



Integrating Primary Care into Behavioral Health Settings: What Works for Individuals with Serious Mental Illness

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Foreword

Mental illness affects millions of Americans of all ages and results in substantial disability and costs. About one-fifth of adults with mental illness have a serious mental illness (SMI), which interferes with their ability to function normally.

Behavioral health integration (BHI) is a patient-centered approach that addresses all the health needs of patients. While there is much evidence supporting the effectiveness of integrating behavioral health into primary care settings for adults with depression and anxiety disorders, much less focus has been on BHI models that target individuals with SMI.

This report identifies and evaluates the evidence for BHI models for SMI—what works, what shows promise, and key implementation areas that are important for successful endeavors. This account demonstrates what is happening in various health systems and uses evidence to guide the way forward.

Understanding the challenges associated with providing care to individuals with SMI and recognizing that there was a gap in the research for this population, the Reforming States Group (RSG) asked the Milbank Memorial Fund (MMF) to prepare this report so that policymakers can better understand the evidence concerning the integration of primary care into behavioral health settings for those with SMI.

Supported by the MMF, the RSG is a bipartisan, voluntary group of state health policy leaders from both the executive and legislative branches who, with a small group of international colleagues, work on practical solutions to pressing problems in health care. The MMF, an endowed operating foundation that works to improve the health of populations by connecting leaders and decision makers with the best available evidence and experience, engages in nonpartisan analysis, collaboration, and communication on significant issues in health policy.

It is our hope that this report will encourage further effort among policymakers as they develop policies and programs that improve health care delivery for individuals with mental illness.

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Minority Leader
Utah Senate

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Introduction

For the last two decades, research has shown the benefit of behavioral health integration (BHI), a patient-centered approach in which behavioral health and medical providers work together to provide care.

In general, BHI models studied in research trials have been categorized based on their target population—for example, models for patients with depression or anxiety disorders and models that target patients with serious mental illness (SMI) or substance use disorder.

While there is a robust evidence base supporting the effectiveness of integrating behavioral health into primary care settings for adults with depression and anxiety disorders, the evidence base for models that target individuals with SMI and substance use disorder has not been the focus of prior reviews. Consequently, this report focuses on the models that integrate care for patients with SMI and substance use disorder seen in mental health and chemical dependency treatment settings.

Interested in both improving health care outcomes and controlling Medicaid costs, states continue to develop and implement strategies to better integrate primary care into behavioral health services. Medicaid is the primary source of coverage for low-income individuals, many of whom have behavioral health needs.

Understanding the challenges associated with providing care to individuals with SMI and recognizing that there was a gap in the research for this population, the Reforming States Group (RSG) asked the Milbank Memorial Fund to prepare this report to better understand the evidence concerning the integration of primary care into behavioral health settings for those with SMI and substance use disorder. The RSG is a bipartisan, voluntary group of state health policy leaders from both the executive and legislative branches who, with a small group of international colleagues, work on practical solutions to pressing problems in health care.

For the report, databases were searched with a focus on BHI for SMI and substance use disorder. Primary evidence sources include systemic reviews, meta-analysis, technology assessments, and controlled trials over 10 years beginning in 2004. The quality of evidence for each study is evaluated. Each BHI model is summarized and its outcomes assessed. Developed with policymakers in mind, the report also provides strategies for implementation, as well as resources for planning and implementing BHI models.

This report may guide state policymakers and other stakeholders as they develop and implement policies and programs that support the integration of primary care into behavioral health settings.

Background

Overview

Mental illness and substance use disorder are common, affect people of all ages, and result in substantial disability and costs. In the United States, 18.6% of adults and 13% to 20% of children ages 8 to 15 years old have a mental disorder.¹ Approximately 9.4% of the population aged 12 and older use illicit drugs, and 6.3% are heavy users of alcohol, defined as five or more drinks on each of five or more days in the past 30 days.²

About one-fifth of adults with mental illness have a severe or serious mental illness.³ Serious mental illness (SMI) is generally defined as mental or behavioral disorders that result in significant functional impairment and that limit an individual's ability to perform one or more major life activities. These disorders include schizophrenia, schizophrenia-like psychosis (e.g., schizoaffective disorder), bipolar disorder, and other psychoses, as well as severe forms of disorders such as major depression, anxiety, post-traumatic stress disorder, and obsessive-compulsive disorder.

Overall, 9.6 million U.S. adults (4.1%) have a serious mental illness,^{1,3,4} and an estimated 4 million to 5 million children and adolescents have an SMI.^{1,5} Overall, 9.6 million U.S. adults (4.1%) have an SMI,^{1,3,4} and an estimated 4 million to 5 million children and adolescents (0.1%) have an SMI.^{1,6} However, estimates of SMI in children are less precise because diagnosing these disorders is more difficult in children and adolescents.⁶

Individuals with SMI or substance use disorder have higher rates of acute and chronic medical conditions, shorter life expectancies (by an average of 25 years), and worse quality-of-life than the general medical population.^{1,3,7,8} Modifiable risk factors for medical conditions (e.g., smoking, obesity, lack of exercise) and social conditions (e.g., homelessness, poverty, exposure to violence) account for some of the increased risk, but fragmented care increases overall health disparities in these populations. People with SMI and/or substance use disorder frequently have limited access to primary care, due to stigma and environmental factors, and are often underdiagnosed and undertreated.⁸⁻¹⁴ Poor medication management contributes to inappropriate polypharmacy, inadequate medication trials, and inconsistent monitoring of metabolic and other side effects.⁹

Individuals with SMI or substance use disorder also have higher utilization of emergency and inpatient resources, resulting in higher costs.¹⁵ For example, 12 million visits (78/10,000 visits) annually to emergency departments (EDs) are by people with SMI and chemical dependency.⁷ For schizophrenia alone, the estimated annual cost in the United States is \$62.7 billion dollars.¹⁶ Many of these expenditures could be reduced through routine health promotion activities; early identification and intervention; primary care screening, monitoring, and treatment; care coordination strategies; and other outreach programs.¹⁷

Behavioral Health Integration

Continuum of Care

Behavioral health integration (BHI) is a patient-centered approach that identifies and addresses all the health needs of a patient no matter where they seek care.^{17,18} It encompasses a range of models and strategies. In general, models studied in research trials have been categorized based on their target population: 1) models integrating behavioral health into primary care settings for patients with depression or anxiety disorders and 2) models that integrate primary care into behavioral health settings for patients with SMI and substance use disorder.

There is a robust evidence base supporting the effectiveness of integrating behavioral health into primary care settings for adults with depression and anxiety disorders. Many systematic reviews have been published that encompass models integrating behavioral health into primary care including recent reviews by the Cochrane Collaboration,¹⁹ Agency for Healthcare Research and Quality,²⁰ and others.^{21,22} These systematic reviews summarize a high-quality evidence base supporting collaborative care management models that are also described in a 2010 Milbank Report.²³ In addition, two recent randomized controlled trials extend support for the effectiveness of collaborative care management to children with behavior problems, attention-deficit/hyperactivity disorder and anxiety,²⁴ and adolescents with depression.²⁵

The evidence base for models that target individuals with SMI and substance use disorder has not been the focus of prior reviews. Although reviews by Woltman²² and Carey²⁰ include this population, they do not describe the models or target populations in enough detail to assist policymakers with implementing the models. Consequently, this report focuses on the models that integrate care for patients with SMI and substance use disorder seen in mental health and chemical dependency treatment settings.

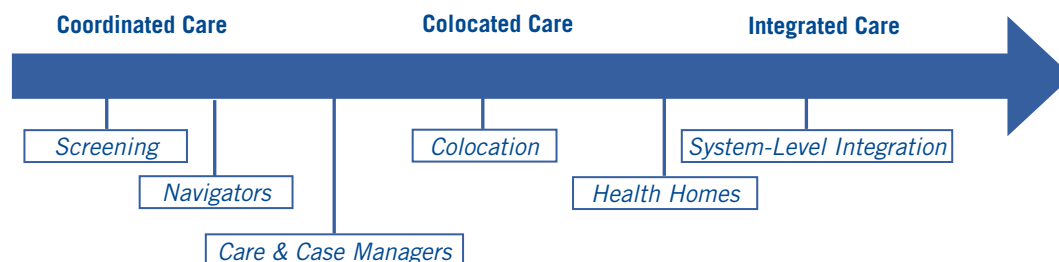
BHI encompasses a set of strategies to improve care for individuals with SMI and substance use disorder through systematic coordination and collaboration among treating providers to address both mental and physical health needs.²⁰ These strategies can be arrayed on a continuum based on practice structure and level of collaboration,²⁶ ranging from no integration of care to fully integrated care. The continuum can range from separate systems and practices with little communication between providers, to enhanced coordination and collaboration among providers usually involving care or case managers, to colocated care with providers sharing the same office or clinic, to fully integrated care where all providers function as a team to provide joint treatment planning and care. In a fully integrated system, patients and providers experience the operation as a single system treating the whole person.

Terminology and Conceptual Frameworks

BHI is a set of strategies to improve care through the systematic coordination and collaboration of treating providers to address both mental and physical health needs.²⁰

To organize the various models and strategies, Heath and colleagues²⁶ developed a conceptual framework that describes a continuum of coordination and collaboration (Figure 1). The models can be arrayed across a continuum based on three practice structures (top of the arrow) and six strategies for enhancing coordination and collaboration (across the bottom). The direction of the arrow generally represents a progression from no integration (left) to fully integrated care (right); however, the six strategies may be used in combination.

Figure 1. Continuum of Physical and Behavioral Health Care Integration*



* Adapted from Nardone.²⁷

Heath²⁶ also describes the progression toward a fully integrated care system by six levels of collaboration and coordination that span the three practice structures:

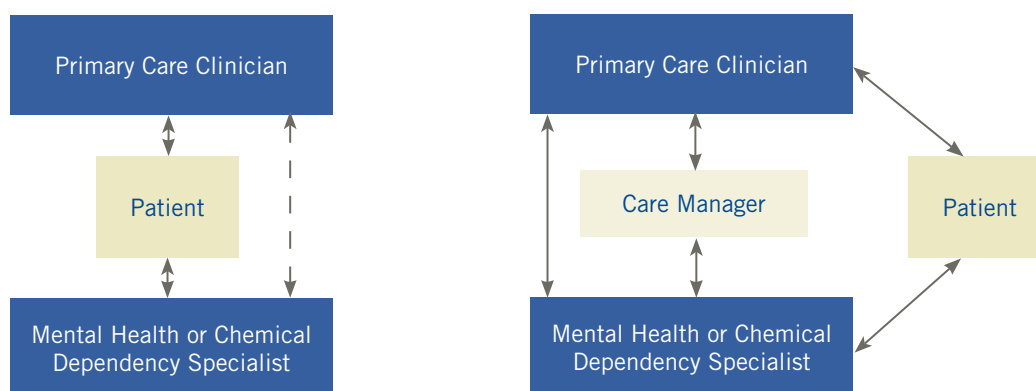
- **Coordinated care (off-site)**
 - Level 1: Minimal collaboration
 - Patients are referred to a provider at another practice site, and providers have minimal communication.
 - Level 2: Basic collaboration
 - Providers at separate sites periodically communicate about shared patients.
- **Colocated care (on-site)**
 - Level 3: Basic collaboration on-site
 - Providers share the same facility but maintain separate cultures and develop separate treatment plans for patients.
 - Level 4: Close collaboration on-site
 - Providers share records and some system integration.
- **Integrated care**
 - Level 5: Close collaboration approaching an integrated practice
 - Providers develop and implement collaborative treatment planning for shared patients but not for other patients.
 - Level 6: Full collaboration in a merged integrated practice for all patients
 - Providers develop and implement collaborative treatment planning for all patients.

The continuum ranges from separate systems and practices with little communication among providers, to enhanced coordination and collaboration among providers usually involving care or case managers, to colocated care with providers sharing the same office or clinic, to fully integrated care where all providers function as a team to provide joint treatment planning. In a fully integrated system, patients and providers experience the operation as a single system treating the whole person. Of note, the six strategies in Figure 1 may be used at any level to enhance coordination and collaboration.

Models of BHI fitting into levels 2 through 4 have generally been used for patients with depression, other mood disorders, and risky alcohol use. Models fitting into levels 3 and 6 have generally been used for patients with SMI and substance use disorder, who need intensive mental health or chemical dependency treatment. This pattern is evident in research studies: 1) collaborative care management models integrating behavioral health into primary care settings for patients with depression or anxiety disorders and 2) colocated and fully integrated models that bring primary medical care into behavioral health settings for patients with SMI and substance use disorder.

There is no consistent definition of collaborative or coordinated care that specifies model components.²² Figure 2 provides a starting point for defining collaborative care management. It contrasts unstructured patient care (level 1 or usual care) on the left side of the figure with care that incorporates a care or case manager to enhance collaboration on the right. At a minimum, care management (also called disease management) can be used to provide structured symptom and treatment monitoring. It can also improve communication and coordination between patients and their providers and between mental health or chemical dependency providers and primary care providers.

Figure 2. Unstructured Patient Care (left) and Coordinated Care Using a Care Manager (right).*



*Line density represents the frequency and degree of structure in the communication. Adapted from figures by Oxman²⁸ and Rubenstein.²⁹

Barriers to Integration

The barriers to integrating clinical services and coordinating payers, health systems, and social supports are well documented and not exclusive to patients with SMI or substance use disorder. Barriers such as funding mechanisms and reimbursement are major impediments, primarily because many activities associated with integrated care (e.g., care management, consultations, and communication activities between providers and patients) are not reimbursed under typical fee-for-service care⁹ and are further fragmented by organizations that “carve out” behavioral health from medical care in managed care arrangements.³⁰ Provider and organizational capacity are also cited as common barriers to care, especially when integrated care requires changes in the process of care and workforce training and support. Resistance to change, new staff and new roles, and balancing competing demands are difficult to overcome. The lack of a health information technology within behavioral health settings and confidentiality rules for mental health and chemical dependency treatment further complicate coordination and collaboration among providers. Translating integrated models from research studies into clinical settings is challenging and model fidelity is compromised due to these barriers.

State-Based Opportunities for Integration

Three funding initiatives have accelerated efforts to integrate medical and behavioral health care. These include the nearly 100 Primary and Behavioral Health Care Integration (PBHCI) service grants from the Substance Abuse and Mental Health Services Administration (SAMHSA); the Health Home Initiative (Section 2703) under the Affordable Care Act; and the Centers for Medicare & Medicaid Services Comprehensive Primary Care Initiative. Some Medicaid Health Homes and other local and regional initiatives are specifically targeting populations with SMI and designing care models that integrate primary care into behavioral health care systems.^{27,31} The PBHCI program is working in tandem with the larger Health Home effort to incorporate existing state integration initiatives into Health Home networks and to establish projects that coordinate and integrate primary care into community-based mental health and chemical dependency treatment settings. With its emphasis on integrating primary care, mental health, chemical dependency, and social services, the Health Home Initiative (Section 2703) may provide one of the best opportunities for implementing evidence-based models that target individuals with SMI.

Focus of the Report

There is a robust evidence base supporting the effectiveness of integrating behavioral health into primary care settings for adults with depression and anxiety disorders. Many systematic reviews have been published that encompass models integrating behavioral health into primary care, including recent reviews by the Cochrane Collaboration,¹⁹ Agency for Healthcare Research and Quality,²⁰ and others.^{21,22} These systematic reviews summarize a high-quality evidence base supporting the collaborative care management models described in a 2010 Milbank Report.²³ In addition, two recent randomized controlled trials

extend support for the effectiveness of collaborative care management to children with behavior problems, attention-deficit/hyperactivity disorder and anxiety,²⁴ and adolescents with depression.²⁵

This report focuses on models targeting individuals with SMI and substance use disorder because prior reviews did not describe the models in detail or provide a detailed evaluation of their evidence base. The purpose of this report is twofold:

- To identify models integrating primary medical care into mental health and chemical dependency treatment settings and evaluate the evidence base for these models.
- To describe implementation efforts across four key areas (target populations, provider integration models, information-sharing and technology, and payment methodologies).

Model Identification and Evidence Evaluation

Methods

A detailed description of the methods for the literature search, study selection, and quality rating for this report is in Appendix A. What follows is a brief summary of these methods.

Search Strategy

A full search of the Oregon Health & Science University's Center for Evidence-based Policy's primary evidence sources was conducted to identify systematic reviews, meta-analyses, and technology assessments. A MEDLINE (Ovid) search was also conducted to identify systematic reviews, meta-analyses, randomized controlled trials, and nonrandomized controlled studies. The searches were limited to citations published between June 2004 and June 2014.

Because few published studies assessed health care utilization and costs, a gray literature search was done to identify evaluation studies that might not be published in journals found in MEDLINE. Websites of organizations known to support BHI were also searched for reports describing evaluations of funded programs and resources to support implementation of integration models.

Inclusion Criteria

Population: Adults and children receiving treatment for SMI or substance use disorder in mental health and chemical dependency treatment settings

Intervention: Models of providing medical care and/or care management

Comparator: Usual care (i.e., no routine screening, preventive care, or medical care)

Outcome: Improved mental and physical symptoms, medical outcomes (e.g., blood pressure), rates of preventive services delivered, mortality, health care utilization, and costs

Exclusion Criteria

Studies were excluded if they were not published in English or did not include a control group.

Quality Assessment

The methodological quality of the included studies was assessed by two independent raters using standard instruments adapted from systems in use by the National Institute for Health and Care Excellence NICE and the Scottish Intercollegiate Guidelines Network.^{32,33} A summary judgment for the overall quality of the body of evidence (QoE) was assigned for each outcome using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system.³⁴ The overall QoE reflects the level of certainty in the impact of the intervention (e.g., collaborative care model) on an outcome (e.g., reduction in symptoms) across all studies in the evidence base. High overall QoE indicates raters are very confident in the impact of the intervention on the outcome, and future studies would likely not change the findings. Moderate QoE indicates moderate confidence in the findings, and low QoE indicates low confidence in the findings. Very low QoE indicates the available evidence is insufficient to assess the impact of an intervention on an outcome.

Findings

The primary source search located six systematic reviews and technology assessments^{8,9,22,35-37} that included randomized controlled trials involving patients with serious mental illness (SMI) or substance use disorder. The MEDLINE search retrieved 680 citations. After review of citation abstracts, staff included one additional systematic review,³⁸ two additional randomized controlled trials,³⁹⁻⁴³ and three nonrandomized controlled studies.^{31,44,45} Because some of the systematic reviews included studies not pertinent to this report (e.g., integration of mental health into primary care settings) and one “Key Question” required a detailed description of the interventions, a decision was made to focus on the pertinent randomized controlled trials for this report.

Twelve randomized controlled trials, described in 19 publications, met inclusion and exclusion criteria.^{39-43,46-59} The results of five studies were reported in more than one article.^{39-43,46-47,50-53,58} Appendix B presents detailed descriptions of the interventions, study design, and results for the 12 studies by condition: bipolar disorder, SMI, and chemical dependency. Three nonrandomized controlled studies also met inclusion and exclusion criteria.^{31,44,45} These studies did not add substantially to the evidence from the randomized controlled trials, so were not included in Appendix B.

Many of the early care management interventions focused on improving mental health outcomes,^{41,46-48,50-52} but often reported physical health-related quality of life (HRQoL) or results for subgroups of patients with comorbid medical conditions. We included these

studies, because they served as the basis for later interventions that targeted patients with medical comorbidities and add to the evidence base on care management for patients with bipolar disorder and other SMI.

Key Question #1: What models have been used to integrate primary medical care into mental health and chemical dependency treatment settings?

Patient Characteristics and Setting

The 12 randomized controlled trials targeted different patient populations and treatment settings: four recruited patients with bipolar disorder,^{39-43,46,47,50-52} three recruited patients with other SMI,^{48,49,54} and five recruited patients with substance use disorder.⁵⁵⁻⁵⁹ Eight of the 12 studies were done in large integrated health care systems, including Veterans Affairs Medical Centers (VAMCs), Kaiser-Permanente, and Group Health Cooperative, where all providers use the same medical record and scheduling systems, which facilitate coordination, information-sharing, and communication.

Characteristics of the Interventions

The study interventions can be categorized by their practice structure (colocated vs. off-site primary care) and the extent that they enhance collaboration.²⁶ The majority of interventions used care management to enhance coordination and collaboration and provided patient self-management support through structured educational programs and motivational interviewing. Self-management support is “the systematic provision of education and supportive interventions by health care staff to increase patients’ skills and confidence in managing their health problems, including regular assessment of progress and problems, goal setting, and problem-solving support.”⁶⁰

In Table 1, the 12 randomized controlled trials are categorized based on practice structure, level of collaboration, and self-management support used in the interventions. Seven of the interventions colocated primary care providers in mental health or chemical dependency treatment settings.^{48,54-59}

Table 1. Structure and Level of Collaboration Used in Study Interventions

Structure and Level of Collaboration*	Study (Target Condition)	Self-management Support
Colocated (On-site)		
Integrated	<u>Willenbring 1999</u> ⁵⁹ (CD): Initial integration, but extent of follow-up collaboration not described	Unclear
	<u>Weisner 2001</u> ⁵⁸ (CD): Intervention physicians had training in CD treatment	Unclear
	<u>Druss 2001</u> ⁴⁸ (SMI)	No
	<u>Rubin 2005</u> ⁵⁴ (SMI): Inpatient only	No

Enhanced Collaboration	<u>Samet 2003</u> ⁵⁵ (CD): Only for initial evaluation, motivational interviewing for self-management support	Yes
Not Enhanced	<u>Umbrecht-Schneiter 1994</u> ⁵⁷ (CD)	No
	<u>Saxon 2006</u> ⁵⁶ (CD): Shared patient records	No
Off-site		
Enhanced Collaboration with Care Managers	<u>Simon 2002, 2005, 2006</u> ⁴¹⁻⁴³ (BPD): Life Goals Program,** motivational interviewing for self-management support	Yes
	<u>Bauer 2006</u> ⁴⁶ (BPD): Life Goals Program	Yes
	<u>Kilbourne 2008, 2009</u> ^{50,52} (BPD): Life Goals Program	Yes
	<u>Druss 2010</u> ⁴⁹ (SMI): Motivational interviewing	Yes
	<u>Kilbourne 2013</u> ⁴⁰ (BPD): Life Goals Collaborative Care***	Yes

Abbreviations: BPD, bipolar disorder; CD, chemical dependency; SMI, serious mental illness.

* Based on the levels of collaboration described by Heath.²⁶

** The Life Goals Program (LGP) is a manual-driven structured group psychotherapy program for individuals with bipolar disorder. This program is focused on systematic education and individualized application of problem-solving in the context of mental disorders to promote illness self-management.

*** The LGP is explicitly combined with collaborative care management for medical conditions.

There was variability across these interventions in the degree they enhanced collaboration. Four interventions fully integrated medical care with mental health or chemical dependency treatment.^{48,54,58,59} For these interventions, providers shared records and had multidisciplinary team meetings to do joint treatment planning. Rubin⁵⁴ provided integrated care while patients were hospitalized on an acute psychiatric ward. Discharge planning was done in conjunction with patients' primary care providers, but there was no ongoing collaboration after discharge.

One intervention⁵⁵ enhanced coordination and collaboration but only did this for the initial evaluation then arranged for primary care at a nearby clinic or with patients' primary care providers if they had one. Two interventions did not report enhanced collaboration even though medical care was on-site.^{56,57} One of these studies was at a VAMC Addiction Treatment Center⁵⁶ where all providers shared patients' medical records.

For the other five interventions, primary care was off-site from the mental health treatment site.^{39-43,46,47,49-52} All five interventions enhanced collaboration by using trained care managers and enhanced self-management support through structured education^{39,40,46,47,50-52} or motivational interviewing techniques⁴⁹ or both.⁴¹ Components of the care management interventions in the included studies^{40,42,46,47,50} are outlined in Table 2 and organized according to four components of Wagner’s Chronic Care Model.^{22,61} Woltman²² defined collaborative care management, or chronic care models, as interventions that have at least three of Wagner’s six components. All interventions in the 12 randomized controlled trials met this definition. Although important, two other components in Wagner’s Chronic Care Model, community resource linkage and health care organization support, were not prominent in the randomized controlled trials.

Table 2. Collaborative Care Management Interventions Organized by the Chronic Care Model

Components of the Chronic Care Model	Specific Features of the Interventions
Delivery System Redesign	<ul style="list-style-type: none"> • Care/case management* or integrated practices • Medical care, mental health, or CD enhancement (on-site or off-site by appropriate specialists) to provide <ul style="list-style-type: none"> –Supervision of care managers –Direct patient care when needed –Education and consultation • Screening
Patient Self-Management Support (often delivered by care managers)	<ul style="list-style-type: none"> • Educational programs (e.g., Life Goals Program) and materials • Goal setting • Motivational interviewing • Systematic follow-up of symptoms and adherence to treatment • Links to community resources (e.g., travel, housing)
Decision Support	<ul style="list-style-type: none"> • Treatment algorithms and guidelines • Expert advice from specialists
Clinical Information Systems	<ul style="list-style-type: none"> • Patient registry • Refill monitoring through pharmacy databases to assure adherence

*Care manager functions include coordination and communication among health care providers, systematic follow-up with structured monitoring of symptoms and treatment adherence, patient education and self-management support including motivational interviewing.

Staffing and Training

Of the 12 interventions, five used nurses or master's level health specialists to function as care managers and had physicians or investigators provide oversight and support for the care managers (Appendix B). Six interventions added physicians, physician assistants, or nurse practitioners, and one study did not state the number or characteristics of the additional personnel. The number of full-time equivalent positions added varied depending on the intervention and number of patients enrolled in the study.

Caseloads for care managers were not well described. They appeared to vary based on the needs of the target population (very symptomatic mental illness and/or high health care utilization vs. less symptomatic) and the intensity of intervention (education and motivational interviewing with frequent contacts vs. only monitoring symptoms and treatment adherence). For high-intensity case management programs such as Assertive Community Treatment, caseloads are usually less than 20;⁶² for moderate intensity interventions that include brief psychotherapy or self-management education and motivational interviewing such as the Life Goals Program,^{39,40} estimates of caseloads are 60 to 80 patients per year; and for less intensive interventions for patients with low needs (e.g., patients with depression who are insured and employed), estimates of caseloads are 100 to 125 patients.⁶³ A general rule used to estimate caseload for the Life Goals Program is based on the number of hours per patient: 20 hours per patient per year for less symptomatic patients with bipolar disorder and 32 hours per patient per year for more symptomatic patients (Amy Kilbourne, personal communication).

The five care management-based interventions described training programs for the care managers, and some described use of protocols for patient monitoring and decision making. One intervention described a brief educational program for the staff affected by the intervention,⁵⁰ and two fully integrated interventions used physician staff that were dually trained in internal medicine and chemical dependency treatment⁵⁸ or psychiatry.⁵⁴

Summary

The 12 randomized controlled trials used a variety of models to integrate primary medical care into mental health and chemical dependency treatment. Seven studies colocated medical care providers in mental health and chemical dependency treatment settings: three of these used fully integrated models with joint care planning and treatment,^{48,54,58} one study enhanced coordination of initial care after completing an on-site medical evaluation,⁵⁵ and two did not report enhancing collaboration beyond being on-site.^{56,57} Five studies enhanced coordination and collaboration primarily through the use of care management.^{39-43,46,47,49-52} Four of these studies included structured educational programs to support patients' self-management with two of the studies adding motivational interviewing

for additional self-management support. Estimates of care manager caseloads varied based on the severity of illness of the target population and the intensity of the intervention. It is important to note that eight of the studies were done in large integrated health care systems. These systems may have facilitated coordination and collaboration through use of single health record and appointment systems and common systems for communication among providers. Finally, almost all interventions added staff and provided additional training, protocols, and support for the intervention team or recruited staff dually trained for the target conditions.

Key Question #2: Do these models of integrated care improve mental health, medical, and health care utilization outcomes?

Randomized Controlled Trials

The 12 randomized controlled trials involved patients with bipolar disorder (four studies; 958 patients), other SMI (three studies; 666 patients), and chemical dependency (five studies; 2,000 patients). The risk of bias varied across the studies. In other words, study quality was variable, which weakens confidence in the overall findings across studies. Of the nine good- and fair-quality studies, five used care management interventions to enhance collaboration, whereas studies that used interventions that colocated care were fair-to-poor quality (see Table 3 and Appendix B). Table 3 is a summary of the results aggregated across the 12 randomized controlled trials and organized by condition. The studies used different measures for each of the broad categories for study outcomes listed in the table (e.g., medical conditions, physical HRQoL). Appendix B provides more detail about the outcomes and their measures.

Table 3. Overview of Study Outcomes by Condition and Level of Collaboration

Structure and Level of Collaboration†	Study (Sample Size, Follow-up Period)	Mental Symptoms‡ or Quality of Life	Medical Conditions or Physical Health-Related QoL	Preventive Services or Primary Care Visits	Utilization or Cost	Study Quality
Bipolar Disorder						
Off-site Enhanced Collaboration	<u>Simon 2002, 2005, 2006</u> ^{41,42,43} (n=441, 24 mos)	Decreased mania symptoms			Increased monitoring and cost	Good
	<u>Bauer 2006</u> ^{46,47} (n=330, 36 mos)	Decreased mania symptoms, ↑ QoL	Worse in subgroup with CVD risk		↔Cost	Good

	<u>Kilbourne 2008, 2009</u> ^{50,51,52} (n=61, 6 mos)	↔	Improved	Increased		Fair
	<u>Kilbourne 2013</u> ⁴⁰ (n=126, 12 mos)	Decreased mania symptoms	Improved blood pressure			Fair
Other Serious Mental Illness						
Colocated Integrated and Enhanced Collaboration	<u>Druss 2001</u> ⁴⁸ (n=120, 12 mos)	↔	Improved	Increased	Decreased ER use, ↔cost	Fair
Colocated Integrated	<u>Rubin 2005</u> ⁵⁴ (n=139, hospitalized patients)			Increased	↔	Poor
Off-site, Enhanced Collaboration	<u>Druss 2010</u> ⁴⁹ (n=407, 12 mos)	Improved QoL	↔	Increased		Good
Chemical Dependency						
Colocated, Integrated	<u>Willenbring 1999</u> ⁵⁹ (n=105, 24 mos)	Increased abstinence	↔ mortality		Increased cost	Fair
	<u>Weisner 2001</u> ⁵⁸ (n=654, 6–12 mos)	Decreased symptoms, ↔ abstinence			↔	Fair
	Subgroup with medical condition (n=341)	Decreased symptoms, increased abstinence			Decreased cost	
Colocated, Enhanced Collaboration	<u>Samet 2003</u> ⁵⁵ (n=470, 12 mos)	↔	↔	Greater percentage with PC visit	↔	Poor
Colocated	<u>Umbrecht-Schneider 1994</u> ⁵⁷ (n=51, 8 weeks)			Increased		Poor
	<u>Saxon 2006</u> ⁵⁶ (n=720, 12 mos)	↔	↔	↔	↔	Fair

Abbreviations: CVD, cardiovascular disease; ER, emergency room; mos, months; QoL, quality-of-life; PC, primary care.

* All comparisons are intervention versus treatment as usual.

† Derived from the six levels described by Heath (2013)²⁶: practice structure may be on-site (colocated) or off-site and level of coordination and collaboration may be 1) none or minimal, 2) enhanced using care managers, or 3) integrated where primary care and mental health providers develop joint treatment plans and often attend multidisciplinary meetings to discuss patients.

‡ Includes chemical dependency symptom measures and abstinence rates.

↔ indicates mixed results across studies, and indicates no statistically significant difference between intervention and treatment-as-usual patients.

For bipolar disorder, four fair- to good-quality randomized controlled trials evaluated care management interventions that enhanced collaboration and coordination and used an educational program designed to enhance patient self-management. For SMI (three randomized controlled trials) and chemical dependency (five randomized controlled trials), study quality and interventions had greater variability compared to the four bipolar disorder studies and assessed a diversity of outcomes. These included mental health symptoms, mental and physical HRQoL, rates of primary care visits, preventive services delivered, and health care utilization and cost. Of the three nonrandomized studies, two included patients with SMI^{31,45} and one included patients with substance use disorder.⁴⁴

Bipolar Disorder

Four studies recruited 958 patients with bipolar disorder from mental health clinics at VAMCs^{39-40,46,47,50-52} and Group Health Cooperative, a health maintenance organization.⁴¹⁻⁴³ All four interventions used structured care management and the Life Goals Program or adaptations of this program. In general, these studies found a decrease in the length of mania episodes and mania symptoms compared to usual care (see Table 3 and Appendix B). One study found physical HRQoL and access to medical services improved, though the latter was not statistically significant due to a small sample size.⁵⁰⁻⁵² A second study^{39,40} also found improvement in blood pressure, compared to usual care, but not cholesterol or physical HRQoL. Monitoring and costs for intervention patients was greater over 24 months in one study,⁴¹⁻⁴³ but another study found that intervention costs were not significantly different from treatment as usual over 36 months.^{46,47}

In summary, care management interventions for patients with bipolar disorder may improve mania, mental HRQoL, and access to medical care over 12 months and be cost neutral over 36 months. Although risk of bias is low to moderate in the individual studies, the overall quality of evidence (QoE) was downgraded to moderate quality due to inconsistency in findings across studies and indirectness of the intervention (interventions primarily targeted mental not physical health outcomes). This indicates moderate confidence in the results from these studies. Very low-quality evidence suggests that blood pressure and physical HRQoL also improves based on two small studies^{39-40,50-52} with very low confidence in these results.

Other Serious Mental Illness

Three randomized controlled trials enrolled 666 patients with SMI from VAMCs,⁴⁸ community mental health clinics,⁴⁹ and an acute inpatient psychiatric ward.⁵⁴ Two studies colocated medical providers in mental health settings^{48,54} and integrated care through joint treatment planning and shared records. One of these studies provided integrated care during acute psychiatric hospitalization and only coordinated care at hospital discharge,⁵⁴ while the other study⁴⁸ used nurse care managers to enhance coordination of care and patient monitoring in addition to integrating care. Both studies found use of preventive services was greater for those patients in the intervention group compared to those receiving treatment as usual. One study⁴⁸ also found improvement in physical HRQoL and primary

care visits for intervention compared to patients receiving treatment as usual. Emergency department (ED) utilization was less for the intervention group, but cost per patient was higher resulting in no significant difference in total costs between intervention and treatment-as-usual patients. Higher cost was attributed to intervention clinicians not having full caseloads during the start-up of the program.

The third randomized controlled trial⁴⁹ involved 407 patients with SMI at an urban community mental health center. Investigators used trained nurse care managers to enhance coordination of care, provide patient self-management support through education and motivational interviewing, and overcome barriers to care such as transportation to appointments. Nurse care managers were based at the community mental health center, but primary care clinicians were based elsewhere. Patients in the intervention group had improved mental HRQoL and social functioning compared to treatment-as-usual patients, although there was no difference in physical HRQoL. A greater percentage of intervention patients received preventive and medical services compared to treatment-as-usual patients (59% vs. 22%, $P<0.0001$), and more had identification of previously undiagnosed medical conditions (12% vs. 2%, $P=0.005$) and possibly lower 10-year cardiovascular risk scores, based on a subgroup of 100 patients with laboratory data.

Two nonrandomized controlled studies also examined the impact of efforts to integrate medical and mental health care for those with SMI. The RAND Corporation conducted an outcomes evaluation of the SAMHSA Primary and Behavioral Health Care Integration service grants awardees.³¹ They compared individuals at three selected intervention sites and three matched control sites and found that some outcomes (diastolic blood pressure, total and LDL cholesterol, and fasting plasma glucose) improved compared to control-site patients, but other outcomes, including indicators of behavioral health, were no different between the sites. The second study examined the impact of colocation of primary medical care services in outpatient mental health settings on preventable hospitalizations.⁴⁵ The study used data from 92,268 veterans with serious mental illness; 9,662 (10.5%) received care in 10 mental health clinics with colocated primary care, and 82,604 (89.5%) received care in 98 clinics without colocated medical care. Pirragalia and colleagues⁴⁵ used national VA data for the fiscal year 2007 and found that fewer patients at sites with colocated medical care had hospitalizations for ambulatory care-sensitive conditions (conditions for which outpatient care might prevent hospitalization or early intervention might prevent complications) over the course of one year compared to patients at other sites (4.3% vs. 5.1%, respectively, beta -0.28 , $P=0.004$). This study provides low-quality evidence about the impact of colocated care and hospitalizations because of its observational study design and uncertainty about the use of strategies to enhance collaboration at sites with colocated care.

In summary, integrated care and care enhanced by trained nurse care managers improves mental HRQoL and use of preventive and medical services and may improve physical HRQoL. The overall quality of evidence from the three randomized controlled trials is mod-

erate for HRQoL and use of preventive and medical services. These studies do not provide sufficient information on costs to determine if the intervention increases or decreases costs or is cost neutral. A single nonrandomized study suggests that potentially preventable hospitalizations might be reduced with colocated care.

Chemical Dependency

Five studies enrolled 2,000 patients with substance use disorder from a residential detoxification unit,⁵⁵ VAMC,^{56,59} and Kaiser Permanente⁵⁸ chemical dependency treatment programs, and a hospital-based methadone maintenance clinic.⁵⁷ Two studies^{58,59} randomized 759 patients to colocated (on-site) primary care with full integration of care (joint treatment planning and multidisciplinary team meetings) or treatment as usual. In these studies, intervention patients had improved substance misuse symptoms or abstinence rates compared to patients in the treatment-as-usual group. There was inconsistency in the results for utilization and cost except for the subgroup of patients with substance misuse-related medical conditions. For these patients, the intervention decreased ED costs and total medical costs over 12 months compared to treatment as usual.

Another two studies^{56,57} involving 771 patients provided colocated primary care but did not describe enhanced coordination and collaboration through joint treatment planning or use of care managers. These studies found that on-site primary medical care, beyond increasing initial visits to primary care, does not decrease the severity of addiction, HRQoL, or health care utilization and costs. The fifth study⁵⁵ colocated care and used care managers to enhance initial coordination with primary care providers, but not ongoing coordination and collaboration. This study was poor quality (high risk of bias) and found no differences between the intervention and treatment-as-usual groups, except for increasing the percent of patients with initial primary care visits managers. An additional nonrandomized trial⁴⁴ screened welfare applicants for substance use disorder and assigned the 421 individuals who screened positive to sites with coordinated care management or usual care. This study found individuals assigned to coordinated care management had higher rates of abstinence at one year compared to those assigned to usual care sites.

In summary, these studies provide moderate quality evidence (moderate confidence) that on-site integrated medical care, through team meetings and joint treatment planning, may improve abstinence rates and chemical dependency symptoms for patients with substance misuse-related medical conditions. The impact of integrated care on health care utilization and cost is uncertain due to the very low quality of evidence and inconsistencies in findings across studies. In contrast, moderate-quality evidence suggests that colocated primary care without integration or enhanced collaboration may not improve abstinence rates, HRQoL, preventive and medical care, or utilization and cost.

Overall Summary, Quality, and Limitations of the Evidence

Twelve randomized controlled trials involved patients with bipolar disorder (four studies; 958 patients), SMI (three studies; 666 patients), and substance use disorder (five studies;

2,000 patients). Three models were used to integrate primary medical care into mental health and chemical dependency treatment settings: care management (five studies), colocated care without full integration of care (three studies), and fully integrated care with joint treatment planning (four studies). All intervention models were compared to usual care. The main findings and, when appropriate, overall QoE for the finding are listed below.

- Care management may improve mental health symptoms and mental HRQoL for patients with bipolar disorder and SMI (moderate QoE).
- Fully integrated care and care management improves use of preventive and medical services (moderate QoE) and may improve physical health symptoms and quality of life for patients with bipolar disorder and SMI (low QoE).
- Colocating primary care in chemical dependency treatment settings without enhanced coordination and collaboration does not improve mental or physical health outcomes (moderate QoE).
- All interventions required additional staff, training, and oversight except when intervention staff was dually trained in primary care and substance misuse treatment.

The impact of these interventions on health care utilization and cost is unknown because of risk of bias in the studies and inconsistencies in results across studies (very low QoE). However, evaluation studies (single group studies with measurements before and after the intervention) of these models in settings that target individuals with high health care utilization suggest that collaborative care management decreases utilization and costs as well as decreases cost in other areas such as the criminal justice system.¹⁸

Gaps in the Evidence

Study quality was variable: there were four good-quality studies (low risk of bias), four fair-quality studies (moderate risk of bias), and three poor-quality studies (high risk of bias). The variability in the interventions, measurement of outcomes, and results across the studies also limited the overall QoE and confidence in the findings, as noted above.

- None of the studies included children or adolescents.
- Few studies reported data on health care utilization and costs, so firm conclusions about cost cannot be drawn based on controlled trials.
- Because most of the studies followed patients for only 12 months, long-term outcomes are unknown.
- Eight of the 12 studies were done in integrated health systems (e.g., Veterans Administration Medical Centers, Kaiser-Permanente, Group Health Cooperative). This might affect implementation of the intervention and outcomes.
- Most of the care managers were not explicitly trained to address medical conditions.

- No studies specifically targeted individuals with co-occurring mental health and substance use disorder conditions or the integration of mental health and chemical dependency treatment.

Comparisons across studies to determine key components of BHI interventions for SMI populations are difficult due to few studies targeting this population and lack of a consistent definition of collaborative care management.²²

Implementation Efforts and Resources

Fragmentation of the physical, mental, and chemical dependency care delivery systems has led to significant gaps in care for individuals with SMI and substance use disorder. These individuals have disproportionately high rates of physical health conditions making them especially vulnerable to the gaps in fragmented care. Care for these populations is considered a major driver for the increase in health care costs.

Fully integrated care or enhancing collaboration through care management appears to improve mental health outcomes and use of preventive services for adult patients with bipolar disorder and other SMI.

As state policymakers develop policies and programs that support integration of physical health care into behavioral health settings, they may consider findings from this evidence review. Three topics in particular are helpful to policymakers: 1) expected outcomes from BHI models that target populations with SMI and substance use disorder; 2) strategies for implementing these models; and 3) technical assistance and tools available for integration efforts.

What We Can Learn from the Studies: Expected Outcomes

Models and outcomes supported by moderate QoE mean there is moderate confidence that models will achieve the expected outcomes. This means that these are promising interventions and should be considered for implementation. Because of some uncertainty about the findings, one approach would be to implement the model and build in an evaluation to assure fidelity to the model and assess outcomes. This would help determine if the model as implemented improves outcomes. Model outcomes supported by low QoE are also promising, but there is a greater degree of uncertainty that they will be achieved. For example, this report did not identify studies of collaborative care management interventions for children and adolescents with SMI. However, two randomized controlled trials of collaborative care management programs targeting youths with disruptive behavior and depression in primary care setting^{24,25} and the results of this report suggest that collaborative care management models may be applicable to children and adolescents. In this situation, piloting a model to assure it will achieve the same outcomes described in research studies would be a reasonable approach. This approach has been used by states described in the 2010 Milbank Memorial Fund report and in the implementation section of this report.

What We Can Learn from the Studies: Implementation Strategies

Three federal funding initiatives have accelerated efforts to integrate medical and behavioral health care: the PBHCI service grants, Health Home Initiative (Section 2703) under the Affordable Care Act, and the Centers for Medicare & Medicaid Services Comprehensive Primary Care Initiative. Many state Medicaid Health Home initiatives, as well as other local and regional initiatives, are targeting populations with SMI and chemical dependency and designing care models that integrate primary care into behavioral health systems^{27,31} In fact, the Health Home Initiative requires integrated care services for individuals with one serious mental health condition and two or more chronic conditions or one chronic condition and at risk of another.⁶⁴

Nine of the 15 states implementing Health Homes are targeting individuals with SMI and recognizing behavioral health providers as eligible to qualify as Health Home providers.^{65,66} These initiatives vary across four key areas that may affect outcomes and present challenges:^{30,31} 1) defining target populations; 2) establishing models of integration and provider standards and training; 3) facilitating use of information sharing and technology; and 4) structuring payment. A few examples of the variability in approach are described below, along with organizations that provide technical assistance and tools. Although data on health care utilization and costs have not been systematically collected or reported, some of the initiatives are reporting significant decreases in ED use and hospitalizations, as well as costs.^{27,67,68} These outcomes are likely affected by decisions made for each of these four key areas.⁶⁹

- **Defining Target Populations**

Some programs are focusing on populations with significant mental health and medical needs and high health care utilization. West Virginia is targeting Health Home services to individuals with bipolar disorder who are infected with hepatitis B or C or at risk of infection.⁷⁰ This is a narrowly defined population, but one with high health care utilization. In contrast, other programs broadly encompass all individuals with SMI seen at community mental health centers to improve medical care and use of preventive services across the entire population. Some states are taking a phased approach to implementation of their Health Homes by targeting specific geographic regions or chronic conditions. This phased approach allows states to expand implementation as provider capacity and experience with integration matures. In general, programs that have targeted individuals with high health care utilization (i.e., ED use and inpatient admissions) and cost are reporting decreases in utilization and costs based on program evaluations.^{17,27,68,69} It is important to note that these evaluations are at high risk of bias due to their study design and methods used to measure outcomes.

- **Integration Models and Provider Standards and Training**

Models of integration and provider standards vary widely across programs.^{27,71,72} Some programs identify specific provider types and set forth specific staffing require-

ments for integrated care teams, while others take a general approach as long as programs meet a state's health home standards that include a dedicated care manager leading a multidisciplinary team of medical, mental health, and chemical dependency providers; social workers; and nurses. These individuals might not be located at the same practice but must ensure coordination of care. A recent evaluation of care coordinators noted the variation in models used and emphasized the importance of involving practices in hiring care managers, as well as providing them with sample job descriptions, training, and peer-networking opportunities.⁷³

For Health Home initiatives, programs need to demonstrate the capacity to fulfill the six core federal Health Home requirements (comprehensive care management; care coordination and health promotion; comprehensive transitional and follow-up care from inpatient to other settings; individual and family support; referral to community and support services; and use of health information technology to link services). Some states, such as Missouri, have specified provider types that may qualify as Health Homes as well as staffing requirements for provider care teams and use of protocols. A recent systematic review of nurse-managed protocols targeting cardiovascular risk factors suggests this approach improves management of diabetes, hypertension, and hyperlipidemia.⁷³ In contrast, other states allow any enrolled Medicaid provider to qualify as long as they meet the state's standards. The extent that integration initiatives adhere to a specific model (i.e., Life Goals Collaborative Care) varies based on resources and the local environment,³¹ and these variations may affect their outcomes.

- **Information-Sharing and Protected Health Information**

States are developing health information technology (HIT) capacity at the state and provider level to support integrated care. It has been a challenge to integrate care across practices that do not share an electronic health record (EHR) system and assure adherence to federal and state regulations regarding protected health information. Almost all sites in the PBCHI program used paper or electronic patient registries to track enrolled patients. Some registries were integrated into EHRs, though few had developed the capacity to easily share information across medical and mental health treatment settings. This created inefficiencies and duplication of effort at many sites.³¹ On the other hand, Missouri's Health Home Initiative leveraged the federal EHR incentive to develop a statewide web-based EHR accessible to enrolled Medicaid providers in addition to its state-run patient registry and a behavioral health pharmacy management system. These systems have facilitated Missouri's BHI efforts. New York developed a statewide information network using Regional Health Information Organizations and the Statewide Health Information Network of New York (SHIN-NY) that allow providers to share information across disparate systems and provide a single point where patients can grant providers permission to access their records across systems.

- **Structuring Payment**

Many activities associated with integrated care, such as care management, consultations, and communication activities between providers and patients, are not reimbursed under typical fee-for-service care.^{30,74} Funding was considered a limitation by most participants in the PBCHI grant program,³¹ and many relied on grants from other federal and state initiatives and from private foundations to implement their programs. Some state Health Home programs addressed this challenge by reimbursing enrolled Health Home providers with a per-member-per-month (PMPM) payment. These PMPM rates vary from fixed amounts to tiered rates based on patient needs (high vs. low) and geography. The SAMHSA-HRSA Center for Integrated Health Solutions compiled [state billing and coding worksheets](#) to provide guidance for organizations that wish to maximize opportunities for reimbursement for integrated care.⁷⁵

In summary, Health Home and other initiatives such as the PBHCI programs are serving as testing grounds for a variety of integration models that target populations with significant mental health needs. Ongoing evaluations of these efforts are under way and could yield a wealth of information in the next several years. These evaluations may contribute to understanding the effectiveness of varied integration models, governance structures, caseloads, and staff credentials and experience, as well as strategies to overcome implementation challenges such as enrolling targeted patient populations, provider capacity, information sharing, and payment for services.

Technical Assistance and Tools

Many national and state organizations provide technical assistance and tools for planning and implementing BHI models. Two national organizations, [SAMHSA-HRSA Center for Integrated Health Solutions](#) and the [Agency for Healthcare Research and Quality's Integration Academy](#), provide examples of successful models, tools to assess patients and organizational capacity for integration, provider standards and quality measures, and webinars. A recent report by the [SAMHSA-HRSA Center for Integrated Health Solutions](#)¹⁷ describes six examples of successful, integrated care teams in safety net clinics and the essential elements of developing successful teams. These examples might be especially useful for many state Medicaid programs, which rely on safety net clinics. In addition, the Center for Health Care Strategies recently developed a [return on investment forecasting calculator](#) to assist policymakers in estimating the net financial benefits of BHI and other Health Home initiatives.⁷⁶

Organizations, such as the Lewin Group and Institute for Healthcare Improvement,⁷⁵ developed [toolkits](#) to assist behavioral health organizations with primary care integration. The National Council for Behavioral Health provides [technical assistance and workshops](#) that include addiction services integration, and the American Academy of Family Practice runs a [collaborative care research network](#) to evaluate integration models. At the state level, [the Colorado State Innovation Model](#), [Colorado Health Foundation, California](#), and [Missouri](#) have developed and collated resources for organizations planning integration efforts. Finally, some academic institutions provide [training, tools, consultations, research collaborations, and other support](#) for implementation of collaborative care.

Overall Summary

Fragmentation of the physical, mental, and chemical dependency care delivery systems has led to significant gaps in care for individuals with SMI and substance use disorder, as well as increased health care utilization and cost. These individuals have disproportionately high rates of physical health conditions making them especially vulnerable to the gaps in fragmented care. Care for these populations is considered a major driver for health care costs. As state policymakers develop policies and programs that support integration of physical health care into behavioral health settings, they may consider findings from this evidence review.

Primarily, the use of fully integrated care or enhancing collaboration through care management appears to improve mental health outcomes and use of preventive services for adult patients with bipolar disorder and other SMI. Colocating primary care in chemical dependency treatment settings without further enhancing coordination and collaboration through care management may have little impact on outcomes for individuals with substance use disorder. The interventions used to integrate care or enhance collaboration required additional staff, training, and ongoing support of care managers in the studies reviewed. A recent systematic review of nurse-managed protocols targeting cardiovascular risk factors corroborates these findings. For adults with diabetes, hypertension, and hyperlipidemia, protocol-based care management had positive effects on hemoglobin A1C, systolic and diastolic blood pressure, and total and low-density lipoprotein cholesterol levels, compared to usual care.⁷⁵

Although the 12 studies in this report did not provide sufficient data on health care utilization and cost to draw firm conclusions, early evaluation data from state Health Homes and other integration initiatives suggests these interventions may reduce costs and decrease health care utilization for adults with SMI. However, it is important to note that many of the interventions targeted individuals with SMI who had frequent ED visits and acute care hospitalizations.

States and other health care programs have taken a variety of approaches to targeting patient populations, developing integration models and care management, and payment for integration efforts. Common among all programs is the use of integrated data and population health tracking systems and robust referral networks for physical and mental health care and social services coordination. Evaluation of the effective features of care coordination and overall sustainability of integrated care models is still under development. However, promising early data suggest that care systems for populations with SMI and substance use disorder are improving and that collaborative care management is a model that can be applied to populations with SMI and substance use disorder.

Appendix A

Detailed Methods for Literature Search, Study Selection, and Quality Rating

Search Strategy

A full search of the Center for Evidence-based Policy's primary evidence sources over a 10-year period was conducted to identify systematic reviews, meta-analyses, and technology assessments using the terms "serious mental illness," "integration of primary care," "multidisciplinary care," "shared care," "access to primary care," "primary care and behavioral health," "colocation," "primary care and substance abuse treatment," and "primary care." Searches of core sources were limited to citations published after June 2004. The primary sources searched included Hayes, Cochrane Library (Wiley Interscience), the United Kingdom National Institute for Health and Care Excellence, the Blue Cross/Blue Shield Health Technology Assessment program, the Veterans Administration Evidence-Based Synthesis Program, BMJ Clinical Evidence, the Canadian Agency for Drugs and Technologies in Health, the Washington State Health Technology Assessment Program, and the Agency for Healthcare Research and Quality.

A MEDLINE (Ovid) search was conducted to identify systematic reviews, meta-analyses, and randomized controlled trials, and nonrandomized controlled trials. The search was limited to studies published in English between June 2004 and June 2014 and included the following strategy:

1. exp Mental Health Services/
2. exp Mental Disorders/dh, dt, nu, pc, rh, th [Diet Therapy, Drug Therapy, Nursing, Prevention & Control, Rehabilitation, Therapy]
3. substance-related disorders/ or alcohol-related disorders/ or amphetamine-related disorders/ or cocaine-related disorders/ or drug overdose/ or inhalant abuse/ or marijuana abuse/ or neonatal abstinence syndrome/ or exp opioid-related disorders/ or phencyclidine abuse/ or exp psychoses, substance-induced/ or exp substance abuse, intravenous/ or exp substance withdrawal syndrome/
4. exp Primary Health Care/
5. exp General Practice/
6. exp General Practitioners/
7. exp Physicians, Family/
8. exp Physicians, Primary Care/
9. exp Physician Assistants/
10. exp Nurse Practitioners/
11. 4 or 5 or 6 or 7 or 8 or 9 or 10

12. (behav\$ adj5 (therap\$ or treat\$ or program\$ or interven\$ or regimen\$ or counsel\$ or modif\$ or alter\$ or chang\$ or improv\$)).mp.
13. exp Health Services Administration/
14. exp Interprofessional Relations/
15. exp Cooperative Behavior/
16. integrat\$.mp.
17. (collaborat\$ or (work\$ adj3 together)).mp. [mP=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
18. (collaborat\$ or cooperat\$ or interdisciplin\$ or inter-disciplin\$ or (work\$ adj3 together)).mp.
19. 13 or 14 or 15 or 16 or 17
20. limit 23 to english language
21. limit 24 to yr="2004 -Current"

In addition, relevant citations and reference lists were hand searched. Searches for studies that cited the studies meeting selection criteria were done using Scopus' "cited by" and PubMed's "related citations" functions.

Because few studies assessed health care utilization and cost outcomes, we searched the gray literature, literature that is not available through traditional journal publications found in MEDLINE and similar databases, and websites of organizations known to support behavioral health integration (e.g., SAMHSA-HRSA Center for Integrated Health Solutions, Institute for Healthcare Improvement, Medicare-Medicaid Coordination Office's Resources for Integrated Care, Agency for Healthcare Research and Quality's Academy for Integrating Behavioral Health and Primary Care). Results from Google and Google Scholar searches were reviewed through the fifth page of the search results. The terms "behavioral health integration" and "health care utilization" or "health care cost" were used in the search.

Inclusion Criteria

Population: Adults and children receiving care in mental health or chemical dependency treatment settings

Intervention: Models of providing medical care and/or care management in mental health or chemical dependency treatment settings that increase coordination and enhance medical care

Comparator: Usual care

Outcome: Improved symptoms, medical care outcomes (e.g., blood pressure, lipids, hemoglobin A1C), rates of preventive services delivered, mortality, health care utilization (e.g., ED use, hospitalizations), and costs

Exclusion Criteria

Studies were excluded if they were not published in English or did not include a control group.

Quality Assessment

Methodological Quality of Included Studies

The methodological quality of the included studies was assessed using standard instruments adapted by the center from systems in use by the National Institute for Health and Care Excellence and the Scottish Intercollegiate Guidelines Network.³²⁻³⁴

Each study was assigned a rating of good, fair, or poor, based on its adherence to recommended methods and risk of bias. In brief, good-quality systematic reviews include a clearly focused question, a literature search sufficiently rigorous to identify all relevant studies, criteria used to select studies for inclusion (e.g., randomized controlled trials) and assess study quality, and assessments of heterogeneity to determine if a meta-analysis would be appropriate. Good-quality randomized controlled trials include a clear description of the population, setting, intervention, and comparison groups; a random and concealed allocation of patients to study groups; low rates of loss to follow-up; and intention-to-treat analyses. Good-quality systematic reviews and randomized controlled trials also have low potential for conflicts of interest and funding that might influence the design or reporting of a study in ways that would favor a particular outcome.⁷⁷ Fair-quality systematic reviews and randomized controlled trials have incomplete information about methods that might mask important limitations. Poor-quality systematic reviews and randomized controlled trials have clear flaws that introduce significant risk of bias that would affect study outcomes.

Overall Strength of Evidence

Each outcome was assigned a summary judgment for the overall strength of evidence based on the system developed by the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Working Group.³⁴ The GRADE system defines the overall quality (or strength) of a body of evidence in the following manner:

- **High:** Raters are *very confident* that the estimate of the effect of the intervention on the outcome lies close to the true effect. The estimate of effect is likely stable. Typical sets of studies are randomized controlled trials with few or no limitations.
- **Moderate:** Raters are *moderately confident* in the estimate of the effect of the intervention on the outcome. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is different. Typical sets of studies are randomized controlled trials with some limitations or well-performed nonrandomized studies with additional strengths that guard against potential bias and have large estimates of effects.
- **Low:** Raters have *little confidence* in the estimate of the effect of the intervention on the outcome. The true effect may be substantially different from the estimate of the effect. Typical sets of studies are randomized controlled trials with serious limitations or nonrandomized studies without special strengths.

- **Very low:** Raters have *no confidence* in the estimate of the effect of the intervention on the outcome. The true effect is likely to be substantially different from the estimate of effect. Typical sets of studies are nonrandomized studies with serious limitations or inconsistent results across studies.
- **No evidence:** No articles were identified based on the report methods.

Appendix B. Summary of Findings Table for Randomized Controlled Trials

Author (Year) Condition	Number of Subjects, Setting, Follow-up	Study Inclusion and Exclusion Criteria	Intervention and Comparator	Outcomes Assessed, Findings	Quality Rating and Comments
Bipolar Disorder					
<p>Bauer Part I (2006)⁴⁶</p> <p>Bauer Part II (2006)⁴⁷</p> <p>Kilbourne (2009)⁵²</p>	<p>330 patients 166 intervention 164 TAU</p> <p>306 included in overall analysis 290 with comorbid SUD or medical conditions in subgroup analysis</p> <p>Setting 11 VAMCs</p> <p>Follow-up 3 yrs</p>	<p>Inclusion</p> <ul style="list-style-type: none"> Type II bipolar disorder Index episode of manic, major depressive, or mixed episode, requiring acute psychiatric hospitalization ≤2 hospitalizations on acute psychiatric ward more than 3 mos apart over 5 yrs <p>Exclusion</p> <ul style="list-style-type: none"> Moderate to severe dementia MMSE ≤26 Unresolved substance intoxication or withdrawal Psychiatric hospitalization ≥6 mos over past yr Enrollment in mobile outreach MH program Terminal medical illness with >3-yr life expectancy Unable to give informed consent <p>Sample Characteristics Compared with other bipolar disorder samples, study participants somewhat older (mean age 46 yrs) and sicker; 34% had current SUDs and 38% anxiety</p>	<p>Intervention: LGP Primary medical care: Off-site Coordination/collaboration: Enhanced Self-management: Enhanced</p> <ul style="list-style-type: none"> Psychoeducation: Supporting patient self-management skills through group-based psychoeducation—LGP Provider decision support: Simplified VA Bipolar Guide-line (1-page distillation with manual) Delivery system redesign: Through NCC and manual-based access and continuity procedures Scheduled care: With NCC or psychiatrist as needed during program clinic hours Unscheduled care: Next business day with NCC or psychiatrist as needed Telephone contact: Same day with NCC and with psychiatrist as needed Missed appointments: Outreach by NCC Liaison to other medical, surgical, and MH providers: Communication via NCC 	<p>Mental Health (LGP vs. TAU) Significant reduction in weeks for any affective episode (LGCC vs. TAU, $P=.041$) due to reduction in weeks while manic ($P=.017$), but not depressed ($P=.318$)</p> <p>Over 3 yrs, effects would translate to 6.2 fewer weeks in an affective episode (95% confidence interval [CI], -0.3 to -12.5 weeks) with 4.5 fewer weeks of manic episodes (95% CI, -0.8 to -8.0 weeks)</p> <p>Comparable treatment effects were found for those with and without current SUD or anxiety disorders.</p> <p>Psychosis was associated with an augmented intervention effect: intervention participants had about one fewer weeks in an affective episode ($\beta = -1.07$, $P=0.04$) and a manic episode ($\beta = -0.85$, $P=0.04$) vs. TAU participants.</p> <p>Quality of Life For intervention, significant overall increase in social role function ($P=.003$); work role ($P=.049$), parental role ($P<.001$), and extended</p>	<p>Good</p>

		<p>disorders, 51% had >3 medical comorbidities, 18% had CVD, and 13% were homeless</p>	<ul style="list-style-type: none"> • Hospitalizations: Inpatient liaison for treatment plan and follow-up coordination by NCC • Information flow: Augmentation by NCC <p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> • 0.5 FTE NCC and 0.25 FTE psychiatrist for 45–50 patients • 2-day training for NCC and psychiatrist, 1-day on-site training for new nurses, and phone training for new psychiatrists • Regular conference calls and newsletters with updates, discuss difficult patients, review access/continuity issues • Continuous quality improvement through audit and feedback <p>Comparator: TAU</p> <p>Psychoeducation: None</p> <p>Provider decision support: Nationwide release of VA Bipolar Guideline</p> <p>Delivery system redesign: Usual access and continuity</p> <p>Scheduled care: With psychiatrist or therapists, per individual clinician's choice</p> <p>Unscheduled care: Psychiatrist's choice if available, otherwise emergency services</p>	<p>family role ($P=.005$), but not in social and leisure role ($P=.247$) or marital function ($P=.346$)</p> <p>CVD conditions may have blunted intervention effects on physical HRQoL compared to those without CVD risk (=-6.11, $P=0.04$).</p> <p>Utilization</p> <p>LGP completed by 78% of sample; fidelity to intervention was good: 1) ability to manage 45–50 patient caseload; 2) 78% completed phase I LGP within 12 mos of enrolling; 3) Critical Service Encounter Index (unscheduled contacts with program or other MH providers ÷ all unscheduled contacts) was 8%, indicating excellent access and continuity despite typical staff turnover</p> <p>Cost</p> <p>Mean 3-yr costs: difference -\$2,981 (95% CI, -\$16,030 to \$10,601). Nonsignificant increase in outpatient costs of intervention: (difference, \$648; 95% CI, -\$2,994 to \$4,101) were offset by nonsignificant reductions in inpatient costs (difference, -\$3,629; 95% CI, -\$15,503 to \$9,014) compared to TAU</p>	
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<p>Kilbourne (2008)⁵⁰</p> <p>Kilbourne (2008)⁵¹</p>	<p>Pilot study, 61 patients randomized, 58 included in analysis: 27 intervention, 31 TAU</p> <p>Setting One large VAMC</p> <p>Follow-up 6 mos</p>	<p>Inclusion</p> <ul style="list-style-type: none"> • Bipolar disorder I, II, or NOS • Diagnosis of or receiving treatment for DM or CVD-related risk factor (hypertension, hyperlipidemia, obesity, or BMI >25) • Assigned primary care provider at facility <p>Exclusion</p> <ul style="list-style-type: none"> • Unresolved substance intoxication or withdrawal • Already enrolled in MH program with mobile outreach • Unwilling or unable to provide informed consent or comply with study requirements at time of enrollment 	<p>Intervention: Bipolar Disorder Medical Care (BMC) model</p> <p>Primary medical care: Off-site</p> <p>Coordination/collaboration: Enhanced</p> <p>Self-management: Enhanced</p> <ul style="list-style-type: none"> • Psychoeducation: Self-management behavioral education (group sessions on coping strategies for symptoms, adherence, diet and exercise, building self-efficacy via active discussions of coping strategies) based on the LGP • Care management: Based on chronic care models for bipolar disorder; NCM served as liaison, referred urgent matters to providers, followed up with participants and providers about ongoing psychiatric and 	<p>Quality of Life (SF-12) (BCM vs. TAU)</p> <p>Mental Health (SF-12) 1.0 ±7.7 vs. -0.9 ±6.6, not significant (NS)</p> <p>Changes in bipolar symptoms, well being, self-management efficacy, and global functioning (WHODAS) were not significantly different for BMC vs. TAU.</p> <p>Physical Health (SF-12) Change from baseline to 6 mos: 0.8 + 6.7 vs. -0.6 ± 6.6, <i>P</i>=.04, yielding a moderate effect size (Cohen's <i>d</i>=.32)</p> <p>Medical Care: (BCM vs. TAU) Reported difficulty accessing medical care: 13% vs. 23%, NS</p>	<p>Fair</p> <p>Unclear randomization, brief follow-up</p>

		<p>Sample Characteristics</p> <ul style="list-style-type: none"> • Mean age 55.3 yrs, 9% female, 90% white • 90% had BMI >25, 81% hypertension, 76% hyperlipidemia, 33% DM • 50% had >3 CVD-related conditions 	<p>medical care, reviewed lessons learned, and documented clinical and recovery status via monthly phone calls</p> <p>Staffing, Training, Additional Support</p> <p>Two 1-hour sessions for CME credit for MH and medical providers on unique risk factors for CVD in bipolar disorder and recommendations for management (provided for both groups)</p> <p>Comparator: TAU</p> <p>Current care under patient's MH and medical providers (no formal program)</p> <p>Guideline implementation: Two 1-hour sessions for CME credit, same as intervention group</p>	<p>Staff Time</p> <p>Care managers averaged 32 hrs per patient per year: 20.5 hrs on phone care, 4.9 hrs on self-management program, and 6.6 hrs documenting and charting</p>	
<p>Kilbourne (2013)⁴⁰</p> <p>Goodrich (2012)³⁹</p>	<p>126 adults randomized</p> <p>58 intervention</p> <p>60 enhance usual care (EAU)</p> <p>71 included in 12-mo assessment and 75 in 24-mo assessment</p> <p>Setting</p> <p>MH and primary care clinic at a large VAMC in the Midwest</p> <p>Follow-up</p> <p>24 mos</p>	<p>Inclusion</p> <ul style="list-style-type: none"> • Bipolar disorder I, II, or not otherwise specified (NOS) • Diagnosis of, or receiving treatment for, a cardiovascular disease (CVD)-related risk factor (diabetes mellitus (DM), hypertension, hyperlipidemia, obesity or body mass index [BMI] > 30) or CVD 	<p>Intervention: Life Goals Collaborative Care (LGCC)</p> <p>Primary medical care: Off-site</p> <p>Coordination/collaboration: Enhanced</p> <p>Self-management: Enhanced</p> <ul style="list-style-type: none"> • Psychoeducation: Self-management behavioral education (group sessions on coping strategies for symptoms, adherence, diet and exercise, building self-efficacy via active discussions of coping strategies) based on the LGP 	<p>Manic Symptoms</p> <p>(LGCC vs. enhanced usual care)</p> <p>Reduction in manic symptoms vs. EUC patients (beta=-23.9, P=.01)</p> <p>Physical Health</p> <p>Reduced systolic blood pressure (beta=-3.1, P=.04) and diastolic blood pressure vs. EUC patients (beta=-2.1, P=.04), though these were not significant after adjustment for multiple comparisons (P>.0125)</p>	<p>Fair</p> <p>Small sample size, 40% loss to follow-up at 24 mos</p>

		<p>Exclusion</p> <ul style="list-style-type: none"> • Unresolved substance intoxication or withdrawal • Already enrolled in intensive case management • Unwilling or unable to provide informed consent or comply with study requirements at time of enrollment <p>Sample Characteristics</p> <ul style="list-style-type: none"> • Mean age 53 yrs, 17% female, 95% White • 91% had BMI > 25, 70% hypertension, 83% hyperlipidemia, 25% DM, 20% CVD • 97% were taking an anti-hypertensive at baseline • 69% had a moderate (10%–19%) to high (> 20%) 10-yr risk of a CVD event (e.g., heart attack) based on the Framingham Risk Score 	<ul style="list-style-type: none"> • Care management: Based on chronic care model but enhanced using social cognitive theory to focus on health behavior change, delivered by a master’s level health specialist, referred urgent matters to providers, followed up with participants and providers about ongoing psychiatric and medical care, reviewed lessons learned, and documented clinical and recovery status via monthly phone calls <p>Staffing, Training, Additional Support</p> <p>Master’s level–trained health specialist 1) led four 90-minute interactive psychosocial educational group sessions including discussion on management of CVD risk factors, 2) delivered monthly care management support, 3) provided information and guideline resources to providers. Health specialist had 2-day training program with investigators to review protocols and intervention manual.</p> <p>Comparator: EUC</p> <p>Current care under patient’s MH and medical providers who received quarterly newsletters regarding wellness topics and practice guidelines.</p>		
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<p>Simon (2002)⁴¹</p> <p>Simon (2005)⁴²</p> <p>Simon (2006)⁴³</p>	<p>441 randomized 212 intervention 229 treatment as usual (TAU)</p> <p>414 and 441 included in 12-mo clinical and cost analyses, respectively</p> <p>306 and 331 included in 24-mo clinical and cost analyses, respectively</p> <p>Setting Group Health Cooperative MH clinics</p> <p>Follow-up 2 yrs</p>	<p>Inclusion</p> <ul style="list-style-type: none"> • Adults aged ≥18 yrs • Bipolar disorder type I or II confirmed by structured interview and MH provider or record review <p>Exclusion Cognitive impairment severe enough to preclude informed consent</p> <p>Sample Characteristics</p> <ul style="list-style-type: none"> • Mean age 44 yrs, 68% female, 88% white • 7% with current alcohol or drug abuse • 31% unable to perform work or household responsibilities during 30 of the prior 90 days due to illness 	<p>Intervention</p> <p>Primary medical care: Off-site Coordination/collaboration: Enhanced</p> <p>Self-management: Enhanced</p> <ul style="list-style-type: none"> • Assessment and care planning: Nurse care manager provided structured initial assessment, care planning • Structured group psycho-educational program from LGP, 5 weekly sessions on self-management and goal setting, then twice monthly sessions on problem-solving to achieve specific life goals for remainder of intervention (up to 48 sessions) • Structured monthly telephone monitoring: Mood symptoms medication adherence and adverse effects; supported by web-based computer algorithm for medication adjustments • Feedback to MH treatment team • Support, care coordination as needed <p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> • RNs with >5 yrs clinical psychiatry experience • Caseloads averaged 95 patients per FTE 	<p>Outcomes over 12 Mos (Intervention vs. TAU)</p> <p>Mania and depression severity ratings:</p> <ul style="list-style-type: none"> • Mania symptoms ratings were lower ($P=.025$) • Less time spent with hypomania or mania (1.7 vs. 2.6 weeks, $P<0.05$) • Depression ratings were similar between groups, but the intervention group showed a greater decline over time ($P=0.048$) <p>Utilization</p> <ul style="list-style-type: none"> • More frequent medication monitoring visits 7.2 (+ SD, 12.8) vs. 5.1 (4.6), $P=0.01$ and • Greater percentage on an atypical antipsychotic for >90 days (23% vs. 15%, $P=0.05$) <p>Cost Intervention program costs were \$521 per patient</p>	<p>Good 12-mo outcomes</p> <p>Loss to follow-up 14% at 24 mos</p> <p>Fair 24-mo outcomes</p> <p>Loss to follow-up 34% at 24 mos</p>
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			<ul style="list-style-type: none"> • <u>LGP training</u>: 10–12 hrs didactic, 6 hrs observing, and 6 hrs leading group sessions under supervision • <u>Telephone training</u>: 4 hrs didactic and 4 hrs demonstration/role play training in general program and motivational interviewing techniques • 60 minutes supervision per week from study psychiatrist or psychologist <p>Comparator: TAU</p>	<p>Outcomes at 24 Mos (Intervention vs. TAU)</p> <p><u>Mania and depression severity ratings:</u></p> <ul style="list-style-type: none"> • Mania symptom ratings were lower throughout the 24 mos ($P=.04$) • Less time spent with clinically significant mania symptoms (19.2 [+SD, 20] vs. 25 [24] weeks, $P=0.01$) • Depression ratings were similar between groups ($P=0.85$) • For subgroup who were in remission at baseline (PSR scale score <3), the intervention had no significant effect on mania or depression • For subgroup with substantial symptoms (PSR score >3), intervention had a significant effect on mania scores ($P=0.02$) but not depression scores ($P=0.52$) <p>Utilization</p> <p>More frequent medication monitoring visits 14 (13) vs. 11.5 (9), $P=0.05$</p> <p>Cost</p> <ul style="list-style-type: none"> • Intervention program costs were \$300 per patient during the second 12 mos (\$500 the first 12 mos) • 2-yr MH treatment costs were \$1,251 (95% CI, \$55 to \$2,446) higher for intervention vs. TAU group 	
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Serious Mental Illness

<p>Druss (2001)⁴⁸</p>	<p>120 patients: 59 integrated care clinic (4 transferred to general medicine clinic for urgent medical conditions and a language barrier), 61 general medical clinic</p> <p>Setting VAMC MH clinic</p> <p>Follow-up 12 mos</p>	<p>Inclusion Patients with SMI referred by VA MH providers who thought patients would benefit from treatment by a medical provider</p> <p>Exclusion</p> <ul style="list-style-type: none"> • Current primary care provider • Urgent or multiple serious chronic problems <p>Sample Characteristics</p> <ul style="list-style-type: none"> • Mean age 45 yrs, <1% female, 70% white • 12% hypertension, 10% hyperlipidemia, 13% GI or liver disease, 12% arthritis • 53% had medical conditions not previously known 	<p>Intervention: Integrated care (IC) Model Primary medical care: On-site Coordination/collaboration: Integrated Self-management: No enhancement Emphasis</p> <ul style="list-style-type: none"> • Patient education, preventive services • Close contact with MH care providers via e-mail, phone, and face-to-face • Telephone reminders sent the day before appointments • Clinic appointments scheduled immediately after MH visits, if possible • Active efforts made to re-schedule missed clinic visits <p>Coordination/integration:</p> <ul style="list-style-type: none"> • One provider served as liaison to 3 MH teams, attending weekly team meetings • MH care providers notified about patients' medical status and asked to inform clinic of changes in patient MH status • MH providers encouraged to coordinate with integrated care clinic to ensure attendance at medical appointments 	<p>Health-related Quality of Life (SF-36) (IC vs. TAU over 12 mos)</p> <ul style="list-style-type: none"> • No significant differences in MH or alcohol or drug subscales of Addiction Severity Index • 4.7 point improvement in physical health vs. 0.3 decline ($P=<.001$) <p>Medical and Preventive Care: (IC vs. TAU during 12 mos)</p> <ul style="list-style-type: none"> • More likely to make primary care visits (91.5% vs. 72.1%, $P=.006$) • More likely to receive 15 of 17 preventive measures • Similar rates of hemocult testing • Less likely to have pneumovax (11.9% vs. 32.8%, $P=.006$) 	<p>Fair</p> <p>Unclear allocation concealment, large loss to follow-up</p>
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			<p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> • 1 FTE NP • 0.5 FTE family practitioner who supervised NP, liaised with physicians • 1 FTE nurse case manager provided patient education, case management, and liaised with MH care providers • 0.5 FTE administrative assistant who scheduled appointments, took messages <p>Comparator: TAU VA general medical clinic: attending physician (29 patients), NP or physician assistant (28), medical resident (11)</p>	<p>Utilization and Cost</p> <ul style="list-style-type: none"> • Less likely to have ED visit (11.9% vs. 26.2%, $P=.04$) • Mean cost IC vs. TAU: \$13,010 (SD \$13,271) vs. \$14,543 (SD \$15,871), $P=.67$ • Estimated IC costs \$1,582 per patient (\$266 per visit) vs. estimated general medicine clinic cost \$398 per patient (\$148 per visit) for the medicine clinic ($P=.02$) • Higher cost attributed to start-up phase and clinicians not having full caseloads • High primary care cost difference possibly offset by large NS difference in inpatient costs (\$410 vs. \$2,673, $P=.19$) 	
Druss (2010) ⁴⁹	<p>407 patients: 205 Nurse Case Management/Manager (NCM), 202 TAU</p> <p>8 subjects (2%) withdrew, 89% had complete 12-mo chart review data, 68% completed 12-mo interviews</p> <p>Setting Urban Community Mental Health Centre (CMHC)</p> <p>Follow-up 12 mos</p>	<p>Inclusion CMHC patient with SMI, able to provide informed consent</p> <p>Exclusion None stated</p> <p>Sample Characteristics 78% African American and low income (median annual income \$3,400)</p> <p>Psychiatric diagnoses: 42.8% schizophrenia 32.7% depression 17.2% bipolar disorder 25.3% had co-occurring SUD</p>	<p>Intervention: Medical Care Management Primary medical care: Off-site Coordination/collaboration: Enhanced Self-management: Enhanced Patient barriers to primary care: Motivational strategies including providing information on patient's medical condition, available community medical providers, upcoming appointments, an information booklet with updated patient information, motivational interviewing techniques to support patient self-management skills, action plans with goals for medical care or lifestyle change</p>	<p>Health-related Quality of Life (SF-36) (NCM vs. TAU at 12 mos)</p> <ul style="list-style-type: none"> • Mental summary score 8.0% improvement vs. 1.1% decline, $P=0.008$ • NCM patients had greater improvement over time vs. TAU on MH ($P=0.04$) and social functioning ($P=0.01$) subscales • Physical summary score No significant difference in change over 12 mos in summary and subscale scores 	Good

		<p><u>Medical comorbidities:</u> 45.6% hypertension 36.6% arthritis 25.6% tooth or gum disease 20.1% asthma 17.9% diabetes</p>	<p>Provider barriers to primary care: NCM served as advocate for the patient, communication conduit between patient and specialty medical and MH providers, developed and maintained a provider list, notified providers of changes in patient medication regimen and medical status, provided patients with coaching on interacting with providers, and accompanied them to specialty appointments as needed</p> <p>System-level barriers to care: NCM helped enroll uninsured patients in entitlement programs, provided transportation, and addressed factors that may hinder ability to attend appointments</p> <p>Staffing, Training, Additional Support:</p> <ul style="list-style-type: none"> • 2 FTE RNs • Manualized protocol for care <p>Comparator: TAU List with contact information for local primary care medical clinics that accept uninsured and Medicaid patients provided</p>	<p>Medical and Preventive Care (NCM vs. TAU at 12 mos)</p> <ul style="list-style-type: none"> • 58.7% vs. 21.8% received indicated services ($P<0.0001$) <p><u>Physical examinations:</u> (70.5% vs. 35.6% [$F=166.83$, $df=1,361$, $P<0.001$])</p> <p><u>Screening tests:</u> (50.4% vs. 21.6% [$F=105.93$, $df=1,361$, $P<0.001$])</p> <p><u>Educational interventions:</u> (80.0% vs. 18.9% [$F=410.93$, $df=1,353$, $P<0.001$])</p> <p><u>Indicated vaccinations:</u> (24.7% vs. 3.8% [$F=100.76$, $df=1,353$, $P<0.001$])</p> <p><u>Sustaining a primary source of care:</u> (IC from 49.5% to 71.2% vs. TAU 48.3% to 51.9% [$F=10.42$, $df=1,310$, $P=0.001$])</p> <ul style="list-style-type: none"> • 12% vs. 2% had identification of previously undiagnosed medical conditions ($P=0.005$), most common were hyperlipidemia, hypertension • Of 202 subjects with diabetes, hypertension, hypercholesterolemia, or coronary artery disease; NCM had significantly greater increase in indicated services vs. TAU (34.9% vs. 27.7%, $P=0.03$) 	
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				<ul style="list-style-type: none"> • Of 100 subjects with blood tests to calculate the Framingham cardiovascular risk index, NCM patients had significantly lower 10-yr risk vs. TAU (6.9% vs. 9.8%, $P=0.03$) 	
Rubin (2005)⁵⁴	<p>139 patients: 55 intervention 84 TAU</p> <p>Setting Inpatient psychiatric unit at teaching hospital</p> <p>Follow-up Unclear; chart reviewed after discharge to determine if health maintenance services ordered or completed</p>	<p>Inclusion Inpatients ≥ 18 yrs admitted to inpatient psychiatric units</p> <p>Exclusion Patients requiring medical consultation before randomization</p> <p>Unequal group size: Larger usual care group (84 vs. 55); although they were younger ($P=.001$), there were significantly more medical comorbidities among participants than nonparticipants ($P=.016$)</p>	<p>Intervention Primary medical care: On-site Coordination/collaboration: Integrated Self-management: No enhancement</p> <ul style="list-style-type: none"> • Within 24 hrs of admission, medical exam done by internist who communicated with PCP • Internist updated list of medical problems and medications and arranged health maintenance services specified by the USPSTF • Internist attended daily work rounds, ordered specialty consultations, planned for alcohol and nicotine abatement, managed acute and chronic nonpsychiatric illnesses • At discharge, internist communicated with PCP about new medications, medical problems, and plans for health maintenance services <p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> • General internist (FTE not stated) 	<p>Medical and Preventive Care (Intervention vs. TAU) More had process of care items completed: review of systems, review of medication list, family risk plan, needs assessment summary score (all items, $P<.001$)</p> <p>More had health maintenance items done as indicated: alcohol and tobacco risk plans, Papanicolaou test, stool hemocult, mammogram, tetanus and flu vaccine, lipid screening, health maintenance summary score (all items, $P<.02$)</p> <p>Not significant: Length of stay (11.5 vs. 10.9 days), total hospital costs (\$8,558 vs. \$8,527), updated problem list, physical exam, digital rectal exam and prostate-specific antigen test, pneumonia vaccine</p>	<p>Poor</p> <p>Unclear randomization process created unequal group size and composition</p>

			Comparator: TAU Consultations with medical specialists were done through usual hospital services		
Chemical Dependency					
Samet (2003) ⁵⁵	470 gave informed consent: 235 intervention 235 TAU Setting Residential detoxification unit in Boston, MA Follow-up 12 mos: 46% 24 mos: 59%	Inclusion <ul style="list-style-type: none"> Alcohol, heroin, or cocaine as drug of choice Age >17 yrs Residence in proximity to primary care clinic or homelessness Exclusion <ul style="list-style-type: none"> Established primary care provider, intention to continue Unable to provide history or informed consent (<21 of 30 on the MMSE) Plans to leave Boston area in next 12 mos Inability to provide 3 contact names for follow-up tracking Pregnancy Not fluent in English or Spanish Sample Characteristics <ul style="list-style-type: none"> Mean age 35.8 yrs 76% male 46% black, 11% Hispanic 56% >1 drug of choice: 63% alcohol, 31% heroin 51% cocaine 47% had 1 or more chronic medical conditions 40% had health insurance 47% homeless 	Intervention: HELP Clinic Primary medical care: On-site for initial evaluation, then linked to primary care Coordination/collaboration: Enhanced for initial evaluation but not for follow-up Self-management: Unclear <ul style="list-style-type: none"> A multidisciplinary HELP clinic in a residential detoxification facility HELP clinic did a single comprehensive initial evaluation at the substance abuse treatment unit HELP clinic arranged subsequent follow-up with a primary care physician who could provide ongoing health care Staffing, Training, Additional Support <ul style="list-style-type: none"> Nurse, internist, social worker (FTE not stated) All members of HELP team had full day training in motivational interviewing Comparator: TAU No evaluation or referrals to primary care provided	Utilization (HELP clinic vs. TAU over 12 mos) <ul style="list-style-type: none"> Self-report linkage to primary medical care within 12 mos: 69% vs. 53%, $P=0.0003$; hazard ratio 1.8 (95% CI, 1.3 to 2.4) No difference in mean number of visits during 12 mos: 4.9 vs. 4.7, $P=0.86$ Patients with only administrative data having PC visit: 46% vs. 10% Administrative and self-report data had fair agreement beyond chance agreement ($\kappa=0.41$) No significant difference in HIV risky behaviors, drug risk behaviors, alcohol and drug abuse severity, HRQoL Utilization of medical and addiction services was not significantly different over 24-mo follow-up period, all P values >0.2 	Poor Unclear allocation concealment, unclear blinding, high loss to follow-up

<p>Saxon⁵⁶ (2006)</p>	<p>720 patients: 358 intervention 362 general medicine clinic</p> <p>Setting Addiction Treatment Center and General Medicine Clinic, VA Puget Sound Health Care System</p> <p>Follow-up 12 mos</p>	<p>Inclusion 1 or more chronic medical conditions or any of the following at screening: 1) Blood pressure >130/90 mm Hg 2) Elevated ALT (>37), AST >40), or GGT (>51) 3) Random glucose >200; 4) Serum creatinine >1.2; 5) Hemoglobin >13.0 6) Total cholesterol >200 mg/dL</p> <p>Exclusion</p> <ul style="list-style-type: none"> Existing relationship with a primary care provider Transfer from an outside SUD treatment program Medical conditions in >3 organ systems <p>Sample Characteristics</p> <ul style="list-style-type: none"> Mean age 46 yrs 98% male 29% black, 2% Hispanic Primary substance: 64% alcohol, 21% cocaine 44% had 3 or more chronic medical conditions, 40% had pain at screening 40% had health insurance 50% homeless 	<p>Intervention: On-site Primary Care Primary medical care: On-site Coordination/collaboration: Unclear Self-management: No Primary care provided on-site at the Addiction Treatment Center for medical conditions</p> <p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> 2 0.5 FTE NPs, 1 FTE physician assistants No special training <p>Comparator: TAU</p> <ul style="list-style-type: none"> Referral to the General Medicine Clinic for care 	<p>QoL and Substance Use (On-site clinic vs. TAU)</p> <ul style="list-style-type: none"> SF-36 MH scores improved and physical health scores declined over time, but NS difference between groups ASI alcohol and drug composite scores improved for both groups over follow-up and NS differences between groups <p>Utilization and Cost Primary care attendance</p> <ul style="list-style-type: none"> No significant difference in attending originally scheduled PC appointments (odds ratio [OR] 1.15, 95% CI, 0.86 to 1.55, $P=0.346$) The odds of rescheduling and attending a later appointment were greater (OR 1.46, 95% CI 1.02 to 2.09, $P=0.041$) On-site subjects had significantly more visits (mean \pm SD, 2.29 \pm2.27 vs. 1.80 \pm1.97, $P=0.002$) <p>Other services</p> <ul style="list-style-type: none"> The mean number of ED visits was significantly less during first 3 mos, but by 12 mos there was no significant difference <p>Cost</p> <ul style="list-style-type: none"> On-site subjects averaged slightly lower medical/surgical costs and slightly higher MH costs, but no significant differences between groups 	<p>Fair</p> <p>26% loss to follow-up, those not followed up younger than rest</p>
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<p>Umbrecht-Schneiter (1994)⁵⁷</p>	<p>51 patients: 25 on-site care 26 referred</p> <p>Setting Hospital-based methadone clinic</p> <p>Follow-up 8 weeks</p>	<p>Inclusion Methadone clinic patients requiring further care for 4 conditions: hypertension, tuberculosis exposure (PPD conversion), positive human immunodeficiency virus (HIV) serology (asymptomatic), acute STD</p> <p>Exclusion Having a primary care physician</p>	<p>Intervention Primary medical care: On-site Coordination/collaboration: Unclear Self-management: No enhancement On-site care for targeted medical conditions: hypertension, PPD conversion, asymptomatic HIV, acute STDs</p> <p>Staffing, Training, Additional Support Not stated</p> <p>Comparator Patients informed of medical condition and need for care, then referred to a medical clinic on the same campus</p>	<p>Medical and Preventive Care (Intervention vs. TAU) Enrolled in medical treatment: 92% vs. 32%, $P < .001$ Seen ≥ 1 time: 25 patients vs. 8 patients, $P < .001$ Mean visits per patient (\pm SD): 3 (1.6) vs. 0.4 (0.6), $P < .001$ Receiving any treatment: 88% vs. 28%, $P < .001$ (Tracked for hypertension, TB exposure, asymptomatic HIV and STDs, but small numbers make group comparisons difficult)</p>	<p>Poor</p> <p>Small sample with unclear randomization resulting in unequal group assignment, no blinding</p>
<p>Weisner (2001)⁵⁸</p> <p>Parthasarathy (2003)⁵³</p>	<p>654 patients: 318 integrated care 336 TAU</p> <p>341 patients had substance abuse-related medical conditions (SAMC): 180 integrated care, 181 TAU</p> <p>Setting Kaiser Permanente Chemical Dependency Recovery Program (CDRP)</p> <p>Follow-up 6 mos (Weisner 2001) and 12 mos (Parthasarathy 2003) after treatment</p>	<p>Inclusion Adults meeting criteria for alcohol or other drug abuse or dependence admitted to Chemical Dependency Recovery Program (CDRP)</p> <p>Exclusion Patients with psychosis and dementia</p> <p>Sample Characteristics</p> <ul style="list-style-type: none"> • Mean age 37 yrs • 55% male • 9% black, 9% Hispanic • Primary substance: 57% alcohol, 26% amphetamines, 17% marijuana • 62% employed 	<p>Intervention: On-site Primary Care Primary medical care: On-site Coordination/collaboration: Integrated Self-management: Unclear</p> <ul style="list-style-type: none"> • Integrated delivery of substance abuse and primary medical care treatment on-site at the CDRP <p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> • 3 physicians (1.25 FTEs), 1 medical assistant (1 FTE), and 2 nurses (1.8 FTEs) • Physicians had specialty training in substance abuse treatment 	<p>Substance Use (On-site clinic vs. TAU over 6 mos)</p> <ul style="list-style-type: none"> • Improvement on all drug and alcohol measures over 6 mos, but differences in abstinence rates were not significant (68% vs. 63%, $P = .18$) • Subgroup with SAMC: Significantly higher total (69% vs. 55%, $P = .006$) and alcohol abstinence rates (80% vs. 65%, $P = .002$) • Subgroup without SAMC: No significant differences in abstinence rates (66% vs. 73%, $P = .23$) 	<p>Good</p> <p>Unclear concealment and blinding</p>

			<p>Comparator: TAU</p> <ul style="list-style-type: none"> • Same substance abuse treatments provided, but medical care was provided by the HMO's primary care clinics, located close to CDRP • If no primary care providers, research staff assisted patient in getting one • Doctors may not know patients are receiving chemical dependency treatment 	<ul style="list-style-type: none"> • Odds of total abstinence were 2.6 times larger in SAMC patients receiving integrated services vs. non-SAMC (OR 2.60, 95% CI, 1.29 to 5.26; $P=.008$), alcohol abstinence OR was 2.22 (95% CI, 1.35–3.64) <p>Cost</p> <ul style="list-style-type: none"> • On-site care patients had higher addiction (\$384 vs. \$338, $P=.02$) and total treatment costs (\$429 vs. \$383, $P=.03$) per member per month <p>Patients with SAMCs in the on-site vs. TAU group had a trend toward higher costs (\$470 vs. \$428, $P=.14$); the incremental cost-effectiveness ratio per additional abstinent patient with an SAMC in the on-site group was \$1,581</p> <p>Utilization and Cost Over 12 mos</p> <p>Downward trend in hospitalization and ED use and costs, over 12 mos, but no significant differences between on-site and TAU groups (total medical costs for intervention patients decreased: \$327.84 to \$269.32; $P=0.25$)</p>	
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				<p>SAMC patients only</p> <ul style="list-style-type: none"> • Decrease in total medical cost over time significantly greater for on-site vs. TAU patients ($P=0.02$) • No significant change in inpatient rates ($P=0.62$), downward trend in ED visits (from 0.11 to 0.08; $P=0.16$) • Significant decrease in ED costs (from \$54.48 to \$33.37; $P=0.05$) 	
<p>Willenbring (1999)⁵⁹</p>	<p>105 males with medical complications caused by alcoholism: 48 intervention 53 TAU</p> <p>Setting Minneapolis VAMC</p> <p>Follow-up 2 yrs follow-up</p>	<p>Inclusion</p> <ul style="list-style-type: none"> • Severe alcohol-related medical illness (e.g., cirrhosis symptomatic hepatitis, pancreatitis, cardiomyopathy, GI bleeding, or severe neuropathy) • Recent pathological drinking (past 6 mos) • Able to return for monthly clinic visits <p>Exclusion</p> <ul style="list-style-type: none"> • History of repeated failure to attend outpatient clinics • Terminal illness, life expectancy <12 mos • Severe dementia • Major psychiatric disorder other than depression • Current poly-substance abuse, drug of choice other than alcohol • Civil commitment to treatment or a pending commitment action 	<p>Intervention: Integrated Outpatient Treatment (IOT)</p> <p>Primary medical care: Off-site</p> <p>Coordination/collaboration: Integrated initially, but unclear for follow-up care</p> <p>Self-management: Unclear</p> <ul style="list-style-type: none"> • Development of treatment plan presented to patient and involved family members to reduce the number, length, and severity of relapses • Techniques for addressing excessive drinking and psychosocial problems were integrated with primary care • 1- to 2-day inpatient evaluation conducted by multidisciplinary team • Patients were seen monthly in outpatient clinic by NP or physician or both 	<p>Substance Use (IOT vs. TAU)</p> <ul style="list-style-type: none"> • After 2 yrs, 74% vs. 47% of patients were abstinent ($P=.02$) • Among nonabstinent patients, alcohol use was similar to baseline <p>Mortality</p> <p>81% vs. 70% subjects lived 2 yrs, $P=.03$; however, controlling for age, results of survival analysis were not significant</p> <p>Utilization and Cost</p> <ul style="list-style-type: none"> • Mean (\pmSD) number of visits over 2 yrs 42 (29) vs. 17 (16), $P<.01$ • Use of hospital services was similar for both groups • Incremental cost of intervention was about \$1,100 per patient per year 	<p>Fair</p> <p>Unclear allocation concealment, unclear if intention-to-treat analysis</p>

		<p>Sample Characteristics</p> <ul style="list-style-type: none"> • Mean age 53 yrs in intervention and 57 yrs in TAU group, $P=.04$ • 100% male veterans • 91% white • 70% unemployed 	<ul style="list-style-type: none"> • Recent drinking history and medical problems reviewed, physical examinations and lab tests done • Biological indicators, such as liver function test results, were used to track the effects of drinking <p>Staffing, Training, Additional Support</p> <ul style="list-style-type: none"> • NP, physician (FTE not stated) • Procedure manual, standardized progress notes • Clinical supervision by investigator <p>Comparator: TAU</p> <ul style="list-style-type: none"> • Patients were referred to usual clinical services, including inpatient and outpatient consultation and treatment services for alcohol-related problems in general and specialty medical clinics • For patients entering the study after completion of an intensive alcoholism treatment program, routine continuing alcohol treatment provided 		
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Abbreviations: ALT, alanine aminotransferase (liver function test); ASI, Addiction Severity Index; AST, aspartate aminotransferase (liver function test); BMI, body mass index; BPD, bipolar disorder; CME, continuing medical education; CVD, cardiovascular disease; DM, diabetes mellitus; ED, emergency department; FTE, full-time equivalent; GGT, gamma-glutamyl transferase (liver function test); GI, gastrointestinal; HELP, Health Evaluation and Linkage to Primary Care; HRQoL, health-related quality of life; hrs, hours; IC, Integrated Care; IOT, Integrated Outpatient Treatment; LGP, Life Goals Program; LGCC, Life Goals Collaborative Care; MH, mental health; MMSE, mini-mental state examination; mos, months; NCC, nurse care coordination; NCM, nurse case management/manager; NP, nurse practitioner; NOS, not otherwise specified; NS, not significant; PC, primary care; PCP, primary care provider; PSR, Psychiatric Status Rating; RN, registered nurse; SD, standard deviation; SMI, serious mental illness; STD, sexually transmitted disease; SUD, substance use disorder; TAU, treatment as usual; TB, tuberculosis; SF-36 and SF-12, 36- and 12-item versions of the Short Form Health Survey; USPSTF, United States Preventive Services Task Force; VA, Veterans Affairs; VAMC, Veterans Affairs Medical Center; yrs, years.

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