

**FACILITATORS OF AND BARRIERS TO MENTAL HEALTH TREATMENT AMONG
ADOLESCENTS IN AN INTEGRATED HEALTHCARE SETTING**

by

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ABSTRACT

Background: The high incidence of mental health disorders among adolescents, accompanied by low treatment utilization, is a major public health problem. Including mental health treatment in primary care medical settings through an integrated health care model offers an opportunity for early intervention and easier treatment uptake for adolescents with mental health diagnoses.

Methods: This thesis examined the barriers to and facilitators of implementing a mental health referral system with the support of a quality improvement project within a single clinic. **Results:**

Qualitative analysis revealed key facilitators to be provider education; communication among team members; a shared EHR and electronic referral orderset; ongoing monitoring, evaluation, and improvement of the system; and social workers. Barriers included workflow challenges; lack of protocols; and fewer available services. Quantitative data analyses showed significant improvement in mental health utilization rates since the implementation of the project.

Conclusion: The findings from this thesis can be used to inform future integrated models for adolescent mental health care in primary care settings. Expanding integrated models has public health implications for increasing treatment utilization among adolescents in need of mental health services, ultimately leading to improved quality of life throughout adulthood.

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1.0 INTRODUCTION

The high incidence of mental health disorders among adolescents, accompanied by low treatment utilization, is a major public health problem. Including mental health treatment in primary care medical settings through an integrated health care model offers an opportunity for early intervention and easier treatment uptake for adolescents with mental health diagnoses. Implementing an integrated model requires system-level changes to health care settings, intentional preparation, and a team of providers dedicated to the implementation and monitoring of an integrated system. This team should include medical, mental health, and social work providers.

Integrated models continue to emerge in research as effective health care delivery. However, clinics implementing mental health care into their medical care confront a number of barriers. A number of factors, or facilitators, enable the implementation and sustainability of the integrated model and can offset system barriers. Addressing barriers and planning to include facilitators prior to implementing the model can increase implementation effectiveness. This thesis examines the barriers to and facilitators of implementing a mental health referral system with the support of a quality improvement project within a single clinic.

Qualitative analysis revealed key factors and modifications that facilitate mental health integration. Quantitative data analyses that examined these factors, using control charts typical

of quality improvement research, showed significant improvement in mental health utilization rates since the implementation of the project.

The findings from this thesis can be used to inform future integrated models for adolescent mental health care in primary care settings. Expanding integrated models can lead to increased treatment utilization among adolescents in need of mental health services, ultimately leading to improved quality of life throughout adulthood.

2.0 BACKGROUND

The prevalence of mental health problems, among adolescents in the United States is a major public health problem. According to the 2010 National Comorbidity Survey-Adolescent Supplement NCS-A of over 10,000 adolescents aged 13-18, almost 32% experienced anxiety disorders; 19% behavior disorders, 14.3% mood disorders, and 11.4% substance use disorders at the time of the survey [1]. Mental health disorders with severe impairment or distress affected approximately 22% of all adolescents surveyed [1]. Other large studies found high and increasing prevalence rates for mental health disorders, specifically Major Depressive Disorder (DSS). The Substance Abuse and Mental Health and Services Administration's (SAMHSA) 2014 National Survey on Drug Use and Health (NSDUH) of over 17,000 adolescents aged 12-17 found that 11.4% of adolescents had a major depressive episode (MDE) during the prior year and 8.2% of adolescents had a MDE with severe impairment [2]. These rates for prior-year MDEs and MDEs with severe impairment have steadily increased since 2010 [2].

Adolescence is a critical stage for intervention for mental health disorders. Studies indicate that half to most of all lifetime cases of mental health disorders begin during adolescence and persist into adulthood [1, 3-8]. Combined data from SAMHSA's NSDUH from 2010 to 2012 show that the prevalence of any mental health disorder increase with age, from 7% among 12-15 year olds, to 11.2% among 16-17 year olds, and as high as 20% among young adults 18-25 [9].

Depression has the greatest public health impact and warrants early intervention during adolescence. A history of depression is a major risk factor for suicide, the third leading cause of death among adolescents [10]. Depression is associated with short-term negative impacts among adolescents including problems with family and friends, trouble completing homework, and increased use of computers [11]. Long term, depression typically is a chronic condition and is associated with smoking, alcohol consumption, physical inactivity, and sleep disturbance [12, 13]. Other noted conditions associated with a 10-year follow-up of depression include reoccurring depressive episodes, greater symptom severity, and low social support [4].

Finally, uptake rates of mental health treatment for adolescents are low, despite the high prevalence of depression among adolescents, its public health significance, and effective identification methods [14]. Only 35.7% of adolescents between the ages of 12-15 and 39.9% between 16-17 utilize treatment [9]. A number of barriers, notably negative health beliefs, impact these low utilization rates.

2.1 BARRIERS TO TREATMENT

Literature describing barriers to mental health treatment is more extensive for adults than adolescents. However, many of the barriers identified among adults mirror those identified in the growing body of research with adolescents. Negative health beliefs, including stigma, are the most notable barriers to mental health treatment. Livingston and Boyd (2010)'s systemic review found that stigma was associated with "greater psychiatric symptom severity and poorer treatment adherence" in 63.6% of studies [15]. The research found that negative health beliefs about one's need for treatment and negative attitudes about mental health treatment were barriers

for adolescents [16]. The National Comorbidity Survey-Replication of over 9,000 adolescents between 2003 and 2005 found similar negative health beliefs related to low perceived need and negative attitude barriers among adolescents with mental health disorders [17]. Gulliver et al. (2010)'s systematic review found barriers including: low mental health literacy, such as identifying symptoms; negative health beliefs such as a reliance on self-help and fear of asking for help; and concerns about trust and confidentiality with mental health providers [18].

Similarly to research among adults, stigma was identified in 75% of qualitative studies in a 2006 systematic review of barriers among adolescents to receiving care [18]. Stigma continues to be a salient factors inhibiting mental health treatment, especially for youth [8, 19, 20].

Parents play a significant role in treatment utilization among adolescents [21-23]. Radovic et al 2015's study of primary care physicians' perceptions found that physicians perceive that parents may have difficulty accepting their child's diagnosis and, therefore, may be unable to facilitate treatment for their child. Negative family dynamics and a history of trauma may also act as barriers [22].

Increasing access to quality mental health care and reducing negative beliefs of mental health care by normalizing it through integrated medical and behavioral health systems have emerged as structural solutions [8].

2.2 INTEGRATED CARE

In 2008, the World Health Organization (WHO) recognized integrating mental health treatment into primary care settings as a strategy to increase mental health treatment for adults and adolescents [24]. The Patient Protection and Affordable Care Act (ACA) promotes greater

integration of mental and physical health services to increase utilization rates [25]. Greater integration of services gives health care professionals the opportunity to create systems that increase screening and referrals for adolescents with various mental health conditions and thus access to and utilization of care.

Researchers, health care providers, and policy makers use a variety of terms to describe the integration of mental health treatment into primary care. Some terms are overlapping or are used interchangeably. The following definitions provide clarity.

The term *integrated care* describes “the systematic coordination of general and behavioral health care” [26] in the form of a “tightly integrated, on-site teamwork with a unified care plan as a standard approach to care for designated populations” [27]. *Integrated primary care* “combines medical and behavioral health services for the spectrum of problems that patients bring to primary medical care” [27]. The goal in integrated primary care is to meet all of the needs a patient presents; therefore, a behavioral health provider is part of the primary care system [27]. In the United States, primary care-focused integration is most common because primary care physicians are already responsible for “health maintenance and monitoring functions” [28] (p.98).

Collaborative care is a broad term describing models of integrated care that involve a collaborative team of three key providers: a case manager, a primary care physician, and a mental health specialist [29]. *Collaborative care* is a commonly used term within the literature that describes the effectiveness of models that integrate mental and behavioral health care.

The terms *behavioral health care* and *mental health care* are also frequently used interchangeably. *Behavioral health care* is a broader term encompassing any health care that aims to promote positive health behaviors. This includes mental health and substance abuse

treatment, as well as patient activation [27]. *Mental health care* provides for those with or at risk for mental illnesses, with the goal of helping patients “suffer less emotional pain and disability and live healthier, longer, more productive lives” [27].

In addition to the broad terms used to describe the integration of mental and physical health care, three models of collaboration describe varying levels of integration. [30]. In *coordinated care*, medical and behavioral health providers operate in separate locations and systems and collaboration is limited to occasional communication regarding specific issues about shared patients. *Co-located care* describes care where medical and behavioral health providers have increased collaboration due to the convenience of occupying the same facility. In some co-located models, systems begin to overlap, such as with a shared electronic medical record (EMR). The highest level of collaboration, fully *integrated care*, is a single system with a team of interdisciplinary providers who treat all medical and psychosocial needs [30].

2.3 DEVELOPMENT OF THE INTEGRATED CARE MODEL

The integrated care model is based on Wagner’s Chronic Care Model (CCM) developed in 1996 to address the high demands that chronic diseases, including depression, place on patients and families [31]. The CCM addresses gaps in the health care system that result from a lack of organization that contributes to a limited focus on acute problems. These gaps fail to empower patients to self-manage their disease. The CCM alleviates these problems by using preventative and secondary interventions to address the psychosocial concerns accompanying the chronic disease [31].

Wagner and his colleagues posited that four barriers contribute to negative health outcomes:

1. Later detection of complications due to lack of assessment and follow-up,
2. Low patient self-management of disease due to lack of education, feedback, etc.,
3. Low quality of care and effective interventions, and
4. Psychosocial stress [31].

Wagner proposed five elements essential to a successful Chronic Care Model to counteract the above factors and outcomes:

1. Clearly defined plans and protocols,
2. Additional resources and follow-up,
3. Focus on patients' behavioral change needs,
4. Access to mental health expertise, and
5. Information systems [31]

The strong evidence for the effectiveness of Wagner's CCM in treating chronic diseases, including depression, led to the development of other standards for integrating care, first for adults and later for children and adolescents in pediatric primary care. The Agency for Healthcare Research and Quality (AHRQ) (2013) developed extensive standardized definitions, concepts, and guidelines for integrating behavioral health care into the primary care setting [27]. In general, integrated models should include a team of experts with primary care and behavioral health roles; a shared population of patients among primary care and behavioral health providers; a systematic approach to identifying patients needing behavioral health care, involving patients and providers in decision around a shared care plan; a shared electronic health record (EHR); and a plan for follow-up. Along with these factors, the success of the integrated model relies on

integration as the standard model of care for all patients, the implementation of certain necessary business structures, and continuous quality improvement (QI) to monitor the system's effectiveness [27].

Integrated models implementing these standards have proved effective in research on the treatment of depression in both adult and pediatric primary care settings.

2.4 INTEGRATED CARE WITH ADULTS

A number of studies, including randomized control trials, systematic reviews, and meta-analyses support the evidence base for integrated or collaborative care models [32-38]. Most notably, Gilbody et al. (2006)'s meta-analysis of 37 randomized studies including over 12,000 patients found that collaborative care for depression resulted in great positive outcomes than standard care, with statistically significant standardized mean differences of 0.25 for short term outcomes and 0.15 long term outcomes [34].

Despite findings on the effectiveness of integrated care and published standards for integrated care models, research on the specific factors related to implementation is lacking [36, 39]. Katon et al. (2006) wrote that integrated or collaborative care's effectiveness is well established and further research should begin exploring facilitators of implementation [36].

Emerging research examining collaborative care in practice identified a number of key factors facilitating implementation. These factors included a care manager [39-41] who can engage effectively face-to-face with potential patient referrals [34][39]; an effective care team with engaged physicians [39, 42]; a liaison or champion physician to engage colleagues [39,

41]; support from leaders in the health care organization [41]; and clear protocols for identifying, tracking, and follow-up with referrals [39, 40, 42].

The effectiveness of integrated or collaborative care with adults and the literature on implementation facilitators support the use of collaborative care with children and adolescents. The following section describes the treatment of mental health conditions in pediatric primary care and the current literature on standards and facilitators of collaborative care with youth.

2.5 MENTAL HEALTH TREATMENT IN PEDIATRIC PRIMARY CARE

Early intervention and prevention of mental health disorders within pediatric primary care is increasingly necessary due to their benefit in preventing increased severity of disorders and prevalence of comorbid disorders [5, 6]. Targeting early detection and intervention to children and adolescents will likely have greater success than later screening given the early age of onset of mental health disorders [5]. Early detection of youth at-risk for developing mental health disorders can enable coordination with families, childcare providers, and medical providers to intervene and prevent the development of a severe disorder [43]. In other cases of youth who already experience severe disorders, care coordination is necessary to best align the youth's services around shared treatment plan [43]

Significant cost savings result from early detection of mental health disorders among youth in primary care settings. Early intervention reduces costs [44] by decreasing lifetime use of intensive services [45]. Finally, there is a need to address social and emotional concerns through screening and early intervention in pediatric primary care. About half of all pediatric primary care appointments involve psychosocial, behavioral, or other non-medical concerns [45]

The American Academy of Child and Adolescent Psychiatry therefore advocates the formal integration of mental health care into primary care [43].

2.6 INTEGRATED CARE WITH YOUTH

Research describing the effectiveness of integrated care with children and adolescents has emerged [29]. Asarnow et al. (2015)'s meta-analysis of 31 randomized control trials with over 13,000 participants found that youth receiving integrated care were 66% more likely to have better behavioral health outcomes compared to youth receiving standard care [46]. Asarnow et al. acknowledge varying degrees of effect among studies but note that their findings increase confidence in the integrated model having positive clinical outcomes for adolescents [46]. Despite the large number of RCTs examining integrated models, prior to 2014, only two RCTs were published on the effectiveness of collaborative care on adolescent depression, contrasted to the 70 published on adults [47].

Guidelines for the core components of coordinated care, implementation standards, and best practices vary slightly among authors but overlap on the following key components: early detection and screening; care coordination; protocols for identifying and methods for monitoring referrals; and access to psychiatric and/or mental health consultations [28, 29, 43, 45]. These factors improved outcomes in Richardson, et al (2014)'s randomized clinical trial in which patients with depression had a greater decrease in depression at 12 months when receiving care through an integrated model than those patients receiving standard care [47].

Limited studies published examine pediatric primary care practices that have implemented the components discussed above and the operational barriers faced by health care

teams. Literature on the barriers to integrated care discuss systemic and policy barriers to implementation, such as changes in reimbursement and incentives for quality care [43, 45].

Important knowledge gaps for integrated health care implementation with children and adolescents include: 1) the structural components necessary to implement core components, 2) effective systems and protocols for identifying and monitoring referrals, 3) identification of the types of care team members necessary to fulfill the care management and care coordination responsibilities, and 4) barriers faced in implementing the core components. This paper aims to contribute knowledge of the specific factors that facilitate an integrated model by providing a detailed analysis of one clinic's implementation process.

3.0 METHODS

This thesis assessed a case study of a mental health quality improvement (MHQI) project implemented in November 2014 at the Center for Adolescent and Young Adult Health (CAYAH) of Children's Hospital Pittsburgh (CHP) of the University of Pittsburgh Medical Center (UPMC). The CAYAH clinic serves adolescent and young adults ages 12 to 26 as either, or both, primary care and medical consultations for a variety of health needs: confidential sexual health concerns, such as birth control, pregnancy testing, and sexual transmitted infections (STI) testing and treatment; hormonal and menstruation problems; gender and sexuality development; eating disorders; and mental health [48].

The clinical providers of the CAYAH clinic include attending physicians, pediatric residents, physician's assistants, nurse practitioners, a psychiatrist, a psychologists, post-doctoral psychology students, licensed clinical social workers (LCSWs), a licensed social worker (LSW)/Transition Care Coordinator (TCC), and graduate social work students. CAYAH created the TCC position in fall 2014 as a way to further integrate medical and mental health care both within the CAYAH clinic and with other organizations from which patients receive services. The addition of the TCC to CAYAH created a social work team, including the TCC and the social work students he supervises. The social work team provides care coordination, brief intervention, and a key role in the mental health quality improvement (MHQI) project.

The multidisciplinary MHQI team includes an attending physician, a psychiatrist, a licensed social worker (LSW), graduate social work students, and CAYAH's administrative assistant; the CAYAH's division chief supports the team's efforts by providing time, space, and resources. The physician and psychiatrist initiated the exploration of further integrating care at CAYAH in September 2013 which led to the formation of the mental health quality improvement team. The attending physician is the MHQI project leader, responsible for overseeing the project, chairing meetings, and disseminating the project via conferences and presentations. Under the TCC's supervision, the graduate social work students manage referrals and data collection. CAYAH's administrative assistant provides essential support including developing the Excel spreadsheet used for data tracking and reserving spaces for team meetings. All members contribute feedback and recommendations on the effectiveness of the MHQI.

The physician and psychiatrist led the process of implementing the electronic mental health/social work (MH/SW) orderset to be discussed in detail below. The electronic orderset is a way for medical providers to refer patients to mental health or social work services in the same way they refer patients to other medical specialist. The process for creating and implementing the orderset involved advocating the importance of the orderset to Children's Hospital of Pittsburgh's Data Warehouse, and developing the content of the orderset once CHP's Data Warehouse accepted it. This challenging process occurred over months and required the physician and psychiatrist to be strong advocates for the necessity of the MH/SW orderset.

This thesis systematically analyzed the barriers and facilitators of a mental health referral system and the impact of a quality improvement project on mental health care. CAYAH's mental health quality improvement (MHQI) project implemented two significant interventions to enhance the system through which patients were referred to mental health and social work

services: an electronic mental health and social work referral orderset (used by physicians to make direct referrals to the mental health and social work team) through the electronic health record (EHR) and a social work follow-up intervention to coordinate patients' mental health treatment. The MHQI continually evaluated and modified the referral system on a monthly basis in response to identified barriers.

3.1 QUALITATIVE METHODS

The author explored the following research questions through qualitative analysis:

1. What are key **facilitators** to the implementation and continuation of the referral process and the MHQI project?
2. What **modifications** to the mental health referral process and MHQI have occurred since its implementation?
3. What **barriers** in the referral process and MHQI have emerged and how have project team members responded?

The author collected qualitative data on facilitators, modifications, and barriers through multiple methods. First, the MHQI team compiled meeting notes and records of modifications in a shared Microsoft OneNote file. The author read bimonthly and monthly meeting notes since the first meeting of the MHQI project team (August 2013) to gather data on the components of the project, barriers faced, and changes that occurred. Second, beginning in May 2015, the author observed and contributed to monthly MHQI meetings during which discussion of barriers, facilitators, and modifications of the project occurred. Finally, the author identified challenges

and successes during ongoing data collection and management of the project that inform discussion of the facilitators, modifications, and barriers of the project.

Finally, the author coded the data into the domains of intervention, modification, facilitator, and/or barriers, and identified common categories of data points within each domain.

The author based domain coding on the following definitions:

Intervention: Reserved to describe the MHQI project's two *significant system changes*: 1) the implementation of a mental health/social work orderset via a shared EMR and 2) a social work follow-up protocol to coordinate mental health appointments.

Facilitator: *A factor that enables or improves* the mental health referral system and/or the MHQI project.

Modification: *A change* made to the mental health referral system and/or the MHQI project with the intention of becoming a facilitator.

Barrier: *A challenge* inhibiting the mental health referral system and/or the QI project.

The author coded data into the following categories, determined by analyzing themes among the data points, within each domain:

Table 1 Qualitative Data Domains and Categories

Interventions	Facilitators	Modifications	Barriers
Referral orderset through shared EMR	Communication among team members	Communication among team members	System challenges
Social Work	Referral orderset through shared EMR	Referral orderset through shared EMR	Lack of follow-up and/or communication protocol
	Provider education	Provider education	Fewer SW and care coordination resources
	Monitoring, evaluating, and/or improving the system	Monitoring, evaluating, and/or improving the system	
	Growing MH/SW services	Growing MH/SW services	
	Social Work	Social Work	

3.2 QUANTITATIVE METHODS

The following research questions were addressed utilizing quantitative methods. Table 2 further defines the key outcomes.

1. Has the implementation of the MHQI’s interventions impacted the overall **utilization and show rates** of mental and behavioral health?
2. Since the implementation of the MHQI project, has the **uptake rate of first appointments** changed?
3. Since the implementation of the MHQI project, has the **show rate for first appointments** changed?
4. Have any **MHQI modifications** impacted the outcome changes?

Data collection began in September 2013. UPMC's primary electronic medical record (EMR) *Epic* was used to collect utilization and show rates for all mental and behavioral health appointments at CAYAH. Prior to May 2015, CAYAH's program manager performed a monthly calculation for each mental health provider and overall by reviewing daily scheduling reports and tallying the number of appointment slots available, the number of appointment slots filled, and the number of appointments labeled as "no show." In May 2015, the author, a social work intern, began managing MHQI data collection.

In November 2014, the MHQI team, specifically the Transition Care Coordinator (TCC) and social work interns, began data collection and tracking of new referrals. In May 2015, the author assumed responsibility for data collection and referral monitoring. The author accessed a weekly report through Children's Hospital's Data Warehouse of referrals made by medical providers using an electronic orderset within CHP's EMR. She used an Excel Workbook to organize follow-up calls to referrals and to track the number of referrals, uptake of first appointments, and show rates of first appointments. The author also recorded any patient-identified barriers to treatment, analysis of which was outside this thesis's scope.

The author produced statistical control charts generated by QI Macros, a program extension of Microsoft Excel which is a commonly used tool used for analysis of outcome measures in quality improvement (QI) projects [49]. Control charts are used to display data over time in a way that allows QI teams to systematically evaluate variability of outcomes that result from interventions and modifications to the system. Control charts include a center line, the average of the data points, as well as statistical *control limits* which are "computed from collected data to allow the differentiation of predictable variation from unpredictable variation" (p.2116). The Upper Control Limit (UCL) and Lower Control Limit (LCL) represent three

standard deviations from the average, between which is 99% of data points. In conjunction with the control limits, there are four rules that, if present on a control chart, indicate there is a *special cause*, meaning that the variation is outside of the statistical control (p.2121). Identifying these “special causes” helps inform future intervention and modification of QI projects. The following are the four main rules, developed by Shewhart, indicating special causes; statistical probabilities are calculated for Rules 1 and 2 (as cited in [49]):

“Rule 1 (beyond limits): One or more points above upper (UCL) or below lower (LCL) control limits

Probability: This outcome is observed only 0.5% of the time (one chance in 200).

Rule 2 (run or shift): Eight or more consecutive points above or below but on the same side of the center line

Probability: The likelihood of this pattern occurring by chance is one in 256.

Rule 3 (trend): Seven or more consecutive points (of 20 or more total points) or six or more consecutive points (if total points are fewer than 20), all either ascending or descending

Rule 4 (sawtooth): Fourteen or more consecutive points alternating above and below the center line” (p.2122).

Pujar et al. (2010) proposed four additional rules for increased sensitivity in identifying special causes (as cited in [49]):

“Rule 5 (two sigma): Two of three consecutive points outside the two-sigma limit (ie, in zone 3) and on the same side of the center line

Rule 6 (one sigma): Four of five consecutive points outside the one-sigma limit (ie, in or beyond zone 2) and on the same side of the center line

Rule 7: Fifteen or more consecutive points within the one-sigma limits (ie, in zone 1) on both sides of the center line

Rule 8: Eight or more consecutive points outside the one-sigma limits (ie, outside zone 1) on both sides of the center line” (p.2123).

The author used the *p*-chart for the quantitative analysis. *P*-charts are used to represent proportions of attribute data from unequal sample sizes [49]. Each outcome is dichotomous (i.e. either an appointment was attended or was not attended) and measured within a designated time frame (monthly). To create the charts, the QI Macros program uses two sets of data: the total *n*

number of opportunities (i.e. the number of scheduled appointments) and the total number of successful outcomes (i.e. the number of attended appointments) [50]. The p-chart uses moving control limits, continuously redefined with the data over time.

The author plotted the two MHQI interventions, as well as any modifications corresponding with any special causes, on each control chart.

The following table describes the quantitative outcomes analyzed.

Table 2 Quantitative Outcomes

Outcome	Definition	Range of Data Collected	Control Chart Used for Analysis
Monthly Utilization Rate of MH Appointments	#appointments (appts) scheduled/#available slots for the following providers: Psychologist, Post-Doctoral Psychology Students, Licensed Clinical Social Workers (LCSW), and Licensed Professional Counselors (LPC)	September 2013 – December 2015	p
Monthly Show Rate of MH Appointments	#appts attended/#appts scheduled for the following providers: Psychologist, Post-Doctoral Psychology Students, LCSWs, and LPCs	September 2013 – December 2015	p
Monthly Show Rate of MH and SW Appointments*	#appts attended/#appts scheduled for the following providers: Psychologist, Post-Doctoral Psychology Students, LCSWs, LPCs, Transition Care Coordinator (TCC)/Master of Social Work, and graduate SW interns	September 2014** – December 2015	p
Monthly Uptake Rate	#appts scheduled/#referrals made using the MH/SW orderset	November 2014 – November 2015	p
First Appt Show Rate	# first appts attended/# appts scheduled from the MH/SW orderset	November 2014 – November 2015	p

*Utilization rates are not calculated for SW appointments as the SW role involves a variety of responsibilities in addition to in-person appointments.

**The TCC/MSW was hired in September 2014; there was no SW team prior to September 2014.

4.0 RESULTS

4.1 QUALITATIVE RESULTS

The following table displays the qualitative data gathered and coded into categories and types of factors identified in meeting notes and project records.

Table 3 Factors Identified in Meeting Notes and Records

Factors Identified in Meeting Notes and Records				
Month	Note	Category	Domain	
			Intentional Change	System Factor
August 2013	Bimonthly QI meetings began	Communication among team members; Monitoring, evaluation, and/or improvement of system		Facilitator
December 2013	No one knows (unless referring provider initiates follow-up) if a referred patient does not schedule or does not come to appointment	Lack of follow-up and/or communication protocol		Barrier
December 2013	Providers encouraged to schedule MH/BH appointments on day of referral	Monitoring, evaluation, and/or improvement of system	Modification	
December 2013	Inadequate use of Family Links therapists	Workflow challenge		Barrier
December 2013	Inconvenient appointment times	Workflow challenge		Barrier
December 2013	Increase warm referrals to therapist if available	Monitoring, evaluation, and/or improvement of system	Modification	
April 2014	Referral orderset introduced at faculty meeting by a presentation by the MHQI physician	Provider education		Facilitator
June 2014	Challenge scheduling patients on a later date; can therapists access EMR to schedule?	Workflow challenge; Lack of follow-up and/or communication protocol		Barrier

Table 3 Continued

June 2014	Challenge monitoring which referrals have/have not scheduled	Workflow challenge; Lack of follow-up and/or communication protocol		Barrier
July 2014	Inadequate utilization of Family Links therapists	Workflow challenge		Barrier
July 2014	Plan for role of SW students beginning in September: warm referrals, engage with patient during medical visit, coordinating care	Social work		Facilitator
August 2014	CHP Data Warehouse presentation re: data collection	Provider education		Facilitator
August 2014	Meetings became monthly	Communication among team members	Modification	
August 2014	Clinicians asked to be more specific about referral reasons in notes	Communication among team members	Modification	
August 2014	Spreadsheet created to keep track of referrals, who schedules, who attends, etc.	Monitoring, evaluation, and/or improvement of system; Communication among team members	Modification	
September 2014	Began using MH orderset	Referral orderset through shared EMR	Intervention	
September 2014	Transition Care Coordinator (TCC)/Master of Social Work (MSW) hired full time; responsible for tracking referrals	Social work	Modification	
September 2014	Two MSW students began interning, under supervision of the TCC	Social work; Growing MH/SW services	Modification	
September 2014	CHP Data Warehouse began sending weekly reports of referrals	Monitoring, evaluation, and/or improvement of system	Modification	
October 2014	Created call-back protocol for SW follow-ups	Social work	Modification	
October 2014	Began to create monthly summary report to share at faculty meetings and provide feedback to providers	Monitoring, evaluation, and/or improvement of system; Communication among team members	Modification	
November 2014	Began keeping track of data: baseline month	Monitoring, evaluation, and/or improvement of system	Modification	
November 2014	Expanding therapists	Growing MH/SW services	Modification	
November 2014	TCC and SW students begin reviewing data to identify trends and systemic barriers	Social work	Modification	
December 2014	First SW intervention month: follow-up with missed appointments orderset referrals	Social work	Intervention	
December 2014	No MH care available for patients without insurance; however, TCC/MSW can do counseling for mild depression and anxiety and psychosocial issues	Social work		Facilitator
December	Difficulty reaching patients to	Workflow challenge		Barrier

Table 3 Continued

2014	follow-up			
January 2015	TCC/MSW begins orienting new residents to the orderset and to the SW team	Provider education; Referral orderset through shared EMR; Social work	Modification	
February 2015	MSW students assist with scheduling patients referred through orderset; referrals are tracked using spreadsheet	Social work; Referral orderset through EMR; Monitoring, evaluation, and/or improvement of system	Modification	
March 2015	Patients noted transportation and scheduling as barriers to attending visits	Workflow challenge		Barrier
March 2015	Patients could see SW in interim if therapists' schedules are full	Social work		Facilitator
May 2015	MSW students conclude interning	Fewer SW and care coordination resources		Barrier
June 2015	MSW student begins managing MHQI project	Social work; Growing MH/SW services	Modification	
June 2015	OneNote file created to organize MHQI project meetings notes, updates, and data	Communication among team members; Monitoring, evaluation, and/or improvement of system	Modification	
June 2015	First set of data analyzed	Monitoring, evaluation, and/or improvement of system		Facilitator
June 2015	MHQI team began using data to submit abstracts disseminating the project and gaining hospital support	Provider Education		Facilitator
June 2015	SW increases communication back to provider when referral is unsuccessful	Communication among team members; Social work	Modification	
September 2015	Three MSW student fellows begin interning. Responsibilities include: Care coordination of referrals; engaging with patients during medical visits; meeting patients through "warm hand-offs"; meeting with patients for brief counseling	Growing MH/SW services; Social work; Monitoring, evaluation, and/or improvement of system	Modification	
September 2015	MHQI's lead physician on maternity leave; another key physician left CAYAH	Workflow challenge		Barrier
October 2015	SW fellow makes reminder calls to patients of partnering Family Links therapist to attempt to increase "show rate"	Social work; Monitoring, evaluation, and/or improvement of system	Modification	
November 2015	SW fellows doing counseling/brief intervention on Wednesdays and Fridays when there are no MH providers scheduled	Social work		Facilitator
November 2015	Many referrals made as "warm hand-offs" to SW are not being tracked by an orderset	Workflow challenge		Barrier

Table 3 Continued

November 2015	Providers reminded to use MH orderset even if a SW fellow as met patient in person	Provider education; Referral orderset through shared EMR; Social work		Facilitator
November 2015	Psychiatrist to begin in January one day/week	Growing MH/SW services	Modification	
December 2015	New plan to advise providers to print ordersets and place in folder; SW fellows will try to fill therapist's schedule ASAP	Monitoring, evaluation, and/or improvement of system; Provider education; Referral orderset through shared EMR; Social work	Modification	
December 2015	SW fellows conclude semester on 12/17/15	Fewer SW and care coordination resources		Barrier

Investigation into the qualitative factors of the mental health referral system and the MHQI project revealed a number of themes. The following tables indicate the categories within which notes were organized, and the number of times each was indicated. (*Note: Notes were coded into multiple categories where appropriate.*)

Table 4 Counts of Qualitative Data Categories

Counts of Qualitative Data Categories			
Interventions	Facilitators	Modifications	Barriers
Referral orderset through shared EMR (1)	Social work (5)	Monitoring, evaluating, and/or improving the system (11)	Workflow challenges (9)
Social Work (1)	Provider education (4)	Social work (11)	Lack of follow-up and/or communication protocol (3)
	Monitoring, evaluating, and/or improving the system (2)	Communication among team members (6)	Fewer SW and care coordination resources (2)
	Referral orderset through shared EMR (1)	Growing MH/SW services (4)	
	Communication among team members (1)	Referral orderset through shared EMR (3)	
		Provider education (2)	

4.1.1 Facilitators

4.1.1.1 Communication Among Team Members.

The MHQI project began with the establishment of bimonthly meetings of a team representing different providers involved in the integration of mental health care into the CAYAH clinic. These members included physicians, mental health providers, and the Transition Care Coordinator and his social work interns. Meetings became more frequent, occurring monthly, as the project progressed. The meetings were an essential venue for addressing another key facilitator: monitoring, evaluating, and/or improving the system. The time dedicated to assessing challenges, reporting data, and brainstorming modification was integral to the quality improvement process.

Second, the MHQI team reported findings and developments to the entire CAYAH team at monthly staff meetings. Staff meetings were an opportunity to implement another identified facilitator, provider education, to ensure that all members of the care team have consistent knowledge of the referral process.

Third, communication among team members included specification of roles and responsibilities. For example, when the MHQI team determined that monitoring and analyzing data using a spreadsheet would be a helpful strategy, the team assigned this responsibility to the Transition Care Coordinator and his social work interns.

Finally, the creation of a shared data drive, OneNote, allowed for shared access of meeting notes, monthly reports, and data analysis files.

4.1.1.2 Electronic MH/SW Orderset Through a Shared Electronic Health Record (EHR)

A shared electronic health record (EHR) among all members of a care team, and the corresponding electronic MH/SW orderset, facilitated successful mental health referrals and greater integration of care in the following ways. First, the shared EHR allowed the social work team (to be discussed more below) to access necessary information for data collection, including patient scheduling records, clinical notes from the patient’s medical visit, and confidentiality information. Second, the social work team member accessed providers’ schedule templates so that he/she could assist the patient with scheduling MH/SW appointments rather than the patient contacting the front desk staff. Third, all members of the care team – medical providers, mental health providers, and the SW team – could communicate with each other through the EHR, a key component to collaboration. This helped facilitate the *communication among team members* discussed above.

Finally, the electronic MH/SW orderset facilitated CAYAH’s mental health referral system in a number of ways. First, while in-person “warm referrals” are beneficial to improving mental health appointment outcomes, they were not always feasible for the CAYAH providers. The mental health providers’ time at CAYAH was limited; while the social work team was present most frequently, a team member may not always be available. The electronic MH/SW orderset ensured that patients, at minimum, received follow-up calls to facilitate mental health care. Second, medical providers were familiar with the process of using an electronic orderset and could conveniently access the MH/SW orderset in the same section of the EMR as other referral order forms. Third, the electronic MH/SW orderset produced a weekly report, an organized way to access the referrals ensuring timely follow-up. Lastly, the electronic MH/SW orderset provided a quantitative component to evaluate the MHQI interventions.

4.1.1.3 Provider Education

Implementation of a mental health referral system required educating providers on the process, expectations, and any system modifications. The author identified a number of *provider education* notes. Prior to the MH/SW intervention, the MHQI team's physician trained medical providers to use the orderset during a staff meeting. As medical residents rotated monthly through the CAYAH clinic, the social work team oriented them specifically to the mental health referral system, including the MH/SW orderset and the role of the social work team. The MHQI continually update providers on modification to the referral system.

The MHQI team submitted a number of abstracts to conferences to disseminate the innovations and findings of the MHQI project. The team's physician presentations educated other providers on ways to further integrate care in their settings.

4.1.1.4 Monitoring, Evaluating, and/or Improving System

The MHQI project involved continuous effort to monitor, evaluate, and improve the referral system. These processes facilitated systematic analysis of the project barriers and development of evidence-supported modifications.

Data Collection and Organization

A clearly defined data organization method enabled systematic monitoring of the mental health referral process. The MHQI team created a data organization method in response to the challenge it identified of monitoring mental health appointment scheduling. As the MHQI project adapted, the team further defined the data collection and organization. The following outlines the data organization method.

First, a member of the social work team (the Transition Care Coordinator and his social work interns) retrieved weekly reports of the MH/SW referrals sent from the CHP Data Warehouse. The weekly reports included the following patient information: name, date of birth, date of referral, referring provider, reason for referral, to whom the patient is referred, patient contact information (phone numbers and occasionally email addresses). The social work team member then transferred data from the weekly report into a monthly Excel spreadsheet. Next, the social work team member reviewed each patient's chart in the EMR to find the patient's scheduling status. If a patient already scheduled a mental health or social work appointment, the social work team member recorded the date and provider of the appointment in the spreadsheet. If the patient had not scheduled an appointment, the social work team member read clinical notes from the date of referral for further information. The SW team member called the patient to facilitate scheduling with the appropriate provider. The social work team members record all contacts or attempted contacts with the patient in the spreadsheet. The SW team member monitored the referrals to collect data on appointment attendance, retrieved from the EMR. When a patient scheduled and attended his/her first appointment, the social work team concludes the MHQI intervention for that patient.

If a patient scheduled an appointment but did not attend, the social work team member called the patient with two intentions. First, the caller probed for reasons the patient missed the appointment. The caller premised this question by acknowledging that many patients face challenges to attending appointments, and the clinic was trying to learn about these barriers to best treat its patients. The caller recorded patients' responses in the spreadsheet. Second, the caller assisted the patient in rescheduling the appointment if he/she was willing.

For both calling patients to schedule initial appointments and as follow-up to missed appointments, the SW team member made two attempts to reach each patient. After two attempts, the social work team member sent a communication message to the referring medical provider through the EHR to inform him/her that the referral closed and to request that he/she revisits the concern at the patient's next medical visit. If the social work team member reached patients who did not want to pursue mental health or social work treatment, the social work team member attempted to address the reasons for which a patient did not want to attend, providing support and normalizing any negative attitude about treatment. This conversation was shared with the referring medical provider to address at the patient's next medical visit.

In summary, three possible outcomes of the referral process indicated that the MHQI's intervention with the patient was complete. The social work team coded these outcomes as: the patient made the first appointment and showed up; the patient did not want an appointment; or the referral was closed/the provider was emailed.

Data Analysis

To evaluate the process, the social work team analyzed key outcomes two months from the month of the referral. This timeline allowed for patients to schedule appointments, complete appointments, and for the SW team to adequately follow-up with patients. After two months, the social work team analyzed the following outcomes: the number of referrals, the uptake rate, and the show rate for first appointments. Analysis included comparing the monthly outcomes to the prior month's outcomes. The social work team members included additional outcomes such as the barriers patients reported, the number of referrals who were reached by the SW team, and the uptake and shows rates by referral reason in their analysis. The SW team members created Excel

charts and graphs to display outcomes; the SW team members presented outcomes to the MHQI team, and the MHQI team reported outcomes at CAYAH staff meetings.

Data Reporting

Two opportunities for data reporting occurred that facilitated system improvements. First, social work team members reported monthly data to the MHQI team during meetings. The quantitative outcomes, along with qualitative discussions of the process, informed discussions about potential modifications that may improve the mental health referral system and the measured outcomes. Second, the MHQI team reported data at the CAYAH staff meetings. This was an important component of *communication with team members* where the MHQI team shared project updates. This opportunity allowed MHQI team members to propose potential modifications to the system, supported by the data. Including the entire CAYAH staff in the modification process was important given the entire care team's integral role in the referral process.

4.1.1.5 Growing Mental Health/Social Work Services

The expansion of accessible mental health and social work services was essential to the integration of mental health into the CAYAH clinic. Modifications in this category included expanding the hours the clinic offers appointments with mental health providers and including a psychiatrist in the care team beginning in January 2016. In September 2014, CAYAH hired a full-time Master of Social Work (MSW) into a new role as a Transition Care Coordinator (TCC), including a social worker as a member of the care team for the first time. Also in September 2014, the CAYAH clinic began hosting masters-level social work interns. The social work team enabled greater accessibility to services in a numbers of ways. At least one member of the social

work team was always present in the clinic, and the team members typically had more flexible schedules than other mental health providers at CAYAH. Finally, the social work team members did not bill for services, allowing them to treat uninsured patients. The following section discusses the detailed role of the social work team in facilitating the mental health referral system and the MHQI project.

4.1.1.6 Social Work

The social work team was a significant facilitator propelling the MHQI project and the mental health referral system. CAYAH's social work team included a Transition Care Coordinator (TCC)/Master of Social Work (MSW) and three advanced practice MSW interns, including the author. The TCC worked full time at the CAYAH clinic; the MSW interns spent an average of 24 hours at the clinic weekly during the academic year. The MSW interns were part of the University of Pittsburgh School of Social Work's Cannon Fellowship program, funded by a federal grant to train social workers in integrated health care settings.

The social work team has been integral to the implementation of the MHQI project and the mental health referral process. The social work interns managed data collection, referral tracking, and patient follow-up since the initiation of the MHQI project. Beginning May 2015, the author managed the project, under the supervision of the TCC and the leading physician. As noted in the *monitoring, evaluating, and/or improving system* section, the social work team conducted all patient communication with referrals and collected, analyzed, and reported data. In addition to this critical role in the MHQI project, the social work team members intervened with patients in a variety of capacities that facilitated greater integration of mental health services into the CAYAH clinic. Five examples of the ways that the social work team engaged with patients in the integrated care model are outlined below.

Engagement with Patient and Medical Team for Entirety of Medical Visit

Members of the social work team often engaged with patients along with the medical providers during medical appointments. In this intervention, a member of the social work team accompanied the medical provider as he/she greeted the patient in a medical room for their intake assessment. When the medical provider and social work team member met the patient, the social work team member briefly oriented the patient to the integrated model, normalizing the presence of a social worker as part of the clinic's structure.

While the medical provider conducted the intake assessment, gathering information about the patient's health concerns and conducting a HEADSS assessment (Home, Education and Employment, Activities, Drugs, Sexuality, Suicide/Depression), the social work team member observed, making note of any social work-related to address. After the assessment, the social work team member asked any relevant follow-up questions. Next, the medical provider and the social work team member convened to develop a care plan for the patient's visit. At this point in the process, the role of the social work team members varied based on the patient's mental health presentation. The following were some of the possible outcomes:

1. The team did not identify any mental health or social work needs; the social work team member ceased involvement in the patient's care.
2. The team identified psychosocial stressors that the social work team member could address through brief counseling. The social work team member and the patient scheduled an in-person appointment.
3. The patient presented with some possible symptoms of a mental health diagnosis.

The social work team member and the patient scheduled an in-person biopsychosocial assessment.

4. The patient presented with a history or diagnosis of a mental health condition. The social work team member assisted the patient in scheduling with a therapist or psychologist.

This model of including members of the social work team from the beginning of a medical appointment normalized the inclusion of mental health and social work into patient care with the intention of reducing the stigma associated with mental health treatment. Patients did not receive attention from the social work team in response to a problem, but rather simply because they were a patient in an integrated health care clinic.

Warm Referral/Warm Hand-Off

During a medical visit, the medical provider identified the need for a social work referral. The provider invited a member of the social work team to briefly meet the patient and create a care plan. Four possible social work outcomes after this meeting included care coordination, biopsychosocial assessing, brief intervention counseling, or no care in cases in which patients were not interested in receiving any behavioral health support. This warm referral built rapport between the patient and the social work, with hopes that the patient would likely return for his/her MH/SW appointment.

Care Coordination

The social work team could assist a patient through care coordination regardless of the way in which the social work team came to work with a patient. For example, the care team identified that a patient needed a higher level of care than the CAYAH clinic offers, such as an assessment at UPMC's Western Psychiatric's Services for Teens at Risk (STAR) clinic. The social work team member facilitated this referral by emailing a contact person at the STAR clinic

to provide patient information. After confirmation that the patient needed an assessment, the social work team member contacted the patient or patient's family to guide them through scheduling the assessment at STAR. The social work team member communicated with the patient or patient's family to confirm that the patient completed the assessment and learn STAR's recommendations for treatment. The social work team member reported this information back to the ordering medical provider.

Other situations of care coordination included assisting patients with insurance applications, locating mental health providers within a patient's insurance network close to their residence, assisting with transportation, and engaging with patients' school counselors or teachers.

Assessment and Referrals

Social work team members frequently scheduled appointments with patients to conduct biopsychosocial assessments. From these assessments, social work team member determined whether a patient did or did not present with a particular mental health diagnosis at that point in time. If the biopsychosocial assessment revealed a mental health diagnosis, the social work team member referred the patient to a therapist or psychologist. The social work team member facilitated the referral by assisting with scheduling and communicating with the future provider.

Brief Intervention Counseling

If after conducting a biopsychosocial assessment, the social work team member concluded that the patient did not meet a mental health diagnosis and, therefore, did not need a higher level of care, the social work team member met with the patient for 5-8 sessions of brief intervention counseling, under the supervision of the Transition Care Coordinator. This

counseling included a variety of therapeutic models and interventions including: using Cognitive Behavioral Therapy (CBT) strategies; increasing healthy lifestyle behaviors; skill-building around healthy relationships; and developing skills for coping with stress and anxiety. If at any point during the therapeutic relationship, the social work team member identified a need for a higher level of care, he/she referred the patient to the appropriate mental health provider.

The social work team's work with patients involved any combination of the interventions identified above. As a recent inclusion to CAYAH clinic model, the role of social work in the integrated setting continually evolved.

4.1.2 Barriers

Barriers identified in the qualitative data included workflow challenges, lack of follow-up and/or communication protocol, and fewer SW and/or care coordination resources.

4.1.2.1 Workflow Challenges

A number of meetings discussed workflow barriers relating to the mental health referral system. A significant system challenge noted in November 2015 was low utilization of the MH/SW orderset. Particularly when social work students began meeting patients during medical visits or through warm-handoffs, providers interpreted these introductions as referrals and did not submit the electronic MH/SW orderset. Therefore, the quantitative data does not include a number of successful mental health referrals. This prohibited the social work team from identifying which patients needed follow-up to assure appointment attendance. The MHQI team responded to this barrier through provider education at the following staff meeting, reminding providers to complete the orderset regardless of whether the social work team has already

connected with the patient. Additionally, the social work team became more diligent about reminding providers to complete the orderset.

The MHQI team and the CAYAH clinic as a whole went through a number of staff changes that impacted the workflow of the referral system. MHQI team members assumed new responsibilities while the lead physician was on maternity leave and when a key physician left the CAYAH clinic. As new medical and mental health providers joined the CAYAH team, the MHQI team provided additional education on the MHQI project and the referral system. The project faced challenges during these transition times as new providers learned the process.

4.1.2.2 Lack of Follow-Up and/or Communication Protocol

The team encountered a number of challenges related to the lack of protocol particularly early in the MHQI project. For example, meeting notes from December indicated that the team could not decipher if a referred patient had or had not scheduled their initial appointment unless the referring provider accessed this information; in June 2014, the team struggled without a protocol for following-up to schedule referred patients who did not schedule independently. These challenges prompted the team to develop more defined systems for patient follow-up and team communication. In June 2014, the team identified that a protocol was needed for scheduling and monitoring referred patients' appointments. Unanswered questions the team asked included: If patients did not schedule with a mental health provider independently, who would call the patient to follow-up? Would this caller know which mental health provider the patient should meet? What will be the protocol when patients miss their first appointment?

These challenges resulted in system modifications. In August 2014, the team created a spreadsheet to monitor referrals and appointments. In September 2014, the Transition Care Coordinator and his social work interns assumed responsibility of following-up with patients to

assist with scheduling. From these barriers, a system developed through which the social work team reviewed the medical provider's clinical notes to determine the appropriate mental health provider; the social work team member accessed the provider's schedule through the EMR. Then, the social work team members communicated with the referred patient to schedule the appointment through an EMR message to the front desk staff.

Difficulty reaching patients to schedule or reschedule appointments was another system barrier. The MHQI team determined that the social work team members have engagement and motivational interviewing skills that made them the appropriate team members responsible for patient follow-up. The social work team members called patients to schedule appointments but to also assess barriers the patients face to attending appointment. However, the social work team members often had difficulty engaging patients by phone. If patients did not schedule on their own prior to leaving their medical appointment, the social work team needed to spend more time making additional phone calls to facilitate the referral. Often, multiple voicemails went unreturned. The social work team faced similar difficulty reaching patients after they did not attend their first appointment. This made it especially difficult to gather data on the barriers patients faced that prevented their attendance. No particular modifications have addressed this barrier, but the team has considered implementing text-message communication.

4.1.2.3 Fewer Social Work and/or Care Coordination Resources

The final category of barriers coded from the qualitative data was the inverse of one of the most effective facilitators: social work resources. Once social work became integral to the mental health referral system and the MHQI project, the functioning of both waned when there were fewer social work team members. Student interns, following an academic calendar schedule, comprised the majority of the social work team. Therefore, when students concluded

interning for summer or winter breaks, fewer resources were available to meet patient needs and to monitor the system. The team has yet to modify the system to address this barrier.

Qualitative data analyses revealed the preceding facilitators, modifications, and barriers to CAYAH's mental health referral system.

4.2 QUANTITATIVE RESULTS

The following control charts display the quantitative outcomes of utilization, uptake, and show rates and were analyzed for any special causes that resulted from MHQI factors.

4.2.1 Monthly Utilization Rate of Mental Health Appointments

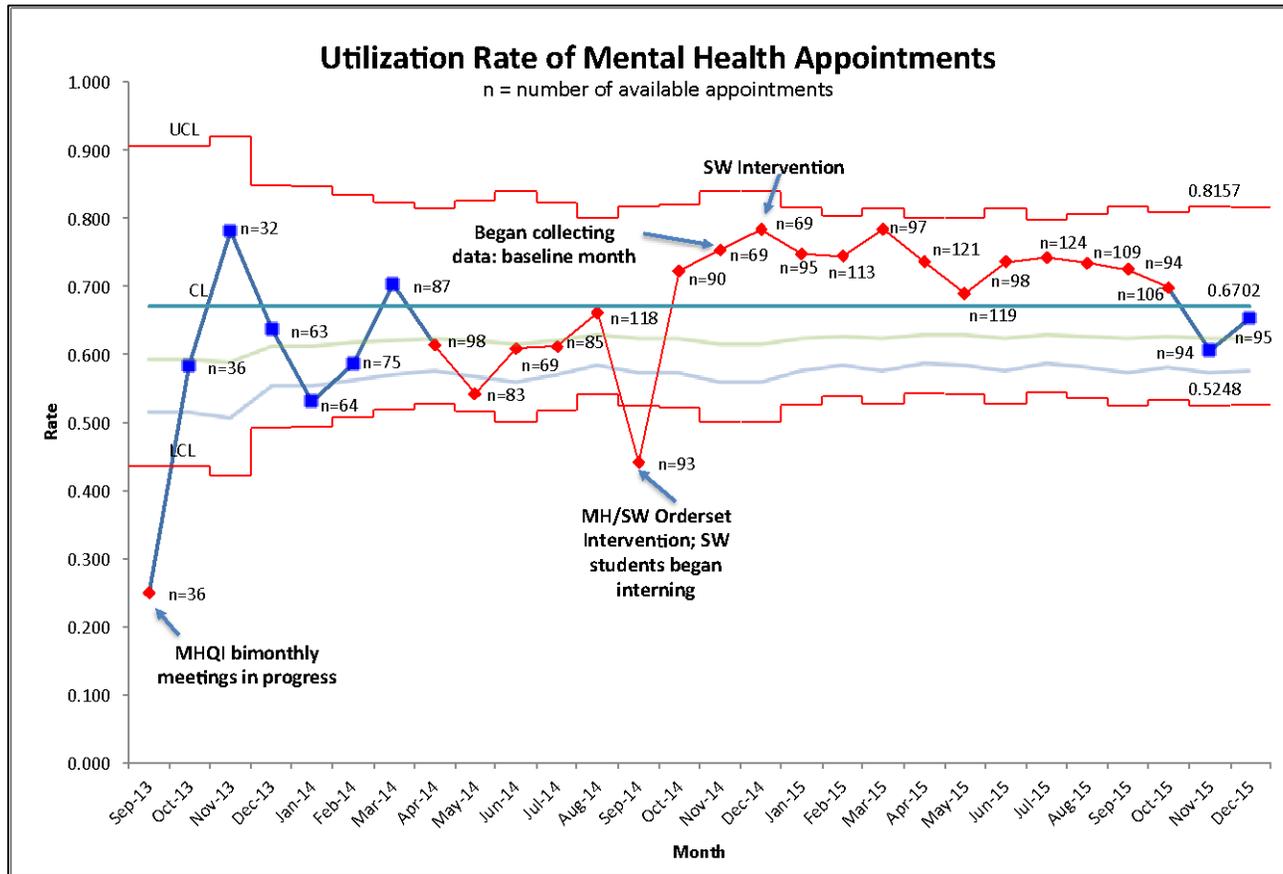


Figure 1 Utilization Rate of Mental Health Appointments

The *p*-chart for Utilization Rate of Mental Health appointments indicated a number of special causes. In September 2013, the data point falls below the Lower Control Limit (LCL), fulfilling Rule 1: beyond limits. The utilization rate for September 2013 was outside the control and not due to normal system fluctuation. Data collection began during September 2013, as did the MHQI project meetings. One possible explanation for the low rate is that the MHQI project's initiation increased utilization after September 2013; however, this explanation cannot be supported without data from the months prior to September 2013.

The points between April 2014 and August 2014 indicate Rule 6: one sigma; four of five consecutive points are outside the one-sigma limit. These low show rates occurred prior to any MHQI project interventions.

The September 2014 data point fell below the LCL, fulfilling Rule 1: beyond limits. The utilization rate was outside the control and not due to normal system fluctuation. The low utilization rate in September 2014 may be due to the Transition Care Coordinator's time dedicated to training the new social work interns, rather than engaging in patient follow-up to schedule appointments.

The thirteen consecutive points from October 2014 to October 2015 above the median indicated Rule 2: run. This run indicates that an overall improvement to utilization rate occurred after October 2014. The beginning of this run aligned with the implementation of the MH/SW orderset intervention, suggesting that the intervention improved utilization rates.

4.2.2 Monthly Show Rate of Mental Health Appointments

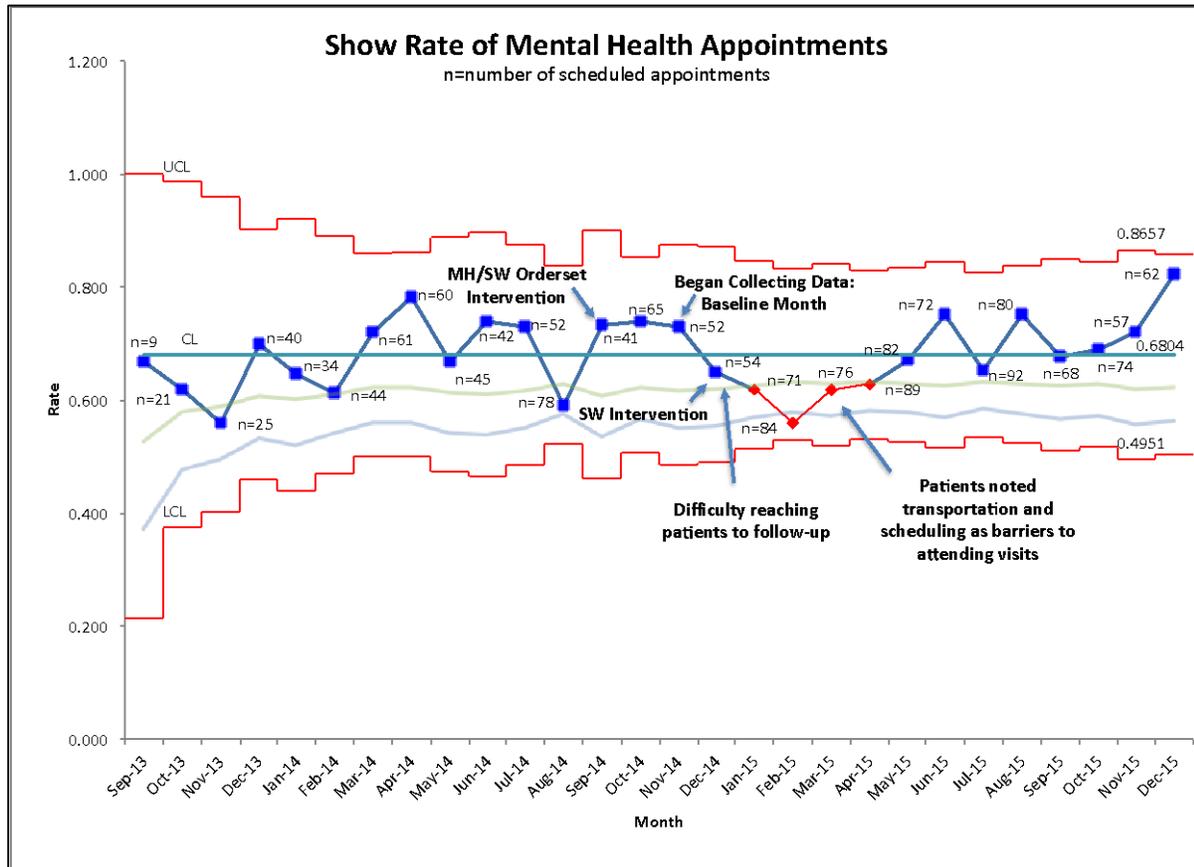


Figure 2 Show Rate of Mental Health Appointments

Figure 2 indicated Rule 6: one sigma. The four consecutive data points from January 2015 to April 2015 fall below the one-sigma (one standard deviation) limit. There are a number of possible explanations for the low show rates during this time. The qualitative data indicated that in December 2014, the social work team members had difficulty reaching patients to follow-up; patients may have been harder to engage during these months of low show rates. In March 2015, the team identified a transportation barrier among patients who did not attend their first appointments. This transportation barrier may have been an even greater barrier during months

of inclement winter weather. Overall, the MHQI interventions did not significantly improve the show rate of mental health appointments prior to December 2015.

4.2.3 Monthly Show Rate of Mental Health and Social Work Appointments

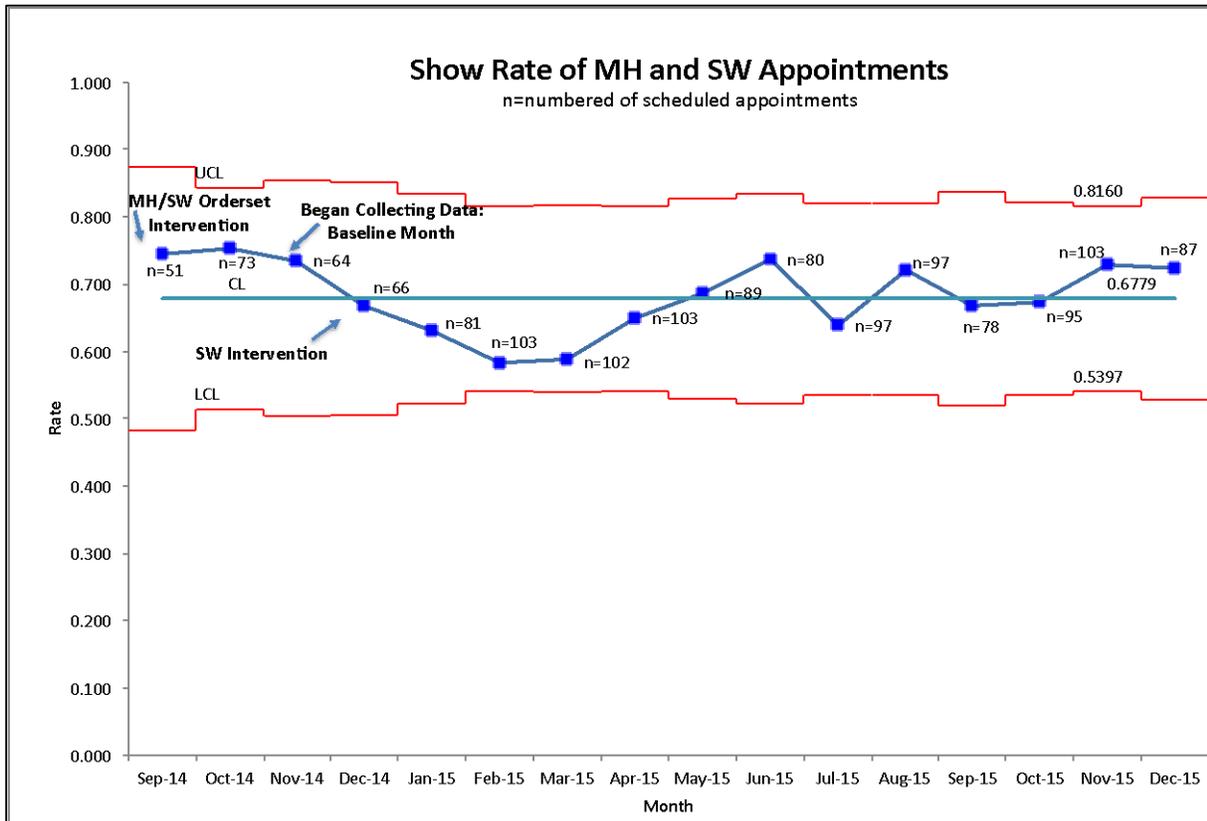


Figure 3 Show Rate of MH and SW Appointments

Figure 3 displays the monthly show rate of mental health and social work appointments. No consistent trends or changes in the show rate occurred between September 2014 and December 2015.

4.2.4 Monthly Uptake Rate of First Appointments

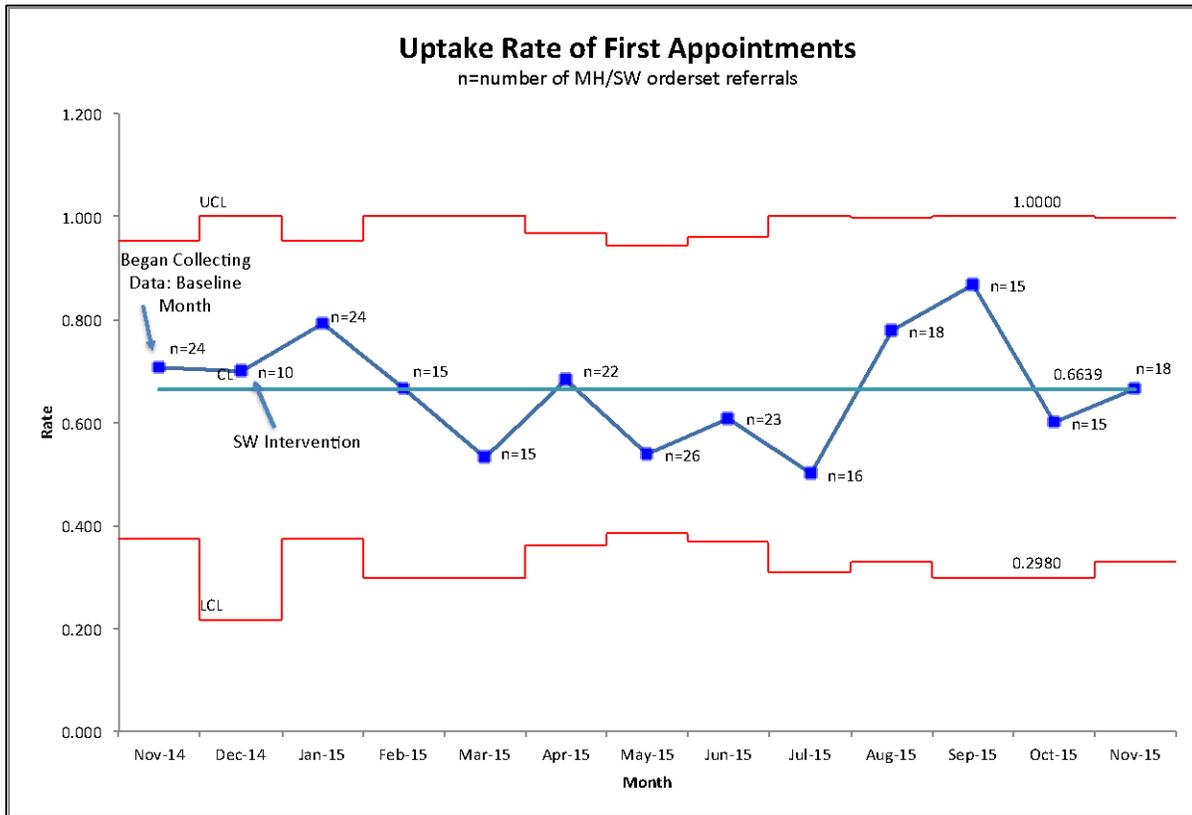


Figure 4 Uptake Rate of First Appointments

The *p*-chart displaying the uptake rate of first appointments of patients referred through the MH/SW orderset showed no special causes. No significant changes in the uptake rate occurred between November 2014 and November 2015.

4.2.5 Monthly Show Rate of First Appointments

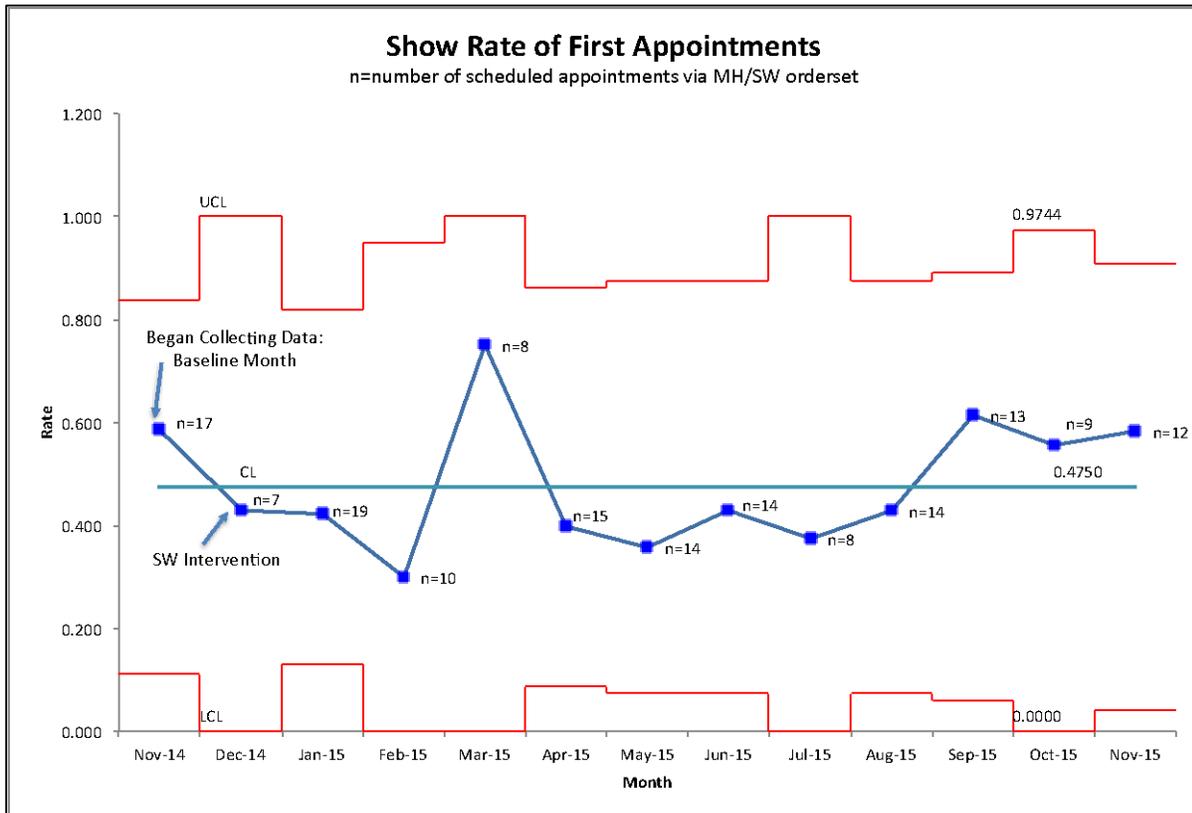


Figure 5 Show Rate of First Appointments

The *p*-chart displaying the first appointment show rate of patients referred through the MH/SW orderset showed no special causes. No significant changes in the first appointment show rate occurred between November 2014 and November 2015.

5.0 DISCUSSION

Integration of mental health services into primary care is an evidenced-based method for addressing the public health problem of mental health disorders among adolescents [46]. Implementation of integrated models with adolescents is emerging in the literature. More research is however needed to identify the facilitators necessary for implementation and related barriers. The purpose of this thesis was to explore and evaluate the facilitators and barriers to the integration of a mental health referral system into the outpatient clinic of Children's Hospital Pittsburgh's Center for Adolescent and Young Adult Health (CAYAH).

This thesis' qualitative analysis revealed that modifications made to the mental health referral system that served as facilitators were communication among team members; an electronic MH/SW orderset through a shared EMR; provider education; continuous monitoring, evaluating, and/or improving the system; growing mental health and social work services; and a social work team. The barriers faced by the MHQI team were system challenges; lack of follow-up and communication protocols; and fewer MH/SW resources available.

Quantitative data analysis showed that the overall utilization of mental health appointments at CAYAH has steadily increased since the start of the MHQI project, specifically following the implementation of the electronic mental health/social work orderset. Overall show rates, first appointment uptake, and first appointment show rates did not significantly change

during the studied time span. Future data analysis may reveal different trends as the MHQI implement modifications to address the identified barriers.

5.1 FINDINGS CONSISTENT WITH PUBLISHED LITERATURE

The facilitators of CAYAH's integrated model were consistent with the standards for mental health integration discussed in the literature. First, the social work team filled the care management and coordination responsibilities, a commonly discussed component of integrated care with adults and adolescents [29, 39-41, 43, 45]. Second, CAYAH's electronic orderset and the MHQI project's ongoing monitoring and evaluating illustrated clearly identified systems and protocols for identifying, monitoring, and collecting data on referrals supported by the literature [27-29, 31, 39, 40, 42, 43]. Third, a collaborative multidisciplinary team, including a physician to be the liaison between the MHQI project and the medical provider, facilitated CAYAH's integrated model [27, 28, 31, 39, 41, 42]. Finally, the use of information technology, such as the orderset through the shared EMR, met standard recommendations for integrated models [27, 29, 31].

The identified barriers related to policy, operational, and clinical systems. These are in many ways the inverse of the facilitators found in the literature. First, the system challenges the MHQI encountered were continually monitored through the quality improvement process and were addressed by ongoing modifications. Second, the MHQI team faced challenges that led to the development of protocols and clearer roles and responsibilities of the MHQI team members. Third, the lack of sufficient full time social work and mental health clinicians limited the

project's care management and coordination scope. The policy barrier noted in the literature related to challenges in reimbursement likely influenced this deficiency [43, 45].

5.2 LIMITATIONS

The author encountered a number of limitations in the execution of this thesis and its results. First, as a single case study, the CAYAH experience of integrating mental health services into its outpatient clinic may not generalize to other settings. Second, the author was the only person coding qualitative data into domains and categories. However, the author consulted other MHQI team members to confirm that all data points were included and coded consistently.

Next, the current MHQI system did not differentiate between social work and mental health referrals via the electronic orderset. Sometimes referrals entailed a social work consult involving care coordination or connections to other services, not an actual appointment. The MHQI team discussed this challenge and decided to include social work appointments in the outcomes given the broad scope of social work's involvement that included both behavioral health appointments and care management. The author used her judgment when coding these referrals as successful or unsuccessful. Data may have been influenced by these inconsistencies and variations in the types of referrals made in the order set.

Further, there were limitations to the quantitative data. The MHQI team only collected one month of baseline data before implementing the social work intervention. A longer baseline period would have allowed for more rigorous pre-and post-data analysis. The MHQI project was still in its early stages, so outcomes indicating its impact may change as the project continues.

Finally, the author acknowledges potential conflict of interest in evaluating a project of which she was closely involved.

6.0 CONCLUSION

The findings from this study inform further execution of CAYAH's mental health referral system as well as contribute to the body of knowledge on facilitators of and barriers to integrated health care with adolescents.

6.1 RECOMMENDATIONS

The author identified a number of recommendations for CAYAH's MHQI project and mental health referral system moving forward. First, separate ordersets, or separate spreadsheets, for MH/SW appointments and SW care coordination referrals would yield more accurate data analysis. Second, the clinic's integrated model would benefit from an improved process for a medical provider or available social worker to schedule patient's mental health or social work appointments prior to leaving their medical appointment. An improved process would decrease the time spent calling to schedule patient appointments and eliminate the barriers that exist in reaching patients by phone. Third, additional mental health providers would provide increase availability of services; ideally a mental health provider would be available to schedule appointments and receive warm referral every day the clinic is open. Fourth, the system may benefit from the social work team conducting biopsychosocial assessments with all referred patients. The outcome of the initial assessment would better inform a referral to a mental health

provider and would ensure greater show rates for the mental health provider appointments given that patients would all have already attended an initial assessment appointment. Finally, CAYAH's integrated model could continue to improve and expand with additional social work staff to continue to manage project and coordinate care during the summer months.

6.2 IMPLICATIONS FOR ADVANCING KNOWLEDGE

The CAYAH case study advances the knowledge of operational and clinical facilitators and barriers that can inform the implementation of future integrated health care systems. The findings offer examples of specific protocols, systems, and staff roles that other clinics can implement to begin moving toward an integrated health care model.

Integrated health care has proven to be effective but the implementation of such care requires a number of structural factors for the process to be successful. Clinics and health care settings should consider implementing the identified facilitators as a foundation for their integrated model with adolescents. For example, this study exhibited strong evidence for the necessity of social workers in implementing integrated health care models. Their diverse education and training allow them to fill a number of roles that facilitate improved mental health integration, including care management and coordination, monitoring referrals, and brief therapeutic interventions.

Future research on adolescent integrated health care still needs to address a number of key gaps. Salient barriers, most notably stigma, inhibit mental health care for adolescents. Research is needed to address how to individually and systemically overcome these barriers. More knowledge is needed on the strategies providers can use when referring patients to mental

health or social work appointments to lessen the impact of barriers. Policy-level interventions are needed to reduce widespread negative health beliefs of mental health treatment and to increase mental health knowledge among adolescents and parents; the author suggests the implementation of universal preventative mental health care to children and young adolescents. Future research should address these gaps in order to improve mental health treatment utilization among adolescents.

This thesis highlighted the value of social work in integrated health care. The essential role of a care coordinator in the integrate model is best filled by a social worker, whose skills include strengths-based patient engagement, service coordination, early screening, biopsychosocial assessments, brief therapeutic interventions, and research skills. Further, the CAYAH case study showed that social workers were essential the MHQI project that increased utilization of mental health providers, an important outcome of cost-effective care. The diverse training of social workers makes them invaluable members of the integrated care model and essential to addressing the public health problem of adolescent mental health.

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