is an important step in

providing meaningful work for a population that has very low employment rates. Second, the intervention can reduce the increasing burden on community mental health agencies to provide services that holistically address the needs of consumers, including physical health issues. Third, for a psychosocial intervention, the average number of contacts was modest: an average of 5 in-person visits and 6 phone calls with each participant. (However, there was large variability across participants in the number of treatment contacts they received, which suggests that individualization is important.) Fourth, the intervention showed effects within a relatively short period. And finally, the intervention is billable to Medicaid, which is critical to the sustainability of any intervention provided in a usual care context.

The biggest limitation regarding our confidence in the results of this study is that nearly all the measures were based on self-report from the participants. We will assess the efficacy of this intervention by examining Medicaid insurance records in the upcoming year and by using these external data in additional analyses.

Overall, the Bridge is a promising peer-delivered intervention to address the health care needs and physical health of individuals with SMI. Future work should optimize this intervention so that its effects can be improved.

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