Published in final edited form as:

Gen Hosp Psychiatry. 2018 ; 50: 111–118. doi:10.1016/j.genhosppsych.2017.11.003.

Factors associated with Physician Self-Efficacy in Mental Illness Management and Team-Based Care

Danielle F. Loeb, MD,

Division of General Internal Medicine, Department of Medicine, University of Colorado, Aurora, USA; Danielle.loeb@ucdenver.edu

Erin Leister, MS,

Department of Biostatistics & Informatics, Colorado School of Public Health; The Adult and Child Center for Outcomes Research and Delivery Science, Aurora, USA; Erin.leister@ucdenver.edu

Evette Ludman, PhD,

Group Health Research Institute, Seattle, Washington, USA; ludman.e@ghc.org

Ingrid A. Binswanger, MD MPH,

Institute for Health Research, Kaiser Permanente Colorado, Denver, USA; Division of General Internal Medicine, Department of Medicine, University of Colorado, Aurora, USA
Ingrid.a.binswanger@kp.org

Lori Crane, PhD MPH,

The Adult and Child Center for Outcomes Research and Delivery Science; Department of Community and Behavioral Health, Colorado School of Public Health, Aurora, USA;
Lori.crane@ucdenver.edu

Miriam Dickinson, PhD,

Department of Biostatistics & Informatics, Colorado School of Public Health; Department of Family Medicine, University of Colorado, Aurora, USA; Miriam.dickinson@ucdenver.edu

Danielle M. Kline, MS,

Division of General Internal Medicine, Department of Internal Medicine, University of Colorado School of Medicine, Aurora, USA; Danielle.Kline@ucdenver.edu

Frank V. deGruy, Donald Nease, MD, and

Department of Family Medicine, University of Colorado, Aurora, USA;
Donald.nease@ucdenver.edu

Elizabeth A. Bayliss, MD, MSPH

Corresponding author: Dr. D. F. Loeb; University of Colorado School of Medicine, Division of General Internal Medicine, Academic Office 1; Mailstop B180; 12631 East 17th Ave.; Aurora, CO 80045, Danielle.loeb@ucdenver.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Disclosures

Conflict of Interest: None of the authors report any conflict of interest

Institute for Health Research, Kaiser Permanente Colorado, Denver, CO, USA; Department of Family Medicine, University of Colorado, Aurora, CO, USA; Elizabeth.bayliss@kp.org

Introduction

Patients with mental illness are at risk for poor quality of life, high medical costs,¹ poor health outcomes,² and high mortality rates, especially when they have comorbid medical illness.^{3,4} Mental illness is common in primary care practice, as up to 20 percent of primary care patients suffer from mental illnesses such as anxiety⁵ and depression⁶ and 43–60 percent of treatment for psychiatric conditions occurs in primary care.^{7–10} Therefore, improving the diagnosis and treatment of mental illness in primary care is critical to improving outcomes. Team-based interventions¹¹ such as those based on the Chronic Care Model (CCM)^{12,13} have gained broad acceptance as the preferred primary care approach to caring for patients with chronic disease, including those with concomitant mental illness. Specifically, the Collaborative Care Model¹⁴ and other integrated care models¹⁵ demonstrate improved outcomes for individuals with mental illness.

Although PCPs generally prefer a team-based approach for behavioral health,¹⁶ doing so requires competence in both team based care and the diagnosis and management of mental illness. Learning to share patient care with a team presents both new opportunities and critical challenges for PCPs.^{17–22} For example, physicians' view their own role within the healthcare team quite differently from how social workers view physicians' roles within the team, which can lead to tensions.²⁰ Care team-members reported insufficient²³ and inconsistent²⁴ training in the Patient Aligned Care Teams in the Veterans Administration's medical home model. PCPs also report high levels of uncertainty in their clinical skills in the diagnosis and treatment of mental illness.^{25–28} Adapting practices to provide team-based care to patients with mental illness in the primary care setting has the potential to greatly improve care for patients. However, knowledge gaps remain regarding the preparation necessary for PCPs to effectively manage mental illness and to work in a team-based model.

Self-efficacy is the belief that one can actually perform a behavior or attain specific outcomes.²⁹ According to Bandura's Social Cognitive Theory, self-efficacy is a strong determinant of human behavior. It influences the activities people choose to engage with, the effort they invest in activities, and how long they persevere in activities. It is both modifiable and varies with specific behaviors.³⁰ The association between self-efficacy and behavior has been found in a wide range of behaviors, including patient self-care for chronic illness.^{29,31–45} Self-efficacy is associated with physician behavior- specifically following guideline-concordant care.^{33,46} Clinician self-efficacy in the provision of mental health care has been positively linked to care quality.^{33,34,47–49} Its association with behavior and modifiability make self-efficacy the best measure for physician confidence to effectively care for patients with mental illness within a healthcare team.

Assessing and addressing PCP self-efficacy as part of additional training and clinical support may improve the degree to which PCPs engage in the activities necessary to evaluate and treat patients with mental illness. Understanding factors that contribute to self-efficacy could help in developing and tailoring interventions aimed at improving self-efficacy in team-

based care and mental illness management. In this study we aimed to quantify and identify factors associated with PCP self-efficacy in both the management of mental illness and in participation in team-based care.

Methods

Design

We conducted a survey of PCPs in Colorado.

Study Population

Using a comprehensive statewide database of practicing physicians in Colorado provided by Peregrine Management Corporation,⁵⁰ we randomly selected 450 family medicine (FM) and 450 internal medicine (IM) physicians practicing in primary care clinics.

Survey Procedures

We used the Dillman Tailored Method to maximize the response rate.⁵¹ The survey was a self-administered mail survey conducted from November 2014 to April 2015 with up to five mailings to non-respondents. The first mailing introduced the study. In the second mailing, we sent the survey along with a two-dollar incentive.^{52,53} Approximately one week after the first survey mailing, we sent a reminder postcard. Then, we timed additional survey mailings based on rates of returned surveys from the previous mailing. Study personnel conducted Internet searches for a more current practice address when surveys were returned for incorrect address. If an updated address was found, the mailing survey process was repeated with the new address. Participants were labeled “noncontact” if no address was found or if the provider no longer practiced in a primary care setting. All returned surveys were double entered into the research database by two research team members with an error rate of 0.45%. All discrepancies were corrected prior to final statistical analysis.

Study activities were approved by the Colorado Multiple Institutional Review Board (COMIRB).

Survey Instrument

Figure 1 illustrates the conceptual model upon which the survey instrument was based. The conceptual model was developed using previous research on PCP experience treating complex patients and Social Cognitive Theory.^{54–56} The full survey instrument is in Appendix A. The primary outcomes for the current study were scores on the Team-Based Care (TBC) and Mental Illness Management (MIM) self-efficacy scales. The TBC scale addressed communication within the team, care coordination, population management, self-management support, and continuity of care based on the National Committee for Quality Assurance (NCQA) Patient Centered Medical Home 2011 standard.⁵⁷ The MIM scale addressed self-efficacy related to the diagnosis and treatment of depression, generalized anxiety disorder, and bipolar disorder, as they are commonly treated in primary care and signify increasing complexity in management. The MIM scale also included management of suicidal patients and the management of concomitant psychiatric and medical illness. We described the development and validation of these two scales previously.⁵⁸ All items were

scored on an 11-point scale with higher scores indicating greater self-efficacy: 0 (not at all confident) to 10 (extremely confident). We constructed these scores by calculating the mean self-efficacy rating for each scale.

Covariates of interest for the TBC scale included communication skills, attitude towards team-based care, climate of current clinical team, implementation of team-based care in clinical setting, and clinical resources. For the MIM scale, covariates included communication skills, mental health treatment knowledge, mental health treatment experience and preparedness, and clinical resources. These were measured on the instrument as follows.

All validated scales were reduced using published factor analysis and content domains to keep the overall survey as brief as possible. In order to improve the response rate, we aimed to keep the average completion time to less than ten minutes. Communication was assessed with a modified version of the Communication Skills Self-assessment, which is focused on provider-patient communication.⁵⁹ The four-point response scale was modified to the 11-point scale used for the TBC and MIM self-efficacy scales. The Self-assessment was reduced from 35 questions to 11 questions. As in the TBC and MIM self-efficacy scales, higher scores indicated higher communication self-efficacy. To assess provider attitudes, we selected five items from the 26 item Attitudes toward Health Teams Scale.⁶⁰ Likewise, to assess team climate we used six items of 61 from the Team Climate Inventory which focused on clinical team function and communication.^{61,62} Higher scores indicated more positive attitudes toward team-based care and team climates. We used the Team Approach Subscale of the Practice Monitor⁶³ to assess implementation of team-based care in clinical setting. The subscale addressed the establishment of care: teams and with regular team meetings, defined team member roles, protocols with standing orders, team training, the and team huddles. Higher scores indicated higher levels of implementation. We constructed summary variables for the following domains: the Communication Skills Self-Assessment, the Attitudes Toward Health Teams Scale, the Team Climate Inventory, and the Team Approach subscale of the Practice Monitor, by calculating the mean score for each set of items within the scale (if the participant responded to more than half the questions in that scale).

Mental health treatment knowledge was assessed with a version of Katerndahl's instrument that assesses mental health treatment for major depressive disorder (MDD), generalized anxiety disorder (GAD), and panic disorder adapted to include bipolar disorder.⁶⁴ Participants were asked to rate how effective (not effective, somewhat effective, effective, or don't know) each of 14 different psychotropic medications were for MMD, GAD, and bipolar disorder. Higher scores indicated higher mental illness treatment knowledge. For mental health treatment experience, participants were asked how often they managed treatment (never, uncommonly, somewhat commonly, commonly, or always) for each of MDD, GAD, and bipolar disorder as well as how common these conditions were among their patient panel (very uncommon, uncommon, somewhat common, common, or very common). They were also asked how prepared (not at all, slightly, somewhat, very, or completely) they felt to manage each of the following upon completion of residency: MDD, GAD, bipolar disorder, substance abuse disorders, and concomitant medical and mental illness. For experience with and preparedness for mental health treatment we collapsed the

two categories on each end of the five-point scale to make categorical variables with three levels, and used the middle category as the reference group.

Other covariates included demographic factors (gender, race, and ethnicity) and practice characteristics (practice site type, geographic setting, number of providers at the practice, and available resources), as well as the participants' medical specialty, professional role, and years since residency. These covariates were modeled as categorical variables. Although these factors were not considered modifiable, they were included as identifiable PCP and clinic characteristics on which an intervention could be tailored.

Statistical Analysis

We assessed TBC self-efficacy as a function of communication skills, attitude towards team-based care, climate of current clinical team, implementation of team-based care in clinical setting, and the other covariates described above. We assessed MIM self-efficacy as a function of communication skills, mental health treatment knowledge, mental health treatment experience, and the other covariates. First, we fit simple linear regression models for each outcome and independent variable of interest. We then used multivariable linear regression models to assess the relationship of each of the two self-efficacy scales with the independent variables of interest. We used a purposeful selection procedure (inclusion $p=0.25$, retention $p=0.10$) to select a subset of independent variables for each outcome to be used in the final multivariable linear regression models. We also conducted sensitivity analyses to see how sensitive our MIM self-efficacy results were to our definitions of mental health treatment experience. In this analysis, we used an overall mean score calculated across the three individual ordinal items for each mental health condition, with higher scores representing more experience managing patients with mental health conditions.

All analyses were performed in SAS version 9.4 (Cary, NC).

Results

Figure 2 illustrates the response rate. Excluding non-contacts who never received the survey, the response rate was 49 percent. Table 1 shows practice and participant characteristics. Generally, we had a diverse participant population in terms of practice site, notable for 44 percent of participants in private practice and 20 percent in rural settings. The majority of participants were male (57 percent) and participants were predominantly white (87 percent) and non-Hispanic (91 percent). Participants were evenly split between FM (49 percent) and IM (50 percent) participants. Table 2 shows additional survey response information, including resources available to the practices, participant experience and preparedness with treating mental health disorders (MDD, GAD, and bipolar), and participant scores of communication self-efficacy, mental health treatment knowledge, attitudes toward team based care, practice monitor, and team climate.

Simple linear regression results are included in Appendix B. Factors associated with TBC self-efficacy in the final multivariable model are shown in Table 3. Notable associations included: positive associations with high score on the Attitude Toward Team-Based Care scale [β -coefficient = 1.086, $p < 0.001$], presence of a health psychologist [$\beta = 0.416$, $p =$

0.022], access to an electronic medical record [$\beta = 0.555$, $p < 0.043$], and higher self-efficacy with communication [$\beta = 0.468$, $p < 0.001$]. Participants in a solo practice had lower TBC self-efficacy scores than those in practices with 2 or more providers [$\beta = -0.611$, $p = 0.030$]. Family medicine practitioners had lower TBC self-efficacy than internal medicine PCPs [$\beta = -0.315$, $p = 0.042$]. Clinical practice site was associated with TBC self-efficacy [$p = 0.014$] with non-academic hospital associated clinics [$\beta = -0.459$] and Veterans Administration and Military Clinic [$\beta = -1.459$] with lower self-efficacy. Hispanic ethnicity was associated with lower TBC than non-Hispanic respondents [$\beta = -0.972$, $p = 0.021$]. However, only 14 respondents identified as Hispanic, so limited conclusions can be drawn from this finding. The team-based subscale of the Practice Monitor was significantly associated with TBC self-efficacy in bivariate analysis, but not in the final multivariate model. The team-based subscale of the Practice Monitor.

Factors associated with MIM self-efficacy in the final multivariable model are shown in Table 4. Notable associations included: positive associations with self-efficacy with communication [$\beta = 0.523$, $p < 0.001$] and with access to psychology consultation [$\beta = 0.394$, $p = 0.002$]; and negative associations with feeling poorly prepared to manage bipolar disorder at residency completion [$\beta = -0.534$, $p = 0.001$]. Although not statistically significant, those who reported “never” or “uncommonly” managing major depressive disorder trended toward lower MIM self-efficacy [$\beta = -0.463$, $p = 0.092$] (relative to those who managed this disorder “somewhat” commonly). In contrast to TBC self-efficacy, family medicine specialty was associated with higher MIM self-efficacy [$\beta = 0.254$, $p = 0.048$].

In sensitivity analyses, we assessed any changes in results due to our alternate covariate definition of the experience managing mental health treatment expressed as an overall mean score as opposed to individual categorical covariates. After refitting our multivariable model, we observed that providers with higher mental health management experience scores had significantly higher MIM self-efficacy outcome scores [$\beta = 0.540$, $p < 0.001$]. We kept the categorical variable definition because we wanted to show the effects of experience managing each individual condition on MIM SE. We also found the individual categorical variables more interpretable than a summary score.

Discussion

In this survey of PCPs, we found that greater team-based care and management of mental illness self-efficacy were associated with higher communication self-efficacy. Higher TBC self-efficacy scores were associated with positive attitudes towards health teams, more positive team climates, and the presence of a health psychologist in clinic. In addition to communication self-efficacy, family medicine specialty, access to psychology consultation and greater knowledge of mental illness management were associated with greater MIM self-efficacy. Whereas feeling poorly prepared to manage bipolar disorder at completion of residency was associated with lower MIM self-efficacy.

With our focus on PCP self-efficacy, this analysis offers unique contributions to both the team-based care and the mental illness in primary care literature. Team-based care is one of Bodenheimer’s building blocks of high-performing primary care,⁶⁵ and PCPs report high

satisfaction with team-based models such as the Collaborative Care Model.⁶⁶ Previous research has examined influences of medical student self-efficacy during a psychiatry rotation.⁶⁷ The current study adds insights into factors that may differentiate PCPs in terms of their willingness to engage in team-based care. To our knowledge no other studies have examined factors associated with primary care physician self-efficacy in treatment of mental illness.

Self-efficacy with patient-physician communication was associated with both TBC and MIM self-efficacy. Physician communication skills have proven particularly important for outcomes in patients with mental illness. For patients with mental illness, patient satisfaction, adherence to treatment recommendations, and willingness to file malpractice claims have been associated with physician communication skills.⁶⁸ Although not specifically examined in the communication self-efficacy scale in this survey, the importance of communication within healthcare teams on patient safety is well established. According to The Joint Commission, as many as 70% of adverse events are caused by faults in communication.⁶⁹ Open communication has been identified in both qualitative and quantitative studies as key to collaboration within the team.⁷⁰⁻⁷² In a study of barriers and facilitators to the implementation of medical homes in the Veterans Administration, poor communication at different levels was identified in three of the top five barriers.⁷³ Further, nurses and physician have discordant views on the level of collaboration within their teams, with physicians rating levels of collaboration higher than nurses.⁷⁴ Importantly, interventions have proven effective in improving communication within healthcare teams.^{75,76} These findings and previous research point to the need for communication training for physicians working in interprofessional healthcare teams.

Further, our finding that PCP team clinical climate correlates with TBC self-efficacy scores is consistent with research into team dynamics and the implementation of care. In a survey study of 18 Harvard-affiliated primary care practices, work satisfaction and care coordination between PCP's were positively correlated with improved team dynamics.⁷⁷ In a mixed method study of a new intervention for diabetes at 17 practice sites, team climate arose as major facilitator to implementation of team-based strategies for diabetes care.⁷⁸ In a study of 37 primary care practices in Quebec, higher scores on the team climate inventory were associated with high-quality patient care.⁷⁹ Another study of 42 primary care practices in Great Britain also found a positive association between the team climate inventory and both team effectiveness and quality of care for diabetes.⁸⁰ Thus, previous research indicates that team climate is associated with team effectiveness. Although having a practice monitor was significant in the bivariate model, it dropped out of the final model, suggesting that other factors such as attitudes toward team-based care and team climate are more influential for team based self-efficacy for these respondents. From the current study we can add that for PCPs in particular, team climate is associated with their self-efficacy in team-based care.

Both knowledge about the treatment of mental health and preparedness in managing mental illness were associated with MIM self-efficacy scores. Specifically, reporting feeling "not at all" or "slightly" prepared to manage bipolar disorder after residency was strongly associated with lower MIM self-efficacy. Previous qualitative research has shown that many PCPs do not feel prepared to manage mental illness after residency.²⁷ In a survey study of

398 Canadian general practitioners, lack of adequate training was negatively associated with willingness to accept the patient as their own patient.⁸¹ Although Family Medicine residents have defined competencies in the area of mental illness,⁸² Internal Medicine residents have none.⁸³ This difference in training may be reflected in our finding that family medicine PCPs reported higher self-efficacy in MIM. In a study of 146 Norwegian medical students during their psychiatric rotation, greater clinical experience with patients with mental illness during their rotation was strongly positively associated with both competence and self-efficacy in psychiatry.⁶⁷ Given how common patients with mental illness are in primary care, and the PCPs' increasing role in managing mental illness, clinical training in the management of mental illness in family and, especially, internal medicine residencies may need to be reexamined.

In Social Cognitive Theory, experience is a predictor of self-efficacy.³⁰ In our study, experience managing patients with each of three mental health conditions was significantly associated with MIM self-efficacy scores in simple linear regression analyses, with more experience with each condition associated with greater reported MIM self-efficacy. In our fully adjusted multivariable models, we observed similar trends, but associations between MIM self-efficacy and experience managing individual conditions was not statistically significant. In sensitivity analyses, in which we created a single variable reflecting the mean "experience" score across the three conditions, more experience managing mental illness was associated with greater MIM self-efficacy. This suggests that cumulative experience with managing mental illness may be associated with greater MIM self-efficacy, but that the effects of experience managing individual conditions on overall MIM self-efficacy should be further explored.

Limitations

This study has several limitations. The generalizability of the study is limited as the survey was administered in one state in the Rocky Mountain region. Although the survey sample included diverse practice settings within the state, Colorado is more rural and less racially diverse than some other regions of the country. Practice patterns may differ for PCPs in rural areas with less access to psychiatric specialists and those in urban areas. Further, as a cross-sectional study, it cannot be used to draw conclusions about causality. The survey includes several sources of potential bias. The survey could be subject to response bias. Providers with higher MIM and TBC self-efficacy may be more likely to respond to the survey than those with lower self-efficacy. PCPs who have been in practice longer may be affected by recall bias when answering questions about their preparedness to manage specific mental illnesses at the end of residency. We used validated measures whenever possible. However, we did shorten these measures using content domains and published factor analysis to improve the response rate of the survey. We did not validate the shortened measures. Therefore, these shortened instruments may be subject to measurement error. For the measures we developed for the survey, like clinic resources, we cannot know exactly how the respondents defined each resource. We accounted for potential confounding variables in the multivariable analysis. However, there may be some other variables that we did not measure which could affect both the outcome and the predictor variables, leading to biased results.

Conclusions

Although, causality cannot be deduced from this cross-sectional study, it points to important areas of potential intervention to improve PCP self-efficacy in managing mental illness through team based care. PCP training and experience treating patients with mental illness may be modifiable factors to improve PCP self-efficacy in mental illness management. These findings also support increased training for internal medicine and family medicine residents in the treatment of mental illness. Focusing on clinician attitudes, communication skills, and practice resources may be crucial to preparing PCPs for a team-based model of care. Focusing on these factors as part of practice-based interventions may improve adoption of team-based models by PCPs. Prospective studies are required to test whether intervening on the identified factors leads to improved PCP self-efficacy in team-based care and the management of mental illness.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funders: Dr. L is funded by the National Institute of Mental Health 5K23MH100162 and UC Health System Research Funds. The funders played no role in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the article for publication.

References

1. Greenberg PE, Fournier AA, Sisitsky T, Pike CT, Kessler RC. The economic burden of adults with major depressive disorder in the United States (2005 and 2010). *J Clin Psychiatry*. Feb; 2015 76(2): 155–162. [PubMed: 25742202]
2. Egede LE, Nietert PJ, Zheng D. Depression and all-cause and coronary heart disease mortality among adults with and without diabetes. *Diabetes Care*. Jun; 2005 28(6):1339–1345. [PubMed: 15920049]
3. Hamer M, Batty GD, Stamatakis E, Kivimaki M. The combined influence of hypertension and common mental disorder on all-cause and cardiovascular disease mortality. *J Hypertens*. Aug 18.2010
4. Katon W, Fan MY, Unutzer J, Taylor J, Pincus H, Schoenbaum M. Depression and diabetes: a potentially lethal combination. *J Gen Intern Med*. Oct; 2008 23(10):1571–1575. [PubMed: 18649108]
5. Kroenke K, Spitzer RL, Williams JB, Monahan PO, Lowe B. Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Ann Intern Med*. Mar 06; 2007 146(5):317–325. [PubMed: 17339617]
6. Borowsky SJ, Rubenstein LV, Meredith LS, Camp P, Jackson-Triche M, Wells KB. Who is at risk of nondetection of mental health problems in primary care? *J Gen Intern Med*. Jun; 2000 15(6):381–388. [PubMed: 10886472]
7. Wang PS, Lane M, Olfson M, Pincus HA, Wells KB, Kessler RC. Twelve-month use of mental health services in the United States: results from the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. Jun; 2005 62(6):629–640. [PubMed: 15939840]
8. Mental disorders in general medical practice an opportunity to add value to healthcare. *Behav Healthc Tomorrow*. Oct; 1996 5(5):55–62. 72. [PubMed: 10161577]
9. Katon W, Schulberg H. Epidemiology of depression in primary care. *Gen Hosp Psychiatry*. Jul; 1992 14(4):237–247. [PubMed: 1505745]

10. Kessler RC, Demler O, Frank RG, et al. Prevalence and treatment of mental disorders, 1990 to 2003. *N Engl J Med*. Jun 16; 2005 352(24):2515–2523. [PubMed: 15958807]
11. Boyd CM, Reider L, Frey K, et al. The effects of guided care on the perceived quality of health care for multi-morbid older persons: 18-month outcomes from a cluster-randomized controlled trial. *J Gen Intern Med*. Mar; 2010 25(3):235–242. [PubMed: 20033622]
12. Wagner EH, Austin BT, Von Korff M. Organizing care for patients with chronic illness. *Milbank Q*. 1996; 74(4):511–544. [PubMed: 8941260]
13. Baskerville NB, Liddy C, Hogg W. Systematic review and meta-analysis of practice facilitation within primary care settings. *Ann Fam Med*. Jan-Feb;2012 10(1):63–74. [PubMed: 22230833]
14. Katon WJ, Lin EH, Von Korff M, et al. Collaborative care for patients with depression and chronic illnesses. *N Engl J Med*. Dec 30; 2010 363(27):2611–2620. [PubMed: 21190455]
15. Butler M, Kane RL, McAlpine D, et al. Integration of mental health/substance abuse and primary care. *Evid Rep Technol Assess (Full Rep)*. Nov.2008 (173):1–362.
16. Gallo JJ, Zubritsky C, Maxwell J, et al. Primary care clinicians evaluate integrated and referral models of behavioral health care for older adults: results from a multisite effectiveness trial (PRISM-e). *Annals of family medicine*. Jul-Aug;2004 2(4):305–309. [PubMed: 15335128]
17. Katon W, Von Korff M, Lin E, Simon G. Rethinking practitioner roles in chronic illness: the specialist, primary care physician, and the practice nurse. *General hospital psychiatry*. May-Jun; 2001 23(3):138–144. [PubMed: 11427246]
18. Wagner EH. The role of patient care teams in chronic disease management. *BMJ*. Feb 26; 2000 320(7234):569–572. [PubMed: 10688568]
19. Wright B, Lockyer J, Fidler H, Hofmeister M. Roles and responsibilities of family physicians on geriatric health care teams: Health care team members' perspectives. *Canadian family physician Medecin de famille canadien*. Nov; 2007 53(11):1954–1955. [PubMed: 18000273]
20. Leipzig RM, Hyer K, Ek K, et al. Attitudes toward working on interdisciplinary healthcare teams: a comparison by discipline. *Journal of the American Geriatrics Society*. Jun; 2002 50(6):1141–1148. [PubMed: 12110079]
21. Sommers LS, Marton KI, Barbaccia JC, Randolph J. Physician, nurse, and social worker collaboration in primary care for chronically ill seniors. *Archives of internal medicine*. Jun 26; 2000 160(12):1825–1833. [PubMed: 10871977]
22. Steiner JL, Ponce AN, Styron T, Aklon EE, Wexler BE. Teaching an interdisciplinary approach to the treatment of chronic mental illness: challenges and rewards. *Acad Psychiatry*. May-Jun;2008 32(3):255–258. [PubMed: 18467485]
23. Ladebue AC, Helfrich CD, Gerdes ZT, Fihn SD, Nelson KM, Sayre GG. The experience of Patient Aligned Care Team (PACT) members. *Health care management review*. Jan-Mar;2016 41(1):2–10. [PubMed: 25539056]
24. Rodriguez HP, Giannitrapani KF, Stockdale S, Hamilton AB, Yano EM, Rubenstein LV. Teamlet structure and early experiences of medical home implementation for veterans. *J Gen Intern Med*. Jul; 2014 29(Suppl 2):S623–631. [PubMed: 24715392]
25. Johansen IH, Carlsen B, Hunskaar S. Psychiatry out-of-hours: a focus group study of GPs' experiences in Norwegian casualty clinics. *BMC Health Serv Res*. 2011; 11:132. [PubMed: 21619608]
26. Oud MJ, Schuling J, Slooff CJ, Meyboom-de Jong B. How do General Practitioners experience providing care for their psychotic patients? *BMC family practice*. 2007; 8:37. [PubMed: 17598879]
27. Loeb DF, Bayliss EA, Binswanger IA, Candrian C, deGruy FV. Primary care physician perceptions on caring for complex patients with medical and mental illness. *J Gen Intern Med*. Aug; 2012 27(8):945–952. [PubMed: 22370766]
28. Ballester DA, Filippin AP, Braga C, Andreoli SB. The general practitioner and mental health problems: challenges and strategies for medical education. *Sao Paulo Med J*. Mar 2; 2005 123(2): 72–76. [PubMed: 15947834]
29. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. Mar; 1977 84(2):191–215. [PubMed: 847061]

30. Pajares, F., Urdan, TC. Self-efficacy beliefs of adolescents. Greenwich, Conn: IAP - Information Age Pub., Inc.; 2006.
31. Mohebi S, Azadbakht L, Feizi A, Sharifirad G, Kargar M. Review the key role of self-efficacy in diabetes care. *Journal of education and health promotion*. 2013; 2:36. [PubMed: 24083286]
32. Mendes de Leon CF, Seeman TE, Baker DI, Richardson ED, Tinetti ME. Self-efficacy, physical decline, and change in functioning in community-living elders: a prospective study. *The journals of gerontology. Series B, Psychological sciences and social sciences*. Jul; 1996 51(4):S183–190.
33. Cabana MD, Rand CS, Powe NR, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA : the journal of the American Medical Association*. Oct 20; 1999 282(15):1458–1465. [PubMed: 10535437]
34. Ozer EM, Adams SH, Gardner LR, Mailloux DE, Wibbelsman CJ, Irwin CE Jr. Provider self-efficacy and the screening of adolescents for risky health behaviors. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine*. Aug; 2004 35(2):101–107. [PubMed: 15261638]
35. Lorig K, Holman H. Arthritis Self-Efficacy Scales measure self-efficacy. *Arthritis care and research : the official journal of the Arthritis Health Professions Association*. Jun; 1998 11(3):155–157. [PubMed: 9782806]
36. Marks R, Allegrante JP, Lorig K. A review and synthesis of research evidence for self-efficacy-enhancing interventions for reducing chronic disability: implications for health education practice (part I). *Health Promot Pract*. Jan; 2005 6(1):37–43. [PubMed: 15574526]
37. AbuSabha R, Achterberg C. Review of self-efficacy and locus of control for nutrition- and health-related behavior. *J Am Diet Assoc*. Oct; 1997 97(10):1122–1132. [PubMed: 9336559]
38. Knecht MC, Syrjala AM, Laukkanen P, Knuuttila ML. Self-efficacy as a common variable in oral health behavior and diabetes adherence. *Eur J Oral Sci*. Apr; 1999 107(2):89–96. [PubMed: 10232456]
39. Rimal RN. Closing the knowledge-behavior gap in health promotion: the mediating role of self-efficacy. *Health Commun*. 2000; 12(3):219–237. [PubMed: 10938914]
40. Martin MY, Person SD, Kratt P, et al. Relationship of health behavior theories with self-efficacy among insufficiently active hypertensive African-American women. *Patient education and counseling*. Jul; 2008 72(1):137–145. [PubMed: 18395395]
41. Rabinowitz YG, Mausbach BT, Thompson LW, Gallagher-Thompson D. The relationship between self-efficacy and cumulative health risk associated with health behavior patterns in female caregivers of elderly relatives with Alzheimer's dementia. *J Aging Health*. Dec; 2007 19(6):946–964. [PubMed: 18165290]
42. Lee H, Song R, Cho YS, Lee GZ, Daly B. A comprehensive model for predicting burnout in Korean nurses. *J Adv Nurs*. Dec; 2003 44(5):534–545. [PubMed: 14651702]
43. Rhodes SD, Hergenrather KC. Using an integrated approach to understand vaccination behavior among young men who have sex with men: stages of change, the health belief model, and self-efficacy. *J Community Health*. Oct; 2003 28(5):347–362. [PubMed: 14535600]
44. Piazza J, Conrad K, Wilbur J. Exercise behavior among female occupational health nurses. Influence of self efficacy, perceived health control, and age. *Aaohn J*. Feb; 2001 49(2):79–86. [PubMed: 11760269]
45. Syrjala AM, Knuuttila ML, Syrjala LK. Self-efficacy perceptions in oral health behavior. *Acta Odontol Scand*. Feb; 2001 59(1):1–6. [PubMed: 11318039]
46. Hyman DJ, Maibach EW, Flora JA, Fortmann SP. Cholesterol treatment practices of primary care physicians. *Public Health Rep*. Jul-Aug; 1992 107(4):441–448. [PubMed: 1641441]
47. Strauss SM, Jensen AE, Bennett K, Skursky N, Sherman SE, Schwartz MD. Clinicians' panel management self-efficacy to support their patients' smoking cessation and hypertension control needs. *Translational behavioral medicine*. Mar; 2015 5(1):68–76. [PubMed: 25729455]
48. Logsdon MC, Eckert D, Tomasulo R, Myers J. Self-efficacy and postpartum teaching: a replication study. *The Journal of perinatal education*. Summer; 2013 22(3):166–170. [PubMed: 24868128]
49. Logsdon MC, Foltz MP, Scheetz J, Myers JA. Self-efficacy and postpartum depression teaching behaviors of hospital-based perinatal nurses. *The Journal of perinatal education*. Fall; 2010 19(4):10–16. [PubMed: 21886417]

50. Timberline Database. Peregrine Management Corporation. 2013. download
51. Dillman, DA., Smyth, JD., Christian, LM. Internet, mail, and mixed-mode surveys: the tailored design method. 3. Hoboken, NJ: Wiley & Sons; 2009.
52. Edwards PJ, Roberts I, Clarke MJ, et al. Methods to increase response to postal and electronic questionnaires. *Cochrane Database Syst Rev.* 2009; (3):MR000008. [PubMed: 19588449]
53. Griffin JM, Simon AB, Hulbert E, et al. A comparison of small monetary incentives to convert survey non-respondents: a randomized control trial. *BMC Med Res Methodol.* 2011; 11:81. [PubMed: 21615955]
54. Loeb DF, Bayliss EA, Binswanger IA, Candrian C, deGruy FV. Primary care physician perceptions on caring for complex patients with medical and mental illness. *J Gen Intern Med.* 2012; 27
55. Loeb DF, Bayliss EA, Candrian C, deGruy FV, Binswanger IA. Primary care providers' experiences caring for complex patients in primary care: a qualitative study. *BMC Family Practice.* 2016; 17(1):1–9. [PubMed: 26739311]
56. Bandura, A. Self-efficacy : the exercise of control. New York: W.H. Freeman; 1997.
57. Patient-Centered Medical Home (PCMH) 2011. 2016. http://www.ncqa.org/portals/0/programs/recognition/pcmh/pcmh_2011_faqs_9_24_13.pdf
58. Loeb DF, Crane LA, Leister E, et al. Development and initial validation of primary care provider mental illness management and team-based care self-efficacy scales. *Gen Hosp Psychiatry.* 2016 (In Press).
59. Ashbury FD, Iverson DC, Kralj B. Physician Communication Skills: Results of a Survey of General/Family Practitioners in Newfoundland. *Med Educ Online.* 2001; 6(1)
60. Heinemann GD, Schmitt MH, Farrell MP, Brallier SA. Development of an Attitudes Toward Health Care Teams Scale. *Evaluation & the health professions.* Mar; 1999 22(1):123–142. [PubMed: 10350960]
61. Anderson NR, West MA. Measuring climate for work group innovation: development and validation of the team climate inventory. *Journal of Organizational Behavior.* 1998; 19(3):235–258.
62. Kivimaki M, Elovainio M. A short version of the Team Climate Inventory: Development and psychometric properties. *Journal of Occupational and Organizational Psychology.* 1999; 72(2): 241–246.
63. [Accessed March, 4, 2016] Comprehensive Primary Care Practice Monitor. http://cufamilymedicine.org/evaluation_hub/resources-2/comprehensive-primary-care-practice-monitor/
64. Katerndahl D, Ferrer RL. Knowledge About Recommended Treatment and Management of Major Depressive Disorder, Panic Disorder, and Generalized Anxiety Disorder Among Family Physicians. *Prim Care Companion J Clin Psychiatry.* 2004; 6(4):147–151. [PubMed: 15361917]
65. Bodenheimer T, Ghorob A, Willard-Grace R, Grumbach K. The 10 building blocks of high-performing primary care. *Ann Fam Med.* Mar-Apr;2014 12(2):166–171. [PubMed: 24615313]
66. Levine S, Unutzer J, Yip JY, et al. Physicians' satisfaction with a collaborative disease management program for late-life depression in primary care. *Gen Hosp Psychiatry.* Nov-Dec;2005 27(6):383–391. [PubMed: 16271652]
67. Hoifodt TS, Olstad R, Sexton H. Developing psychiatric competence during medical education and internship: contributing factors. *Advances in health sciences education : theory and practice.* Nov; 2007 12(4):457–473. [PubMed: 16847730]
68. Cruz M, Pincus HA. Research on the influence that communication in psychiatric encounters has on treatment. *Psychiatr Serv.* Oct; 2002 53(10):1253–1265. [PubMed: 12364673]
69. Eggertson L. On the same team? Nurse-physician communication. *The Canadian nurse.* May; 2012 108(5):28–32.
70. Dieleman SL, Farris KB, Feeny D, Johnson JA, Tsuyuki RT, Brilliant S. Primary health care teams: team members' perceptions of the collaborative process. *Journal of interprofessional care.* Feb; 2004 18(1):75–78. [PubMed: 14668104]
71. Nancarrow SA, Booth A, Ariss S, Smith T, Enderby P, Roots A. Ten principles of good interdisciplinary team work. *Human resources for health.* 2013; 11:19. [PubMed: 23663329]

72. True G, Stewart GL, Lampman M, Pelak M, Solimeo SL. Teamwork and delegation in medical homes: primary care staff perspectives in the Veterans Health Administration. *J Gen Intern Med*. Jul; 2014 29(Suppl 2):S632–639. [PubMed: 24737223]
73. Helfrich CD, Sylling PW, Gale RC, et al. The facilitators and barriers associated with implementation of a patient-centered medical home in VHA. *Implement Sci*. 2016; 11:24. [PubMed: 26911135]
74. Nelson GA, King ML, Brodine S. Nurse-physician collaboration on medical-surgical units. *Medsurg nursing : official journal of the Academy of Medical-Surgical Nurses*. Feb; 2008 17(1): 35–40. [PubMed: 18429539]
75. Rao JK, Anderson LA, Inui TS, Frankel RM. Communication interventions make a difference in conversations between physicians and patients: a systematic review of the evidence. *Med Care*. Apr; 2007 45(4):340–349. [PubMed: 17496718]
76. Streeton A, Bisbey C, O'Neill C, et al. Improving Nurse-Physician Teamwork: A Multidisciplinary Collaboration. *Medsurg nursing : official journal of the Academy of Medical-Surgical Nurses*. Jan-Feb;2016 25(1):31–34. 66. [PubMed: 27044126]
77. Song H, Ryan M, Tendulkar S, et al. Team dynamics, clinical work satisfaction, and patient care coordination between primary care providers: A mixed methods study. *Health care management review*. Nov 5.2015
78. Van der Wees PJ, Friedberg MW, Guzman EA, Ayanian JZ, Rodriguez HP. Comparing the implementation of team approaches for improving diabetes care in community health centers. *BMC Health Serv Res*. 2014; 14:608. [PubMed: 25468448]
79. Beaulieu MD, Haggerty J, Tousignant P, et al. Characteristics of primary care practices associated with high quality of care. *Cmaj*. Sep 3; 2013 185(12):E590–596. [PubMed: 23877669]
80. Bower P, Campbell S, Bojke C, Sibbald B. Team structure, team climate and the quality of care in primary care: an observational study. *Quality & safety in health care*. Aug; 2003 12(4):273–279. [PubMed: 12897360]
81. Fleury MJ, Bamvita JM, Tremblay J. Variables associated with general practitioners taking on serious mental disorder patients. *BMC Fam Pract*. 2009; 10:41. [PubMed: 19515248]
82. Education ACfGM. ACGME Program Requirements for Graduate Medical Education in Family Medicine. 2016
83. Education ACfGM. ACGME Program Requirements for Graduate Medical Education in Internal Medicine. Vol 20162013.

Figure 1.
Conceptual Model

Figure 2.
Survey Responses Flow Diagram

Table 1

Characteristics of Survey Respondents

Characteristic	Factor	Number N=402	Percent
Clinical practice site	University-based practice	34	9
	Non-academic hospital	64	16
	MCO	60	15
	Private Practice	177	44
	Community Health Center	50	12
	VAMC	10	3
	Other	4	1
Setting	Urban, inner city	75	19
	Urban, non-inner/suburban	244	61
	Rural	81	20
Number providers at practice	1 (just myself)	37	9
	2–5	114	28
	6–10	111	28
	11	137	34
Primary professional role	Clinician	315	78
	Clinician-Educator/Researcher	41	10
	Clinician-Administrator	42	10
Medical specialty	Family medicine	198	49
	Internal medicine	202	50
Years since residency	Less than 5	42	10
	5–9	54	13
	10–19	126	31
	20	175	44
Gender	Male	228	57
	Female	169	42
Race	Non-white	35	10
	White	351	87
Ethnicity	Hispanic	14	4
	Non-Hispanic	366	91

MCO= Managed Care Organization; VAMC= Veterans Administration or Military Center

Missing data: Clinical practice site (N=3), setting (N=2), number providers (N=3), professional role (N=4), specialty (N=2), years since residency (N=2), gender (N=5), race (N=11), ethnicity (N=22).

Table 2

Descriptive Analysis of Survey Items

Response		Number N=402	
Self-efficacy Scales	Range	Mean (SD) *	
Team-based Care	0–10	379	7.7 (1.7)
Mental Illness Management	0–10	401	7.1 (1.4)
Measure	Range	Mean (SD) *	
Communication	0–10	395	8.4 (0.9)
MH Knowledge	0–100	371	68.0 (13.0)
Attitude Toward Team-based Care	1–5	380	3.2 (0.4)
Practice Monitor	1–5	368	2.7 (1.0)
Team Climate Inventory	1–5	383	3.9 (0.7)
Resource		Percent	
Psychology consult	Available	262	65
Psychiatry consult	Available	219	55
Health psychologist	Available	135	34
Social Worker	Available	136	34
Case Manager	Available	156	39
Pharmacist	Available	162	40
Patient Registries	Available	277	69
Electronic Medical Record	Available	354	88
Experience – How often managed treatment?		Percent	
Bipolar disorder	Always/Commonly	62	15
	Somewhat commonly	95	24
	Never/Uncommonly	233	58
GAD	Always/Commonly	266	66
	Somewhat commonly	95	24
	Never/Uncommonly	32	8
MDD	Always/Commonly	286	71
	Somewhat commonly	63	16
	Never/Uncommonly	42	10
Commonness- How common among your patients?		Percent	
Bipolar disorder	Common/Very Common	68	17
	Somewhat common	136	34

	Response	Number N=402	
GAD	Uncommon/Very Uncommon	187	47
	Common/Very Common	258	64
	Somewhat common	114	28
MDD	Uncommon/Very Uncommon	22	6
	Common/Very Common	290	72
	Somewhat common	79	20
	Uncommon/Very Uncommon	23	6
Preparedness – How prepared to manage at completion of residency?		Percent	
Bipolar disorder	Very/Completely	23	6
	Somewhat prepared	91	23
	Not at all/slightly	271	67
GAD	Very/Completely	123	31
	Somewhat prepared	160	40
	Not at all/slightly	106	26
MDD	Very/Completely	153	38
	Somewhat prepared	154	38
	Not at all/slightly	81	20

GAD = generalized anxiety disorder; MDD = major depressive disorder; MH= Mental Health

Missing answers resources: psychology consult = 10; psychiatry consult =12; health psychologist = 14; social worker = 12; case manager = 14; pharmacist = 13; registries 20; Electronic Medical Record = 7

* Scoring: higher self-efficacy scores indicated higher self-efficacy; higher communication score indicated higher communication self-efficacy; higher MH knowledge score indicated better performance on knowledge evaluation; higher Attitude Toward Team Based Care score indicated positive attitude toward team based care; higher practice monitor score indicated higher level of implementation of team based care in clinic; higher team climate inventory score indicated higher rated team climate.

Table 3

Independent Factors associated with the Team-Based Care Self-Efficacy Score

Variable group	Covariate Level	Reference	Estimate	95% CI	P-value
Number Providers Clinical Practice Site	solo practice	2 and up	-0.611	(-1.162, -0.060)	0.030
	Community Health Center	Private	-0.131	(-0.625, 0.363)	0.014
	MCO	Private	0.338	(-0.162, 0.839)	---
	Non-academic	Private	-0.459	(-0.888, -0.030)	---
	University	Private	-0.157	(-0.689, 0.375)	---
Ethnicity	VAMC	Private	-1.459	(-2.386, -0.531)	---
	Other	Private	-0.159	(-1.728, 1.411)	---
	Hispanic	Non-Hispanic	-0.972	(-1.794, -0.150)	0.021
	Family medicine	Internal medicine	-0.315	(-0.616, -0.013)	0.042
Specialty Resources	Health psychologist	No access	0.416	(0.063, 0.770)	0.022
	Electronic Medical Record	No access	0.555	(0.020, 1.090)	0.043
	SE Factor Score		0.468	(0.306, 0.629)	<.001
Communication	Mean score		1.086	(0.747, 1.424)	<.001
Attitude Toward Team-Based Care	Mean score		0.247	(0.036, 0.458)	0.022
Team Climate Inventory					

MCO= Managed Care Organization; VAMC= Veterans Administration or Military Center

Table 4
Independent Factors associated with the Management of Mental Illness Self-Efficacy Score

Variable group	Covariate Level	Reference	Estimate	95% CI	P-value
Role	Clinician-Administrator	Clinician	0.420	(0.055, 0.784)	0.075
	Clinician-Educator/Researcher	Clinician	0.067	(-0.309, 0.443)	---
Specialty	Family Medicine	Internal	0.254	(0.003, 0.504)	0.048
Resources	Psychology consult	No access	0.394	(0.151, 0.636)	0.002
Communication	Factor Score		0.523	(0.399, 0.647)	<.001
MH Knowledge	10% increase in score		0.140	(0.050, 0.230)	0.002
Experience – How often managed treatment?					
Bipolar disorder	Always/Commonly	Somewhat commonly	0.039	(-0.344, 0.421)	0.051
	Never/Uncommonly	Somewhat commonly	-0.358	(-0.646, -0.071)	---
GAD	Always/Commonly	Somewhat commonly	0.361	(0.047, 0.676)	0.067
	Never/Uncommonly	Somewhat commonly	0.155	(-0.346, 0.657)	---
MDD	Always/Commonly	Somewhat commonly	0.214	(-0.155, 0.583)	0.092
	Never/Uncommonly	Somewhat commonly	-0.463	(-0.947, 0.021)	---
Preparedness – How prepared to manage at completion of residency?					
Bipolar disorder	Not at all/Slightly	Somewhat prepared	-0.534	(-0.827, -0.242)	0.001
	Very/Completely	Somewhat prepared	0.262	(-0.257, 0.780)	---

MH= Mental Health; GAD = generalized anxiety disorder; MDD = major depressive disorder.

Results are the regression coefficient estimates from a multivariable linear regression model including all covariates listed as predictors of the Management of Mental Illness Self-Efficacy Score outcome. For categorical variables, the estimate represents the difference in the outcome scores between the listed covariate level and the reference group. For continuous variables (Communication, Attitude, Team Climate), the estimate represents the change in the outcome score due to a one unit increase in the continuous variable.