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Serious Mental Illness and Rural Primary Care: Provider Training, Attitudes, and Opinions

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Serious Mental Illness and Rural Primary Care:

Provider Training, Attitudes, and Opinions

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ABSTRACT

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Healthcare resources are especially limited in rural regions of the US. The lack of Primary Care Providers (PCPs) and mental/behavioral health services is problematic, as there are high rates of behavioral and medical concerns within rural populations. Special populations, such as rural persons with Serious Mental Illness (SMI), are medically complex and represent a vulnerable and underserved population. Healthcare outcomes for persons with SMI are poor compared to the general population and commonly lead to premature death. Various barriers prevent this population from accessing optimal healthcare, especially in rural areas, due to negative perceptions/stigma, a lack of understanding from PCPs, and a shortage of resources in general. The current study aimed to determine the extent of mental health training that rural PCPs receive regarding patients with SMI, as well as to evaluate their perceptions, knowledge, and experiences with these patients and understand providers' perceptions regarding rates of patients with SMI who present to primary care clinics in rural settings. The current study used a sample of rural primary care providers ($N = 90$) , surveyed via USPS mail. Results indicated significant differences in reported mental health training among providers from different disciplines. Greater reported mental health training significantly predicted lower levels of stigma, more correctly identified medical conditions comorbid with SMI, and greater reported comfort and confidence in treating patients with SMI. Providers reported differences in the number of patients with and without SMI seen in rural clinics. Implications for these findings are discussed.

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Chapter 1. Introduction

Across rural America, healthcare resources are particularly scarce (Annapolis Coalition, 2007). Approximately 77% of U.S. counties suffer from a considerable shortage of medication prescribers, and rural counties are affected the most (Thomas, Ellis, Konrad, Holzer, & Morrissey, 2009). Further, more than 85% of federally designated mental health professional shortage areas are in rural regions (Bird, Dempsey, & Hartley, 2001). Healthcare resources are particularly needed within rural communities, as rural populations are vulnerable to various behavioral health risks that precipitate more serious medical conditions (Daumit, Pratt, Crum, Powe, & Ford, 2002; Morden, Mistler, Weeks, & Bartels, 2009). For example, rural populations evidence significantly higher rates of smoking, alcohol abuse, diabetes, and obesity as compared to their urban counterparts (Befort, Nazir, & Perri, 2012; Bolin et al., 2015). Rates of medical conditions are inflated within rural communities (Bolin et al., 2015; Hartley, 2004), with approximately one-third of residents of rural counties reporting more than one significant health risk (Matthews et al., 2017). Rural communities are also less likely to provide residents with a selection of healthy food choices, exercise facilities, or even sidewalks (Gilbert, Laroche, Wallace, Parker, & Curry, 2017), each of which could aid in the prevention or treatment of medical conditions.

Given the general lack of health care resources in rural communities and the marked need for care, it is especially important that primary care providers (PCPs) are knowledgeable and experienced in a broad range of medical and behavioral issues that may present in primary care settings. This is true for addressing mental health concerns as well, as it has been documented that U.S. patients are generally more likely to seek mental health treatment from their PCPs rather than from mental health experts (Lester, Tritter, & Sorohan, 2005; Wang et al., 2006).

PCPs have reported high rates of mental and emotional concerns in their patients and believe behavioral change is needed, but they note limitations in addressing these concerns themselves (Robohm, 2017).

Of those residing in rural communities, vulnerable populations can be especially susceptible to behavioral, psychological, and medical concerns that may go unaddressed. Specifically, persons with serious mental illness (SMI) represent a unique and complex population who are often underserved (Daumit et al., 2002) and are medically and psychologically vulnerable (Dixon, Postrado, Delahanty, Fischer, & Lehman, 1999; Morden et al., 2009). For the current paper, SMI is defined as having a diagnosis of bipolar disorder, schizophrenia, schizoaffective disorder, or other disorders characterized by psychotic symptomology. Among the global population, bipolar disorder has a prevalence of approximately 1-2%, bipolar spectrum disorder 8%, and schizophrenia 1% (Saha, Chant, Welham, & McGrath, 2005; Saunders & Goodwin, 2010). The rates of SMI are a concern in the U.S., as 4.2% of American adults are diagnosed with SMI, representing 9.8 million persons across the country (NIMH, 2014; Saha et al., 2005; Saunders & Goodwin, 2010). A combination of individual-, provider-, and community-related factors may preclude persons with SMI from obtaining adequate healthcare, particularly within rural regions of the U.S.

Despite the vulnerability of this population, only about 25% of medical visits for persons with SMI take place within the primary care setting, and these patients often present with multiple chronic health conditions during each visit (Daumit et al., 2002). Instead, persons with SMI are typically undertreated by PCPs and are more likely to seek services through the emergency department (Anderson et al., 2013; Galon & Graor, 2012; Hendrie et al., 2013). Though statistics on rural primary care visits for persons with SMI are lacking, research indicates

that nationally, there are only 267,000 visits by persons with SMI each year (Daumit et al., 2002). This underscores the lack of primary care utilization by persons with SMI, as this number of visits represents only a minor fraction of the 9.8 million adults diagnosed with an SMI in the US (NIMH, 2014). Given the general lack of resources in rural communities, it is likely that the number of primary care visits for persons with SMI who reside within rural regions is even smaller.

The proposed study intends to fill several important gaps within the literature regarding rural PCPs' knowledge of, attitudes towards, and experiences with SMI. Here, I will first review the relevant literature related to the factors that contribute to and exacerbate common medical comorbidities among persons with SMI. Next, I will address the unique barriers that prevent rural persons with SMI from receiving adequate primary care services for mental and physical healthcare. Last, I will discuss why rural persons with SMI represent a stigmatized population.

High Medical Comorbidity

Persons with SMI are likely to engage in inconsistent and unhealthy lifestyle practices that contribute to potentially fatal medical conditions. For example, persons with SMI often engage in risky behaviors such as smoking cigarettes, abusing alcohol or illicit substances, maintaining a poor diet, and leading a sedentary lifestyle, all of which can contribute to chronic and comorbid medical conditions (Brown, 1997; Castillo-Sánchez et al., 2015; Daumit et al., 2002; Dixon et al., 1999; 2000; Jeste, Gladsjo, Lindamer, & Lacro, 1996; Simpson & Tsuang, 1996). Tobacco use has been cited in as many as 75-85% of persons with SMI, with most individuals classified as "heavy smokers," meaning that they smoke more than 25 cigarettes per day (Ziedonis, Williams, & Smelson, 2003). Persons with SMI may be more prone to smoking due to neurological differences in the way their brains operate at the receptor level (Adler et al.,

1998). Moreover, individuals with SMI are at an increased risk for developing substance use disorders, with lifetime prevalence for substance abuse or dependence diagnoses at 47% for persons with schizophrenia and 56% for those with bipolar disorder (Epidemiological Catchment Area Study; Regier et al., 1990).

Engaging in concerning behavioral health risks may also be reinforced by certain cultural aspects characteristic of rural communities. For example, tobacco use is socially acceptable and highly accessible in rural Appalachia, as the growth of tobacco has made economic contributions to the region (Behringer & Friedell, 2006). Food insecurity may also play a role in poor dietary patterns, as rural regions have more limited access to fresh, healthy food choices (Bauer et al., 2012). This contributes to higher prevalence of overweight and obese persons in rural communities in comparison with the general population across the U.S. (Bolin et al., 2015). Further, rural culture may also influence eating patterns, leading to consumption of traditional "country" meals that are high in fat (Ely, Befort, Banitt, Gibson, & Sullivan, 2009; Nothwehr & Peterson, 2005). Additionally, there are few exercise facilities or sidewalks in many rural communities, limiting opportunities for physical activity (Gilbert et al., 2017). Finally, poverty, low levels of education, and low health literacy are also likely to contribute to these and other health disparities among rural populations (Bolin et al., 2015).

In addition to lifestyle factors, there is evidence that the use of antipsychotic medications for persons with SMI also increases risk for further health complications (Dixon et al., 2000; Felker, Yazel, & Short, 1996; Jeste et al., 1996; Morden et al., 2009; Reist et al., 2007). Certain antipsychotics, such as clozapine and olanzapine, are thought to change metabolic functioning (Castillo-Sánchez et al., 2015), potentially contributing to substantial weight gain, elevated serum triglycerides, increased blood pressure, and changes in glucose and lipid metabolism, all

of which increase the likelihood of obesity and cardiovascular disease (McEvoy et al., 2005; Meyer, 2001).

Antipsychotic medication usage has been empirically linked to an increased risk of cardiovascular disease and the development of obesity, diabetes, and dyslipidemia in patients diagnosed with SMI (Castillo-Sánchez et al., 2015; Morden et al., 2009). A meta-analysis conducted by Mitchell et al. (2013) revealed that metabolic syndrome risk factors are high in persons diagnosed with schizophrenia. As a result, they recommended that providers promote healthy lifestyle interventions early during treatment and thoroughly assess the risks and benefits when choosing a treating antipsychotic. Similarly, individuals with bipolar disorder are at high risk of developing metabolic syndrome, particularly if taking long-term antipsychotics (Vancampfort et al., 2013). Moreover, second generation antipsychotics are known to worsen metabolic syndrome (McEvoy et al., 2005; Morden et al., 2009). Thus, researchers have advised PCPs to use caution when prescribing psychotropic drugs to patients with SMI, as they are associated with the onset and worsening of health-related issues (Annamalai & Tek, 2015). Overall, researchers suggest that providers of patients taking antipsychotics closely monitor weight, waist circumference, BMI, glucose, blood pressure, cholesterol, and lipids on a regular basis to detect noteworthy changes (De Hert et al., 2009; Ng et al., 2009).

Persons with SMI also may present with higher rates of medical comorbidities, including lung disease, obesity, deficiency anemia, diabetes, stroke, asthma, dyslipidemia, cardiovascular disease, arthritis, pneumonia, chronic pain, hypothyroidism, neurological disorders, hypertension, liver disease, pancreatitis, chronic obstructive pulmonary disease, (COPD) hepatitis C, electrolyte disorders, nicotine dependence, and emphysema (Bahorik, Satre, Kline-Simon, Weisner, & Campbell, 2017; Brown, 1997; Castillo-Sánchez et al., 2015; Carney, Jones,

& Woolson, 2006; Daumit et al., 2002; Dixon et al., 1999; Dixon et al., 2000; Jeste et al., 1996; Marder et al., 2004; Simpson, & Tsuang, 1996). Researchers have attributed such high medical comorbidities to genetics, poor diet, and sedentary lifestyle, as well as the use of antipsychotics, tobacco, alcohol, and illicit substances (Bolin et al., 2015; Brown, Inskip, & Barraclough, 2000; Carney et al., 2006; Chrisman, Nothwehr, Yang, & Oleson, 2015; Henderson et al., 2005; Meyer & Koro, 2004)

Higher rates of medical and associated behavioral health comorbidities indicate a greater need for healthcare resources for persons with SMI. Relatedly, approximately 100 billion dollars are spent annually on healthcare expenditures for persons with SMI (Insel, 2008). Despite significant spending, persons with SMI still die an average of 25 years earlier than persons without SMI (Rupp & Keith, 1993; Wahlbeck et al., 2011**)** due to complications related to medical illness (Brown, 1997; Castillo-Sánchez et al., 2015; Daumit et al., 2002; Dixon et al., 1999; Dixon et al., 2000; Jeste et al., 1996; Simpson & Tsuang, 1996). Often, persons with SMI die from cardiovascular disease (Colton & Manderscheid, 2006; Morden et al., 2009), as it is up to three times higher in this population and is associated with certain behaviors like inactivity, poor diet, and smoking cigarettes (Morden et al., 2009). Further, not only are medical diseases typically more severe in persons with SMI, but they also associated with increases in psychotic symptoms, depression, and suicide attempts (Dixon et al., 1999). As persons with SMI are at increased risk of developing chronic, life-threatening medical conditions, it is critical that they seek routine primary care services.

Lack of Appropriate Care

There are limited numbers of qualified health providers relative to residents of rural communities (Hartley, 2004), particularly when the rural region covers a substantial geographic

area. When healthcare providers like nurses and community mental health workers are available in rural regions, they often are not licensed, nor are they employed full-time due to limited funding or resources (Bushy, 2005; Rohland & Rohrer, 1998). This lack of appropriate care likely exacerbates health disparities for persons with SMI, as they are already considered "medically homeless" because they do not obtain regular medical care (Smith, & Sederer, 2009). These factors make it less probable that rural patients with SMI will sufficiently address medical, psychological, and behavioral health concerns. Research also indicates that although patients with SMI are at greater risk for a number of chronic health conditions (e.g., obstructive sleep apnea, diabetes, metabolic syndrome, and cardiovascular disease), many individuals are not properly assessed or treated for such conditions in primary care (Alam, Chengappa, & Ghinassi, 2012; Annamalai, & Tek, 2015; Crawford et al., 2014; Osborn et al., 2011; Viron & Stern, 2010). It is also possible that the time constraints within the primary care setting (Takamura, Hagi, & Yokoyama, 2011) may limit providers' abilities to address such complex concerns. Collectively, it appears less likely that rural persons with SMI, who have complex and varied needs, will receive the appropriate level of care.

Individual barriers may also prevent rural persons with SMI from receiving appropriate care, even when health care resources are available. For instance, a majority of patients with SMI have difficulty recognizing and describing their symptoms, attending medical appointments, and managing medications (Skinner et al., 1999). A lack of insurance coverage (Robinson et al., 2012; Xiong, Iosif, Bermudes, McCarron, & Hales, 2010), issues with housing, interpersonal problems, poor time management or communication skills, poverty, and lack of education (Pastore, Griswold, Homish, & Watkins, 2013; Skinner et al., 1999) further create barriers to treatment for persons with SMI. Concerns about privacy and confidentiality create an additional

limitation for rural residents, as these communities are closely knit, making it difficult to conceal personal identities in public settings (Bushy, 2009). Other rural factors, including poverty, isolation, and cultural values like independence and self-reliance, may keep rural persons with SMI from seeking care (Slama, 2004).

Research has further indicated that PCPs have certain misconceptions about SMI that may interfere with their ability and willingness to care for these patients. For example, Lester and colleagues (2005) found that PCPs reported the belief that SMI is too specialized for primary care, and that SMI is a chronic illness about which they lack knowledge and experience. Thus, many PCPs do not perceive that they can effectively treat these patients, whereas persons with SMI view their PCPs as essential and prefer consulting with them about their concerns, even over mental health specialists. Other providers have noted that many of their patients need to make behavioral changes and address mental and emotional concerns, yet they do not believe that they can treat these concerns due to a lack of confidence or competence, inadequate training or knowledge, and perceived lack of patient interest (Robohm, 2017).

These factors can create additional barriers for patients with SMI who seek mental and medical health services from their PCPs. Additionally, patients with SMI reportedly prefer continuity of care, attentive listening, an optimistic approach to treatment, and a willingness to learn from PCPs (Lester et al., 2005). It is even more important that these patients are provided with appropriate treatment, as most people (70%) solely depend upon their PCPs for treatment of mental health concerns (Hamberger, Ovide, & Weiner, 1999).

Given that there is a lack of confidence in treating persons with SMI or addressing behavioral, emotional, and mental health concerns in general (e.g., Lester et al., Robohm, 2017), it would be helpful for PCPs to receive additional mental health training to allow them to feel

more competent to provide care to patients with substantial mental health needs. There may also be economic benefits resulting from training PCPs, as patients who see their PCPs prior to their first psychotic episode are less likely to use costly inpatient or emergency services (Anderson et al., 2013).

Literature describing the type and length of mental and behavioral health training across providers is not available, though available online curricula indicates that various U.S. medical training programs require very little mental health education (Eisenbrandt, Stinson, & LeMay, 2017). More specifically, Eisenbrandt and colleagues (2017) investigated medical curriculum for medical schools online and found that although many universities require some type of mental health training (85.3%), training is often limited to one 4-week psychology-related course or one 6-week psychiatry rotation. Additionally, only 14.1% of training programs reported having at least both didactic (e.g., a psychology-related course) and experiential (e.g., a psychiatric rotation) training required. Further, there were no differences found in mental health-related training between rural and urban universities.

Post-graduate education is another method by which PCPs may obtain such training about SMI. In the United Kingdom, Hardy (2012) created and implemented a brief training intervention with the intention to teach PCPs about SMI. During the two-hour intervention, he provided PCPs with an accurate definition of SMI and taught them the signs and symptoms, epidemiology, and influences of SMI on physical health. At the end of the intervention, providers who received the training no longer held common misconceptions about SMI. Other training interventions have been successful in training providers to work with patients with SMI on cardiovascular disease prevention (Hardy et al., 2013) and diabetes management (Lorenz et

al., 2013). Educational interventions such as these may improve outcomes for patients with SMI while also helping providers feel more comfortable and confident with this population.

Stigma

Persons with SMI may also not receive the types of medical and mental health treatments that they need because of stigma. For example, concerns about mental health often go undetected or are even misdiagnosed by PCPs (Badger, Robinson, & Farley, 1999), suggesting a lack of unawareness about mental health needs. This is concerning given evidence that the sooner psychosis is detected and treated, the more likely patients are to respond to treatment, show reduction in symptoms, and improve overall functioning (Perkins, Gu, Boteva, & Lieberman, 2005).

Other stigma about persons with SMI may also block access to appropriate treatment. For example, research indicates that persons with SMI are perceived as violent and dangerous to society, likely due to media exposure portraying a disproportionately high rate of crime committed by persons with SMI (Jorm & Reavley, 2014; Torrey, 2011). This misconception about predisposition to violence may influence providers to treat patients with SMI differently and might even prevent persons with SMI from seeking appropriate treatment due to internalized stigma (Gamm, Hutchison, Dabney, & Dorsey, 2003; Thesen, 2001). Furthermore, perceptions about the prognosis of SMI might influence how a patient is treated by providers. For example, if a provider believes that SMI is not treatable (Day, Edgren, & Eshleman, 2007), he or she may have limited knowledge of specialized treatment options, differential diagnoses, or rule-out conditions, and consequently may not be able to provide the most effective care for these patients. A related barrier to receiving optimal healthcare faced by patients with SMI is negative perceptions and stigma. Across various countries and cultures, PCPs report unfavorable attitudes

and negative stigma toward patients with SMI (Lam, Lam, Lam, & Ku, 2013; Lawrie, 1998). Additional research discovered that physicians endorse items of stigma, have beliefs that underestimate patients' abilities, and hold skepticism about treatment when it comes to patients with schizophrenia (Hori, Richards, Kawamoto, & Kunugi, 2011).

Education about SMI may be helpful in decreasing negative perceptions and allowing providers to feel more comfortable working with patients who have SMI. Postgraduate mental health training programs for PCPs in Hong Kong have been used to effectively reduce stigmatizing perspectives towards patients with mental health concerns as well as bolster providers' confidence in treating these patients (Lam, Lam, Lam, & Sun, 2015). Post-graduate SMI training has also resulted in PCPs endorsing positive attitudes towards patients with SMI (Hardy, 2012). Finally, trainings regarding the importance of the collaborative patient-physician relationship may assist PCPs in better understanding patients with SMI by opening lines of communication between them. For instance, patients with SMI have reported the desire to collaborate on treatment goals together with their PCPs, to be perceived as capable and credible patients, and to feel as though they and their concerns matter to PCPs (Galon & Graor, 2012).

Research Questions

The current study had three aims. First, rural PCPs' knowledge of medical and mental health comorbidity among patients with SMI was examined. Specifically:

- Hypothesis 1a: Provider-reported trainings would vary based on provider background. This study did not specifically examine the length, exact type, or quality of mental health training.
- Hypothesis 1b: Providers with more mental health training would be able to correctly identify more behavioral concerns and medical conditions specifically among patients

with SMI than will providers with less training. However, providers with less mental health training would endorse more of the distractor items (incorrect, stigmatized options) regarding behavioral concerns and medical conditions (e.g., aggression, HIV).

- Hypothesis 1c: Providers with less mental health training would report feeling less comfortable and confident in treating patients with SMI compared to providers with more mental health training, based on findings that some PCPs believe that they lack the required knowledge and experience to treat SMI (Lester et al., 2005), have limitations in addressing behavioral health concerns themselves (Robohm, 2017), and feel less confident in treating patients with SMI before receiving mental health training (Lam et al., 2015).

The knowledge gained from this study will be used to inform future training programs to educate PCPs about persons with SMI. Future training programs could teach PCPs about the potential medical comorbidities and behavioral health concerns commonly found among persons with SMI, thus potentially influencing preventative care practices for individuals with SMI and decreasing evident healthcare disparities.

Secondly, I examined attitudes towards patients with SMI that are endorsed by PCPs in rural regions.

- Hypothesis 2a: PCPs with less mental health training will endorse more overall stigma and more negative than positive attitudes towards persons with SMI compared to PCPs with more mental health training, based on previous research findings that mental health training decreases negative stigma/attitudes towards mental illness (Lam et al., 2015).
- Hypothesis 2b: Providers with more negative attitudes about *recovery* and *treatability* will be less likely to refer patients to other providers for treatment, due to the belief that

SMI is not likely treatable or curable. This hypothesis is based on previous research illustrating that physicians underestimate the ability of patients with SMI and have skepticism regarding the treatment for these patients (Hori et al., 2011).

The knowledge obtained from the results of the current study will help inform training programs about the importance of educating PCPs about SMI, which may then decrease common misconceptions about persons with SMI that can create negative attitudes toward this population. Training interventions may additionally help to decrease PCPs' beliefs that they are not able to effectively work with patients with SMI.

Third, I examined providers' perceptions of the number of patients with SMI that present for care in rural primary care clinics.

- Hypothesis 3: This will be an exploratory hypothesis to investigate rural PCPs' estimated rates of patients with SMI presenting in their clinics, and to compare it to their attitudes/stigma and correctly identified medical comorbidities.

The data revealed from the current study will help to inform PCPs, as well as researchers, about providers' perceptions of how many persons with SMI are seen in primary care settings across rural regions. This may also help inform PCPs and researchers as to how high the health disparity is among this population may be specifically within rural communities. Overall, the proposed study will provide useful information that will help to guide appropriate interventions in the future that can be implemented to assist rural PCPs in better understanding the needs of patients with SMI, optimize service delivery, reduce health disparities, and decrease subsequent healthcare costs.

Chapter 2. Methods

Participants

A total of 750 providers in rural areas were randomly selected and mailed survey packets between May and September of 2019. A number of survey packets were returned to sender (*n* = 40). A total of 91 returned surveys were completed, either at least fully or in part. Of those returned and completed, missing data were minimal. One participant who completed survey data was excluded as he/she identified as a licensed behavioral health provider.

Final participants (*N* = 90) consisted of 44 males (48.9%) and 46 females (51.1%). A vast majority of participants identified as follows: 94.4% White (*n* = 85), 1.1% Hispanic/Latino (*n* = 1), 1.1% Asian/Pacific Islander (*n* = 1), 1.1% mixed race (*n* = 1), and 2.2%identified as "other" (*n* = 2). The highest number of participants reported living in the West (*n* = 36; 40%), followed by the South (*n* = 25; 27.8%), the Midwest (*n* = 20; 22.2%), and the Northeast (*n* = 9; 10%). Providers' highest degree received included the following: medical degree (*n* = 58; 64.4%), followed by master's degree (*n* = 28; 31.2%), doctorate (*n* = 3; 3.3%), and a professional degree (*n* = 1; 1.1%). Participants were divided into the following three categories, based upon different training types: 1) nurse practitioners (*n* = 22; 24.4%), 2) licensed physicians (MD *n* = 44; 48.9%, and DO *n* = 14; 15.6%), and 3) physician assistants (*n* = 10; 11.1%). Compared to physicians with MD training (*n* = 44), there were far fewer physicians with DO training (*n* = 14). Thus, this variable was collapsed into one overarching group of medical physicians. Degrees were awarded with a range from 1955 to 2019, and number of years providing direct patient care ranged from 1 to 46 years (*m* = 20.96 years, *SD* = 12.89 years). Please see Table 1 for additional details regarding descriptive information for the current sample.

Table 1.
Descriptive Statistics of Sample Based on Job Title

Variables	N (%)	Range	Mean ± SD
Mental health training score			
Physician Assistant	10 (11.1)	0 - 6	3.20 ± 1.99
Nurse Practitioner	22 (24.4)	0 - 11	3.82 ± 2.97
Licensed Physician	57 (64.4)	0 - 11	5.58 ± 2.56
Number of mental health courses			
Physician Assistant	10 (11.1)	0 - 3	1.3 ± 0.9
Nurse Practitioner	22 (24.4)	0 - 4	1.6 ± 1.5
Licensed Physician	57 (64.4)	0 - 4	2.2 ± 1.6
Number of psychiatric rotations			
Physician Assistant	10 (11.1)	0 - 1	0.7 ± 0.5
Nurse Practitioner	21 (23.3)	0 - 4	1.0 ± 1.0
Licensed Physician	57 (64.4)	0 - 4	1.8 ± 0.8
Year degree awarded			
Physician Assistant	10 (11.1)	1978 - 2016	2006 ± 6
Nurse Practitioner	22 (24.4)	1983 - 2019	2003 ± 9
Licensed Physician	57 (64.4)	1955 - 2015	1994 ± 14
Years of direct care experience			
Physician Assistant	10 (11.1)	2.5 – 40.0	14.8 ± 12.3
Nurse Practitioner	22 (24.4)	1.0 – 40.0	18.9 ± 11.4
Licensed Physician	57 (64.4)	3.0 – 46.0	22.8 ± 13.3
Average number of patients/week			
Physician Assistant	10 (11.1)	1 - 85	44.3 ± 26.7
Nurse Practitioner	22 (24.4)	1 - 150	64.2 ± 38.0
Licensed Physician	57 (64.4)	1 - 150	70.1 ± 31.1
Average number of patients with SMI/week			
Physician Assistant	10 (11.1)	0 - 30	4.4 ± 9.6
Nurse Practitioner	22 (24.4)	0 - 50	8.8 ± 12.4
Licensed Physician	57 (64.4)	1-20	6.0 ± 5.4

Measures

Quantitative measures were used to assess providers' perceptions of the number of persons with SMI seen within their practice, providers' mental health training background, and their perceptions and attitudes regarding persons with SMI. These items were included in a single questionnaire, to be completed by PCPs who provide direct patient care in rural primary care settings. Basic demographic questions were included to obtain an understanding of provider's age, gender, current region of practice (i.e., Northeast, Midwest, South, and West) job title, educational background, and years of direct patient care experience. In order to determine providers' perceptions of the number of persons with SMI seen in rural primary care settings, PCPs were asked to approximate the total number of patients seen in a given week, including estimates of how many of those patients have SMI. Although this estimate is not exact, it may provide a reasonable understanding of provider estimates of SMI within rural primary care practices. Please see Appendix A for details regarding survey content.

In order to examine PCPs' medical and mental health knowledge, survey questions asked PCPs to describe their history of mental health training, as discussed further below. PCPs were asked to indicate amount and types of trainings, to include didactic trainings and experiential rotations, in addition to continuing education or other learning exercises. The mechanism of coding these data will be described further within the data analyses section below. Additionally, PCPs were asked to select all perceived types of medical comorbidity and behavioral concerns that apply to patients with SMI. These items were based upon empirical findings of high rates of these particular medical conditions and behavioral concerns among persons with SMI. Distractor items describing additional medical comorbidity and behavioral concerns were included as well, both to capture stigmatized beliefs and to potentially identify overestimation effects. Distractor

items are not empirically related to having a diagnosis of SMI. For example, "HIV/AIDs" and "Irritable Bowel Syndrome" are distractor items within the medical comorbidity list, neither of which are linked to SMI. Similarly, "aggression" and "risky sexual behaviors" are examples of distractor items on the behavioral concern list, also neither of which are significantly associated with SMI. To assess providers' comfort and confidence in treating patients with SMI, two separate items directly inquired about each participant's level of confidence or comfort in treating these patients based on a Likert-type scale ranging from 1 (Not comfortable/confident at all) to 4 (Very comfortable/confident). Additionally, to assess treatment of behavioral concerns among patients with SMI, one item asked, "Who treats *behavioral health problems* with patients with SMI?" and included answer choices and blank spaces to expand upon choices. Further, two additional items asked, "How likely are you to manage the person's mental health concerns yourself?" and "How likely are you to refer the person out for additional mental health care?" Both of these were scored on a Likert-type scale from 1 (Not likely at all) to 4 (Very likely). Please see Appendix B for further information.

Furthermore, PCPs' attitudes and stigma towards patients with SMI were assessed using Day's Mental Illness Stigma Scale (DMISS; Day et al., 2007), a measure used to describe attitudes about mental illness. Day and colleagues (2007) conducted a factor analysis on 68 original items and identified seven unique factors with 28 final items, each with Eigen-values of 1 or higher. Items were retained if they produced a factor loading of at least .35 and were removed if they were the only item that loaded on a given factor or loaded on more than one factor. These seven resulting factors include treatability, professional efficacy, recovery, personal hygiene, interpersonal anxiety, visibility, and relationship disruption. The *treatability* factor (α = 0.71; 5.22% of variance; 3 items; factor loadings = 0.55–0.69) captures individual perceptions

about treatments for persons with mental illness. The *professional efficacy* factor (α = 0.86; 4.55% of variance; 2 items; factor loadings = 0.70 and 0.95) measures beliefs about mental health professionals' capabilities to successfully treat persons with mental illness. The *recovery* factor (α = 0.75; 3.58% of variance; 2 items; factor loadings = 0.66 and 0.75) reflects perceptions about the possibility to recover from mental illness. The *personal hygiene* factor (α = 0.83; 9.22% of variance; 4 items; factor loadings = 0.63–0.87) assesses beliefs about personal self-care and appearance of persons with mental illness. *Interpersonal anxiety* (α = 0.90, accounting for 27.04% of the variance; 7 items; factor loadings = 0.50–0.91) captures individual emotional experiences of nervousness, anxiety, and fear of harm when near persons with mental illness. *Visibility* (α = 0.78; 5.83% of variance; 4 items; factor loadings = 0.54–0.85) measures beliefs about an individual's ability to notice symptoms of mental illness in other people. Finally, *relationship disruption* (α = 0.84; 10.66% of variance; 6 items; factor loadings = 0.48–0.82) evaluates concerns regarding disruptions in ordinary relationships due to symptoms of mental illness. Participants rate each item on a Likert-type rating scale from 1 (strongly disagree) to 7 (strongly agree). DMISS internal consistencies for the current study were as follows: *treatability* (α = 0.57), *professional efficacy* (α = 0.75), *recovery* (α = 0.73), *personal hygiene* (α = 0.93, *interpersonal anxiety* (α = 0.92, *visibility* (α = 0.70) and *relationship disruption* (α = 0.84).

Day and colleagues (2007) have validated this scale in both community and college samples, demonstrating good overall internal consistency (Cronbach's α = 0.90). Further, they discovered that student and community participants report significantly more negative attitudes towards persons with schizophrenia than persons with depression. Specifically, participants reported higher anticipated levels of anxiety and relationship disruption regarding interactions with persons with schizophrenia, and lower anticipated treatability, recovery, and professional

efficacy for that psychiatric population. They also discovered that participants held similarly negative attitudes towards persons with bipolar disorder. This measure has been further validated by other researchers who found excellent internal consistency (Cronbach's $\alpha = 0.93$; Masuda, Price, Anderson, Schmertz, & Calamaras, 2009). This measure is intended for adaptation to assess attitudes toward a variety of disorders. For the current study, SMI is defined as bipolar spectrum disorders, schizophrenia, and other psychotic spectrum disorders, and this definition was included within survey questions to specifically assess providers' perceptions about persons with SMI. Please see Appendix C for items on the DMISS.

Stigma was assessed using The Error Choice Test (ECT) adapted by Michaels and Corrigan (2013) to implicitly assess public stigma. The ECT presents as a knowledge test in an attempt to limit the interference of social desirability in responding. Correct responses are based on empirical findings, with endorsement of incorrect responses representative of stigma and biases. Total scores range from 0 to 14, with higher total scores indicating more stigmatized answers endorsed. For example, one item asks, "People with Schizophrenia make up what percent of the homeless population?" Answer choices include: a) 5% or b) 25%. The correct response to this item is answer choice a, which earns 0 points. However, if b, the incorrect choice is selected, a score of 1 will be assigned. Additionally, another item states, "People with a severe mental illness are capable of establishing an intimate long-term relationship of a sexual nature." The correct response to this item is answer choice a) true, earning a point of 0, whereas answering b) false would gain the participant a score of 1 for this item.

Test re-test reliability from a sample of college students, community members and mental health providers ranged from fair to good (0.50-0.70) and showed good construct validity

through positive associations with a more face-valid stigma scale, Corrigan's Attribution Scale (Michaels & Corrigan, 2013). Please see Appendix D for items on the ECT.

Procedures

Rural PCPs were contacted via mail to complete questionnaires based upon their knowledge, training, attitudes, and perceptions of persons with SMI, using the measures outlined above. An introductory letter was included with the survey packet that explained the purpose of the current study and outlined elements of informed consent (please see Appendix E). Survey data for all three research aims were collected via postal mail, given the lack of availability of direct providers' email addresses and frequent medical agency restrictions on selecting links within emails from outside sources.

Survey packets were mailed to primary care offices within rural regions of the U.S. A list of rural counties (i.e., regions with fewer than 1,000 persons per square mile) was obtained from the U.S. Department of Defense website. For example, Marquette County, Michigan, has a population of only 37 people per square mile. All counties were available for potential sampling. Two rural counties from each state were selected, with the exceptions of Rhode Island and New Jersey, neither or which had any rural counties. The first rural county per state was selected at random. After each rural county was randomly selected, a Google search determined which cities and towns were affiliated with that county. Each city or town associated with each county was entered into three separate Google searches that used the terms "primary care," "family medicine," and "general medicine" to find primary care clinics in these rural locales. After identifying the names of clinics in a particular county, another Google search was conducted to identify websites for each clinic to provide the names, credentials, and gender of providers within each clinic. No more than 10 providers from each county were included. Providers were

selected to include diversity in professional background (e.g., M.D., D.O., NP, DrNP, PA, etc.) as well as differences in gender. The second rural county was selected based on being geographically nonadjacent to the first rural county and at least two counties away from the original county. If there were no two counties more than two counties apart (i.e., the only rural area of the state is several counties clustered together), then only one county in that state was coded. This process was repeated for the remainder of states. Surveys were addressed specifically to each provider and mailed to the corresponding clinic address listed.

Laminated bookmarks with information related to national mental health resources and common medical billing codes were provided with each packet as a token incentive to thank participants for their time. This incentive may have contributed to response rates to the mailed survey. Stamped envelopes were included to facilitate the return of completed surveys. Data were coded and analyzed using SPSS, version 24. As noted above, 750 survey packets were mailed, with 91 completed surveys returned within seven months of initial mailing. This represents a 12.1% survey return rate.

***Data Analyses*.** For hypothesis 1a, mental health trainings were coded as follows: 1) One point was calculated per mental health course, psychiatric rotation, continuing education, or additional training reported; and 2) an additional point was assigned for those who indicate having at least one of each of experiential and didactic training. This formula results in a total of 11 possible points to categorize mental health training. An ANOVA was conducted using categorical indicators of professional discipline (i.e., medical resident/physician, nurse, nurse practitioner) as the predictor variable and the continuous score related to mental health training as the outcome variable. Next, to investigate hypothesis 1b, three hierarchical multiple linear regressions were conducted. For each of the linear regressions, mental health training score and

total stigma scores from the DMISS and ECT were predictors, while the number of 1) indicated physical/medical health concerns, 2) behavioral concerns, and 3) distractor items were the outcomes for each of the three regressions. See Figure 1 for a depiction of the hierarchical multiple linear regressions associated with hypothesis 1b. To examine hypothesis 1c, Pearson's correlational analyses were used to illustrate relationships between reported rates of comfort and confidence in treating patients with SMI and respondents' scores indicative of prior mental health training.

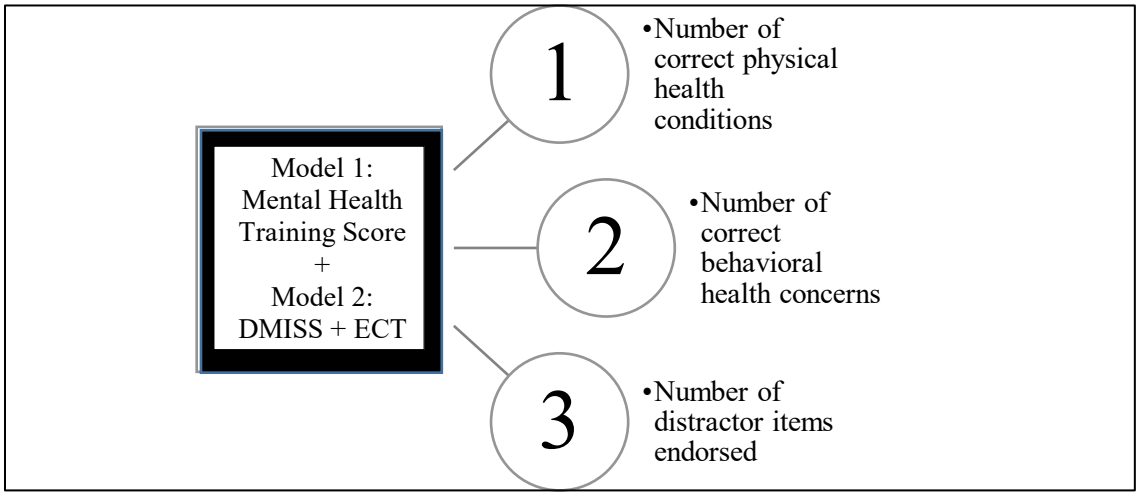

Figure 1. Hierarchical Multiple Linear Regressions

In order to test hypothesis 2a, the total scores on the DMISS and the ECT were calculated to determine providers' attitudes and stigma towards patients with SMI. Mental health training scores were entered as predictors in two separate linear regression analyses, with DMISS and ECT scores as an outcome for each. Since hypothesis 2a and 1b share common variables for analyses (i.e., mental health training, DMISS, and ECT scores), multicollinearity may be an issue. To address these possible multicollinearity concerns, predictor items were included in separate blocks for hypothesis 1b, with training score entered in the first block and the DMISS and ECT items entered in the second block. For the current study, multicollinearity was not

determined to be a concern, as the Variance Inflation Factors (VIF) were all close to 1, indicating that study variables were not correlated with one another to a problematic extent.

In order to test hypothesis 2b, two linear regressions were calculated. Predictors for both regressions included attitudinal scores on the DMISS factors of *recovery* and *treatability*. The first outcome was the participants' Likert score response on the question, "How likely are you to manage this yourself?", while the second linear regression evaluated the Likert score response to, "How likely are you to refer the person out for additional mental health care?"

For hypothesis 3 regarding provider estimates of the number of patients with SMI seen in their rural primary care practice, providers were asked to estimate the number of patients they see on a weekly basis, including estimates of how many of these patients present with SMI. Pearson's correlations were used to investigate associations between self-reported perceived rates of patients presenting with SMI (from Appendix A) and distractor items (i.e., items representing stereotypical, stigmatic beliefs about persons with SMI; see Appendix B), as well as the aggregate number of correctly identified medical and behavioral health concerns (also from Appendix B).

Chapter 3. Results

Hypothesis 1a. A one-way ANOVA was performed to determine whether there were differences in the degree of mental health training across professional disciplines. Results indicated that mental health training differed by discipline to a significant degree, $F(2, 86) = 5.91$, $p = 0.004$. Partial eta squares, a measure of effect size, revealed that 12.1% of the variability in mental health training was accounted for by discipline ($\eta_{p\ 2} = 0.121$). Mental health training scores ranged across the sample from 0 to 11 ($M = 4.88$, $SD = 2.76$). Mental health training varied across disciplines, with licensed physicians reporting the most mental health training ($M = 5.58$, $SD = 2.56$), followed by nurse practitioners ($M = 3.82$, $SD = 2.97$) and physician assistants, who reported the least mental health training ($M = 3.20$, $SD = 1.99$). Licensed physicians were not differentiated, as results of *t*-test analyses indicated that there was no significant difference in training between MD and DO licensed physicians, $t(55) = -0.584$, $p = 0.235$. Additionally, the assumption of homogeneity of variance was tested and satisfied with Levene's *F* test, $F(55) = 1.44$, $p = 0.235$. Please see Table 2 for more details.

Table 2.

Differences in Mental Health Training by Professional Background

Descriptive Statistics

Total mental health training score 0-11.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
physician assistant	10	3.20	1.989	.629	1.78	4.62
nurse practitioner	22	3.82	2.970	.633	2.50	5.14
licensed physician	57	5.58	2.563	.339	4.90	6.26
Total	89	4.88	2.759	.292	4.30	5.46

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Total mental health training score 0-11.	Based on Mean	1.997	2	86	.142
	Based on Median	1.858	2	86	.162
	Based on Median and with adjusted df	1.858	2	84.544	.162
	Based on trimmed mean	2.052	2	86	.135

ANOVA					
Total mental health training score 0-11.					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	80.873	2	40.436	5.906	.004
Within Groups	588.767	86	6.846		
Total	669.640	88			

Robust Tests of Equality of Means				
Total mental health training score 0-11.				
	Statistic[a]	df1	df2	Sig.
Welch	6.881	2	24.659	.004
Brown-Forsythe	6.462	2	43.872	.003

a. Asymptotically F distributed.

Hypothesis 1b. Three stepwise multiple regression analyses were conducted in order to determine whether providers with more mental health training would be better able to correctly identify behavioral concerns and medical conditions specifically among patients with SMI compared to those with less training. In order to control for potential effects from stigma and reduce the possibility of multicollinearity, mental health training score was entered into the first block and stigma scores (i.e., DMISS and ECT scores) were entered into a second block, utilizing a stepwise analysis for each of the multiple regressions.

For the first stepwise multiple regression, mental health training significantly predicted the number of correctly identified medical health conditions associated with SMI, ($F(1, 71) = 6.158$, $p = .015$), with an adjusted R^2 of .067 in the first model. Adjusted R^2 was interpreted,

instead of R^2, as it accounts for the increase in R^2 that results from the inclusion of multiple predictors. Participants' predicted correctly identified medical health conditions is equal to 3.26 + .28 (Mental health training score). Therefore, for every 1 unit increase in mental health training score, the number of correctly identified medical health conditions increased by .28 units. Results from the second model, which controlled for stigma scores, indicate that mental health training still significantly predicted the number of correctly identified mental health conditions associated with SMI, ($F(3,69) = 2.829$, $p = .045$), with an adjusted . R^2 of .071. Participants' predicted correctly identified medical health conditions is equal to 5.78 + .24 (Mental health training score) - .18(DMISS) + .03(ECT). Thus, for every 1 unit increase in mental health training score, the number of correctly identified medical health conditions increased by .24 units, holding stigma constant. However, when stigma scores were added in, they do not predict outcomes significantly more than mental health training scores alone. Thus, stigma scores do not appear to add a significant explanation of variability ($p = .136$ for DMISS, $p = .829$ for ECT). While the stigma scores do explain some of the variability, it is not a large amount. It is important to note that the ECT score was not related to MH training score ($r = .009$, $p = .468$), which may be due to the relatively small number of items (i.e., 14 items) as well as missing data from incomplete responding (*missing n* = 9; 10%). Overall, total mental health training accounts for 6.7% of variability of outcome and when stigma scores are added, the model accounts for 7.1% of variability in the outcome based on adjusted R^2. Please see Table 3 for additional details.

Table 3.

Mental Health Training as a Predictor of Correct Medical Health Conditions Associated with SMI

Model Summary[c]						
				Std. Error	Change Statistics	
Model	R	R Square	Adjusted R Square	of the Estimate	R Square Change	F Change
1	.282[a]	.080	.067	2.87850	.080	6.158
2	.331[b]	.110	.071	2.87237	.030	1.152

	Change Statistics			
Model	df1	df2	Sig. F Change	Durbin-Watson
1	1	71	.015	
2	2	69	.322	2.089

a. Predictors: (Constant), Total mental health training score 0-11.

b. Predictors: (Constant), Total mental health training score 0-11., Total ECT score, Total DMISS score; higher score indicates more overall stigma

c. Dependent Variable: Sum medical correct = more (medical) correct responses endorsed

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.020	1	51.020	6.158	.015[b]
	Residual	588.290	71	8.286		
	Total	639.310	72			
2	Regression	70.027	3	23.342	2.829	.045[c]
	Residual	569.283	69	8.250		
	Total	639.310	72			

a. Dependent Variable: Sum medical correct = more (medical) correct responses endorsed

b. Predictors: (Constant), Total mental health training score 0-11.

c. Predictors: (Constant), Total mental health training score 0-11., Total ECT score, Total DMISS score; higher score indicates more overall stigma

Coefficients[a]	Standardized Coefficients	

Model		Unstandardized Coefficients		Beta	t
		B	Std. Error		
1	(Constant)	3.262	.688		4.742
	Total mental health training score 0-11.	.305	.123	.282	2.481
2	(Constant)	5.780	1.882		3.070
	Total mental health training score 0-11.	.261	.126	.241	2.067
	Total DMISS score; higher score indicates more overall stigma	-.030	.020	-.182	-1.507
	Total ECT score	.033	.153	.026	.217

Model		Sig.	Correlations Zero-order	Partial	Part	Collinearity Statistics Tolerance
1	(Constant)	.000				
	Total mental health training score 0-11.	.015	.282	.282	.282	1.000
2	(Constant)	.003				
	Total mental health training score 0-11.	.043	.282	.241	.235	.945
	Total DMISS score; higher score indicates more overall	.136	-.230	-.178	-.171	.885
	stigma					
	Total ECT score	.829	-.018	.026	.025	.931

For the second stepwise multiple regression, mental health training did not predict correctly identified behavioral health concerns associated with SMI ($F(1, 71) = 1.646$, $p = .204$), with an adjusted R^2 of .009. This first model was not significant when only considering mental health training score, but despite adding in stigma in the second model, it continues to fall short of significance ($F(3,69) = 2.58$, $p = .061$), with an adjusted R^2 of .062 . Interestingly, there was a significant negative association observed between correct number of behavioral health concerns and stigma items endorsed from the ECT ($r = -.27$, $p = .008$). Therefore, as stigma decreased,

number of correctly identified behavioral health concerns increased. Nevertheless, neither model predicted correctly identified behavioral health concerns associated with SMI to a significant degree. Please see Table 4 for additional details.

Table 4.

Mental Health Training as a Predictor of Correct Behavioral Health Concerns Associated with SMI

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.151[a]	.023	.009	1.17607	.023	1.646	1
2	.317[b]	.101	.062	1.14437	.078	2.994	2

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	71	.204	
2	69	.057	2.260

a. Predictors: (Constant), Total mental health training score 0-11.
b. Predictors: (Constant), Total mental health training score 0-11., Total ECT score, Total DMISS score; higher score indicates more overall stigma
c. Dependent Variable: Sum behavioral correct = more (behavioral) correct responses endorsed

ANOVA[a]

Model		Sum of Squares	df	Mean Square	**F**	Sig.
1	Regression	2.277	1	2.277	1.646	.204[b]
	Residual	98.203	71	1.383		
	Total	100.480	72			
2	Regression	10.120	3	3.373	2.576	.061[c]
	Residual	90.361	69	1.310		
	Total	100.480	72			

a. Dependent Variable: Sum behavioral correct = more (behavioral) correct responses endorsed
b. Predictors: (Constant), Total mental health training score 0-11.
c. Predictors: (Constant), Total mental health training score 0-11., Total ECT score, Total DMISS score; higher score indicates more overall stigma

Coefficients[a]

Model		Unstandardized "beta weights" Coefficients		Standardized "beta weights" Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	4.382	.281		15.594
	Total mental health training score 0-11.	.064	.050	.151	1.283
2	(Constant)	4.680	.750		6.240
	Total mental health training score 0-11.	.073	.050	.171	1.458
	Total DMISS score; higher score indicates more overall stigma	.005	.008	.081	.665
	Total ECT score	-.149	.061	-.289	-2.447

Model		Sig.	Correlations Zero-order	Partial	Part	Collinearity Statistics Tolerance
1	(Constant)	.000				
	Total mental health training score 0-11.	.204	.151	.151	.151	1.000
2	(Constant)	.000				
	Total mental health training score 0-11.	.149	.151	.173	.166	.945
	Total DMISS score; higher score indicates more overall	.508	-.031	.080	.076	.885
	stigma					
	Total ECT score	.017	-.267	-.283	-.279	.931

For the third stepwise multiple regression, model 1 results indicated that mental health training did not predict distractor items endorsed (medical health and behavioral health concerns), F(1, 71) = .227, p = .635, with an adjusted R^2 of -.01. Further, when stigma scores are added in model 2, mental health training score was still not a significant predictor of distractor items endorsed (F (3,69) = .898, p = .447), with an adjusted R^2 of -.004 . None of the variables were related to total distractors endorsed, including total mental health training score (r = .056, p = .301), DMISS score (r = -.115, p = .157), and ECT score (r = -.175, p = .062). Please see Table 5 for more details on the regression. For a frequency list of all correctly identified medical comorbidities and behavioral health concerns as well as distractor items endorsed, please see Table 6 below.

Table 5.

Mental Health Training as a Predictor of Distractor Items Endorsed

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.056[a]	.003	-.011	3.26251	.003	.227	1
2	.194[b]	.038	-.004	3.25188	.034	1.232	2

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	71	.635	
2	69	.298	2.072

a. Predictors: (Constant), Total mental health training score 0-11.

b. Predictors: (Constant), Total mental health training score 0-11., Total ECT score, Total DMISS score; higher score indicates more overall stigma

c. Dependent Variable: Total distractor score = more distractors endorsed (behavioral and medical)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.413	1	2.413	.227	.635[b]
	Residual	755.722	71	10.644		
	Total	758.135	72			
2	Regression	28.477	3	9.492	.898	.447[c]
	Residual	729.657	69	10.575		
	Total	758.135	72			

a. Dependent Variable: Total distractor score = more distractors endorsed (behavioral and medical)

b. Predictors: (Constant), Total mental health training score 0-11.

c. Predictors: (Constant), Total mental health training score 0-11., Total ECT score, Total DMISS score; higher score indicates more overall stigma

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.574	.780		5.867	.000
	Total mental health training score 0-11.	.066	.139	.056	.476	.635
2	(Constant)	6.779	2.131		3.181	.002
	Total mental health training score 0-11.	.051	.143	.043	.356	.723
	Total DMISS score; higher score indicates more overall stigma	-.012	.023	-.065	-.517	.607
	Total ECT score	-.224	.173	-.159	-1.295	.200

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	Total mental health training score 0-11.	.056	.056	.056	1.000	1.000
2	(Constant)					
	Total mental health training score 0-11.	.056	.043	.042	.945	1.058
	Total DMISS score; higher score indicates more overall stigma	-.115	-.062	-.061	.885	1.130
	Total ECT score	-.175	-.154	-.153	.931	1.074

a. Dependent Variable: Total distractor score = more distractors endorsed (behavioral and medical)

Table 6.

Frequencies of Endorsed Medical Conditions, Behavioral Health Concerns, and Distractor Items Associated with SMI

Arthritis[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
no	65	72.222	73.864	73.864
yes	23	25.556	26.136	100.000
Missing	2	2.222		
Total	90	100.000		

Asthma[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
no	70	77.778	79.545	79.545
yes	18	20.000	20.455	100.000
Missing	2	2.222		
Total	90	100.000		

Cardiovascular Disease/Hypertension[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
no	26	28.889	29.545	29.545
yes	62	68.889	70.455	100.000
Missing	2	2.222		
Total	90	100.000		

Chronic Pain[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
no	23	25.556	26.136	26.136
yes	65	72.222	73.864	100.000
Missing	2	2.222		
Total	90	100.000		

COPD[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
no	38	42.222	43.182	43.182
yes	50	55.556	56.818	100.000
Missing	2	2.222		
Total	90	100.000		

Diabetes[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	36	40.000	40.909	40.909
yes	52	57.778	59.091	100.000
Missing	2	2.222		
Total	90	100.000		

Emphysema[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	59	65.556	67.045	67.045
yes	29	32.222	32.955	100.000
Missing	2	2.222		
Total	90	100.000		

Hepatitis C[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	52	57.778	59.091	59.091
yes	36	40.000	40.909	100.000
Missing	2	2.222		
Total	90	100.000		

HIV/AIDS[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	62	68.889	70.455	70.455
yes	26	28.889	29.545	100.000
Missing	2	2.222		
Total	90	100.000		

HPV[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	61	67.778	69.318	69.318
yes	27	30.000	30.682	100.000
Missing	2	2.222		
Total	90	100.000		

Irritable Bowl Syndrome[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	60	66.667	68.182	68.182
yes	28	31.111	31.818	100.000
Missing	2	2.222		
Total	90	100.000		

Leprosy[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	86	95.556	97.727	97.727
yes	2	2.222	2.273	100.000
Missing	2	2.222		
Total	90	100.000		

Multiple Sclerosis[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	84	93.333	95.455	95.455
yes	4	4.444	4.545	100.000
Missing	2	2.222		
Total	90	100.000		

Obesity[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	37	41.111	42.045	42.045
yes	51	56.667	57.955	100.000
Missing	2	2.222		
Total	90	100.000		

Pneumonia[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	76	84.444	86.364	86.364
yes	12	13.333	13.636	100.000
Missing	2	2.222		
Total	90	100.000		

Sexually Transmitted Diseases[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	47	52.222	53.409	53.409
yes	41	45.556	46.591	100.000
Missing	2	2.222		
Total	90	100.000		

Stroke[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	68	75.556	77.273	77.273
yes	20	22.222	22.727	100.000
Missing	2	2.222		
Total	90	100.000		

Aggression2				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	46	51.111	51.685	51.685
yes	43	47.778	48.315	100.000
Missing	1	1.111		
Total	90	100.000		

Alcohol1				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	13	14.444	14.607	14.607
yes	76	84.444	85.393	100.000
Missing	1	1.111		
Total	90	100.000		

Deceptiveness2				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	54	60.000	60.674	60.674
yes	35	38.889	39.326	100.000
Missing	1	1.111		
Total	90	100.000		

Gambling2				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	62	68.889	69.663	69.663
yes	27	30.000	30.337	100.000
Missing	1	1.111		
Total	90	100.000		

Illicit Drug Use1				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	26	28.889	29.213	29.213
yes	63	70.000	70.787	100.000
Missing	1	1.111		
Total	90	100.000		

Impulsivity2				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	24	26.667	26.966	26.966
yes	65	72.222	73.034	100.000
Missing	1	1.111		
Total	90	100.000		

Legal Involvement[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	34	37.778	38.202	38.202
yes	55	61.111	61.798	100.000
Missing	1	1.111		
Total	90	100.000		

Malingering[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	60	66.667	67.416	67.416
yes	29	32.222	32.584	100.000
Missing	1	1.111		
Total	90	100.000		

Nonadherence to Medications[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	11	12.222	12.360	12.360
yes	78	86.667	87.640	100.000
Missing	1	1.111		
Total	90	100.000		

Risky Sexual Behaviors[2]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	33	36.667	37.079	37.079
yes	56	62.222	62.921	100.000
Missing	1	1.111		
Total	90	100.000		

Sedentary Lifestyle[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	44	48.889	49.438	49.438
yes	45	50.000	50.562	100.000
Missing	1	1.111		
Total	90	100.000		

Tobacco[1]				
	Frequency	Percent	Valid Percent	Cumulative Percent
no	8	8.889	8.989	8.989
yes	81	90.000	91.011	100.000
Missing	1	1.111		

Tobacco[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Total	90	100.000		

Poor Diet[1]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
no	14	15.556	15.730	15.730
yes	75	83.333	84.270	100.000
Missing	1	1.111		
Total	90	100.000		

[1]Medical conditions/ behavioral concerns supported by the literature
[2]Medical conditions/behavioral concerns not supported by the literature (distractor items)

Hypothesis 1c. Pearson's r correlational analyses were conducted to test the hypothesis that providers with less mental health training would report feeling less comfortable and confident in treating patients with SMI compared to providers with more mental health training. Results support this hypothesis, with greater mental health training being positively associated with reported comfort ($r = 0.325$, $p = 0.002$) and confidence ($r = 0.433$, $p < .001$) when it comes to treating patients with SMI. Further, reported comfort and confidence in treating patients with SMI were very highly correlated ($r = 0.845$, $p < .001$). Please see Table 7 for additional information.

Table 7.

Association of Mental Health Training with Reported Comfort and Confidence in Treating Patients with SMI

Correlations

		Total mental health training score 0-11.	How comfortable are you when it comes to treating patients with SMI?	How confident are you when it comes to treating patients with SMI?
Total mental health training score 0-11.	Pearson Correlation	1	.325**	.433**
	Sig. (2-tailed)		.002	.000
	N	89	88	88
How comfortable are you when it comes to treating patients with SMI?	Pearson Correlation	.325**	1	.845**
	Sig. (2-tailed)	.002		.000
	N	88	89	89
How confident are you when it comes to treating patients with SMI?	Pearson Correlation	.433**	.845**	1
	Sig. (2-tailed)	.000	.000	
	N	88	89	89

**. Correlation is significant at the 0.01 level (2-tailed).

Hypothesis 2a. Linear regression analyses were used to test the hypothesis that providers with less mental health training would endorse more overall stigma towards persons with SMI in comparison with providers with more mental health training. Results were mixed and varied by the particular stigma scale examined. As was expected, ECT and DMISS scores were positively associated via Pearson's correlation between the two stigma scales (r = .253, p = .015). When specifically analyzing stigma using an overall DMISS score, which captured the 7 domains of stigma, the results from the linear regression analysis support a significant negative relationship between degree of mental health training and stigma. Results indicated that less mental health training significantly predicted higher stigma, as measured by the DMISS, F(1, 77) = 4.069, p = .047 with an R^2 of .05. The equation for the intercept is as follows: y = 88.775 - .224(Mental

Health Training Score), $p = .047$. Thus, for every 1 unit increase in mental health training score, stigma (as measured by DMISS) will decrease by .224. Please see Table 8 for additional information.

Table 8.

Mental Health Training as a Predictor of Stigma Using the DMISS

Descriptive Statistics

	Mean	Std. Deviation	N
Total DMISS score; higher score indicates more overall stigma	81.7215	17.89495	79
Total mental health training score 0-11.	4.86	2.763	79

Correlations

		Total DMISS score; higher score indicates more overall stigma	Total mental health training score 0-11.
Pearson Correlation	Total DMISS score; higher score indicates more overall stigma	1.000	-.224
	Total mental health training score 0-11.	**-.224**	1.000
Sig. (1-tailed)	Total DMISS score; higher score indicates more overall stigma	.	**.024**
	Total mental health training score 0-11.	.024	.
N	Total DMISS score; higher score indicates more overall stigma	79	79
	Total mental health training score 0-11.	79	79

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.224**[a]	**.050**	.038	17.55291

a. Predictors: (Constant), Total mental health training score 0-11.

b. Dependent Variable: Total DMISS score; higher score indicates more overall stigma

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1253.812	1	1253.812	4.069	**.047**[b]
	Residual	23724.061	77	308.105		
	Total	24977.873	78			

a. Dependent Variable: Total DMISS score; higher score indicates more overall stigma

b. Predictors: (Constant), Total mental health training score 0-11.

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	*(Constant)- aka intercept*	88.775	4.016		22.107	.000
	Total mental health training score 0-11.	-1.451	.719	**-.224**	-2.017	**.047**

However, when examining stigma using the ECT, no significant relationship was identified associating the degree of mental health training and stigma, F (1, 78) = p = .937), with an R^2 of .000. The regression equation is as follows: y = 5.213 + .009(Mental Health Training Score), p = .937). These insignificant results are not surprising, given that there was no relationship between mental health training score and ECT (r = .009, p = .468), as was noted above related to hypothesis 1b. Potential explanations for these observed disparities will be discussed later. Please see Table 9 for more details.

Table 9.

Mental Health Training as a Predictor of Stigma Using the ECT

Descriptive Statistics

	Mean	Std. Deviation	N
Total ECT score	5.25	2.281	80
Total mental health training score 0-11.	4.93	2.769	80

Correlations

		Total ECT score	Total mental health training score 0-11.
Pearson Correlation	Total ECT score	1.000	.009
	Total mental health training score 0-11.	.009	1.000
Sig. (1-tailed)	Total ECT score	.	.468
	Total mental health training score 0-11.	.468	.
N	Total ECT score	80	80
	Total mental health training score 0-11.	80	80

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.009[a]	.000	-.013	2.295

a. Predictors: (Constant), Total mental health training score 0-11.

b. Dependent Variable: Total ECT score

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.033	1	.033	.006	.937[b]
	Residual	410.967	78	5.269		
	Total	411.000	79			

a. Dependent Variable: Total ECT score

b. Predictors: (Constant), Total mental health training score 0-11.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5.213	.526		9.907	.000
	Total mental health training score 0-11.	.007	.093	.009	.080	.937

Coefficients[a]

Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	4.166	6.261
	Total mental health training score 0-11.	-.178	.193

a. Dependent Variable: Total ECT score

Hypothesis 2b. To test whether rural providers' comfort and confidence were associated with stigma related to recovery and treatability of SMI, Pearson's correlational analyses were conducted. Results indicated that comfort and confidence were not, in fact, related to providers' endorsement of stigmatized views on recovery (r = -0.101, p = 0.180) nor treatability (r = 0.116, p = 0.146). Further, providers' stigmatized beliefs about recovery and treatability of serious mental illness were not related to whether or not they were likely to refer these patients out for additional mental health care (r = 0.13, p = 0.454, and r = -0.155, p = 0.076, respectively). Please see Table 10 for additional information.

Table 10.

Recovery and Treatability in Likeliness to Treat or Refer Out

Descriptive Statistics

	Mean	Std. Deviation	N
How likely are you to manage the person's mental health concerns yourself?	2.99	.934	87
DMISS Recovery Index Score	10.08	2.800	87
DMISS Treatability Index Score	18.09	1.884	87

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.160[a]	.026	.002	.933	2.158

a. Predictors: (Constant), DMISS Treatability Index Score, DMISS Recovery Index Score

b. Dependent Variable: How likely are you to manage the person's mental health concerns yourself?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.877	2	.939	1.079	.345[b]
	Residual	71.367	82	.870		
	Total	73.245	84			

a. Dependent Variable: How likely are you to manage the person's mental health concerns yourself?

b. Predictors: (Constant), DMISS Treatability Index Score, DMISS Recovery Index Score

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.241	1.023		2.189	.031
	DMISS Recovery Index Score	-.037	.036	-.111	-1.014	.313
	DMISS Treatability Index Score	.062	.054	.125	1.143	.256

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	.205	4.277			
	DMISS Recovery Index Score	-.110	.036	-.101	-.111	-.111
	DMISS Treatability Index Score	-.046	.170	.116	.125	.125

Hypothesis 3. Providers' self-reported total number of patients seen per week ranged from 1 to 150 (*M* = 65.6, *SD* = 33.03, median = 60, mode = 60). More specifically, licensed physicians reported seeing the most patients per week, on average (*m* = 70.8, *sd* = 31.1, *range* = 1-150), followed by nurse practitioners (*m* = 64.2, *sd* = 38.0, *range* = 1-150), and physician assistants (*m* = 44.3, *sd* = 26.7, *range* = 1-85). Further, providers' self-reported estimates of patients with SMI ranged from 0 to 50 per week (*M* = 6.5, *SD* = 8.03, median = 4, mode = 5). Regarding patients with SMI seen per week, nurse practitioners reported seeing relatively the most (*m* = 8.8, *sd* = 12.4, *range* = 0-50), compared to licensed physicians (*m* = 6.0, *sd* = 5.4, *range* = 1-20) and physician assistants (*m* = 4.4, *sd* = 9.6, *range* = 0-30). Utilizing Pearson's correlation, providers' self-reported number of patients with SMI seen per week was not related to number of correctly identified medical comorbid conditions ($r = 0.158$, $p = 0.160$), correctly identified behavioral health concerns ($r = 0.115$, $p = 0.306$), incorrect/distractor medical conditions identified ($r = -0.060$, $p = 0.888$), nor incorrect/distractor behavioral health concerns ($r = -0.091$, $p = 0.419$). Please see Table 11 for more details.

Table 11.

Reported Number of Patients Seen Per Week with and without SMI

Variables	N (%)	Range	Mean ± SD
Average number of patients/week			
Physician Assistant	10 (11.1)	1 - 85	44.3 ± 26.7
Nurse Practitioner	22 (24.4)	1 - 150	64.2 ± 38.0
Licensed Physician	57 (64.4)	1 - 150	70.1 ± 31.1
Average number of patients with SMI/week			
Physician Assistant	10 (11.1)	0 - 30	4.4 ± 9.6
Nurse Practitioner	22 (24.4)	0 - 50	8.8 ± 12.4
Licensed Physician	57 (64.4)	1-20	6.0 ± 5.4

Chapter 4. Discussion

The current study sought to investigate the experiences, perceptions, and expertise of rural primary care providers with regards to their patients with serious mental illness. Within the scientific literature, rural primary care providers have estimated that about 10% of their patients are seen for mental-health related concerns (Geller, 1999), suggesting that mental health training is foundational for work within primary care. Given that rural primary care providers may be the main (or perhaps only) source of professional medical contact (Bird, Dempsey, & Hartley, 2001; Thomas et al., 2009) for persons with serious mental illness who have complex healthcare needs (Bahorik et al., 2017; Brown, 1997; Castillo-Sánchez et al., 2015; Carney et al., 2006; Daumit et al., 2002; Dixon et al., 1999; Dixon et al., 2000; Jeste et al., 1996; Marder et al., 2004; Simpson, & Tsuang, 1996), it is especially important to understand how much training these providers have had to treat relevant medical, mental, and behavioral health concerns. Further, this acquired knowledge, as well as experiences with and perceptions of persons with SMI, may also impact rural providers' abilities to provide optimal treatment to these patients (Hori et al., 2011). Findings from the current study were mixed in terms of support for the proposed hypotheses.

First, results demonstrated that there was a statistically significant difference in the amount of mental health training among providers, with licensed physicians reporting the most and physician assistants reporting the least training, relatively speaking. While each of these professions have different overall training requirements, it is also important to note that the amount of time in training may represent a potential confound. For example, licensed physicians are required to complete four years of medical school and three to seven years of residency in addition to their already-attained four-year Bachelor's degree (Thompson, 2014), whereas physician assistants are required to earn a Master's degree (about 27 months) post-Bachelor's

(American Academy of Physician Assistants, 2020). Nurse practitioners require a Master's degree at minimum but can also go on to earn a doctorate (Full Beaker, Inc, 2020), resulting in a moderate length of time in training compared to the other two professions. Thus, the amount of time in training associated with specific professional discipline or title could be a key factor in the amount of mental health training providers receive, simply for the fact that there is greater opportunity over time to include more specialized trainings, such as coursework and clinical rotations, that are mental health-specific. Of note, physician assistants are required to practice under licensed physicians in most states (AAPAs, 2020) and therefore may continue learning over time from the physicians with whom they work who have relatively more training. Similarly, nurse practitioners have full practice authority in only 20 states, and thus must work under the supervision of a licensed physician in the remaining 30 states (Full Beaker, Inc, 2020). This hierarchical structure of care suggests that providers with more training (e.g., licensed physicians) are able to work more independently, whereas those with less training (e.g., nurse practitioners and physician assistants) require more consultation in practice, which could include mental health-related information.

Licensed physicians also endorsed the least amount of stigma (*m DMISS score* = 80.3, *sd* = 18.3; *m ECT score* = 4.9, *sd* = 2.4) relative to other professional groups, while specifically reporting the most mental health-related training (*m* = 5.58, *sd* = 2.56), when it came to both didactic (e.g., coursework; *m* = 2.2, *sd* = 1.6) and experiential (e.g., psychiatric rotation; *m* = 1.8, *sd* = 0.8) trainings. Licensed physicians also reported the most amount of direct patient care experience (*m years* = 22.8, *sd* = 13.3), as well as the most reported comfort (*m* = 2.47, *sd* = .96) and confidence (*m* = 2.37, *sd* = .86) related to treating patients with SMI compared to the other providers. These results make sense given that licensed physicians complete approximately 11

years of medical training (Thompson, 2014), which may allow them more time to gain experience and knowledge, potentially increasing their comfort and confidence. Conversely, physician assistants endorsed the most stigma items (*m DMISS score* = 88.13, *sd* = 16.79.; *m ECT score* = 6.56, *sd* = 1.88), while also reporting the least mental health-related training (*m* = 3.20, *sd* = 1.99), when it came to both didactic (e.g., coursework; *m* = 1.3, *sd* = 0.9) and experiential (e.g., psychiatric rotation; *m* = 0.7, *sd* = 0.5) trainings. Moreover, physician assistants also reported the least amount of direct patient care experience (*m years* = 14.8, *sd* = 12.3), as well as the least reported comfort (*m* = 1.9, *sd* = .88) and confidence (*m* = 1.8, *sd* = .79) related to treating patients with SMI. While licensed physicians reported the most relative comfort in treating patients with SMI, the most common responses to these items were "not comfortable at all" (20.7%), "somewhat comfortable" (27.6%) and "comfortable" (36.2%). Only 15.5% of licensed physicians (*n* = 9) reported feeling "very comfortable." Similarly, licensed physicians most commonly reported feeling "not confident at all" (15.5%), "somewhat confident" (39.7%) and "confident" (36.2%) when it comes to treating patients with SMI. Again, a small fraction of licensed physicians (*n* = 5; 8.6%) reported they were "very confident" in treating patients with SMI. These results are consistent with empirical literature finding that some primary care providers do not think they possess the necessary knowledge and experience to treat SMI (Lester et al., 2005), are limited in addressing behavioral health concerns themselves (Robohm, 2017), and feel less confident in treating patients with SMI prior to receiving targeted mental health training (Lam et al., 2015).

These results suggest that healthcare professional training programs, especially for physician assistants, should increase mental health training opportunities (both didactic and experiential) so that these professionals feel more comfortable and confident in treating patients

with SMI and hold fewer negative and/or stigmatizing beliefs about these patients. That being said, if physician assistants and nurse practitioners are practicing under licensed physicians, this may allow individuals in these professions to learn more about mental health training from their supervisors who have more training themselves. This is especially important for rural providers, as they may be the only ones available to treat these patients (Bird, Dempsey, & Hartley, 2001; Thomas et al., 2009). It is also important to note that it is unclear whether or not the confidence and competence ratings in this study reflected actual confidence and competence or perhaps something more associated with professional attitude and years of experience. Future research should investigate this question further.

Results from the current study also indicated that providers with more mental health training were significantly better able to identify correct medical comorbidities for patients with SMI compared to providers with less mental health training. This is important given the higher rates of various chronic, potentially-fatal medical conditions in SMI populations (Bahorik et al., 2017; Brown, 1997; Castillo-Sánchez et al., 2015; Carney et al., 2006; Daumit et al., 2002; Dixon et al., 1999; Dixon et al., 2000; Jeste et al., 1996; Marder et al., 2004; Simpson, & Tsuang, 1996). Of note, there was a negative Pearson's correlation between total number of correctly identified comorbid medical conditions and stigma as measured by the DMISS (r = -0.23, p = 0.042). This suggests that a lesser amount of mental health training could impact one's stigma toward this population as well as the ability to correctly identify expected medical health concerns. This is important given that rural primary care providers' ability to better identify these medical comorbidities could potentially help improve life expectancy for patients with SMI (who typically die 25 years earlier; Rupp & Keith, 1993; Wahlbeck et al., 2011) while also reducing healthcare costs overall, given that approximately 100 billion dollars are spent annually on

healthcare expenditures for persons with SMI (Insel, 2008). It is also possible that more years of direct care experience could allow providers a better understanding of comorbid medical conditions while also reducing stigma towards patients with SMI. Future research should investigate whether there may be additional mediating factors involved, such as amount of direct care experience.

However, behavioral health concerns most prevalent among those with SMI were not more likely to be correctly identified in light of amount of mental health training in the current study. This is problematic, as medical comorbidities are often influenced or exacerbated by behavioral health concerns such as poor diet and sedentary lifestyle, as well as use of antipsychotics, tobacco, alcohol, and illicit substances (Bolin et al., 2015; Brown et al., 2000; Carney et al., 2006; Chrisman et al., 2015; Henderson et al., 2005; Meyer & Koro, 2004). There are several possible reasons why this finding may have emerged. For example, it is possible that mental health training among these providers was limited to certain types of training (e.g., neurophysiology, psychopharmacology) that did not emphasize behavioral components that contribute to the health of patients with SMI. This would make sense given the heavy emphasis on the medical model in training for those in these professions. This would help explain why more mental health training predicted correctly identified medical health comorbidities but not behavioral health concerns. Additionally, it is possible that provider-held stigma may have interacted with correct identification of behavioral health concerns. This is possible given that provider stigma (as measured by the ECT) had a significant negative correlation with correctly identified behavioral health concerns. Therefore, perhaps providers endorsing greater stigma toward persons with SMI were more likely to view medical comorbidities as a set of fixed conditions due to genetic and/or other medication-related factors, rather than modifiable

conditions through preventative and behavioral intervention. It is also possible that more mental health training does not necessarily equate to better training when it comes to behavioral health concerns in particular. Conversely, all providers may have been able to identify behavioral health concerns at a similar rate regardless of how much mental health training they gained, making it statistically difficult to detect differences. This explanation seems likely, given that out of a possible six correctly identified behavioral health concerns, scores and variability were similar across licensed physicians, nurse practitioners, and physician assistants.

Regarding the distractor items endorsed by rural primary care providers, mental health training and stigma did not appear to predict the number of behavioral and medical distractor items that were endorsed. This finding, while not statistically significant, is important since it suggests that providers with a lack of mental health training and/or increased stigma were not more likely to endorse incorrect/stigmatized medical comorbidities or behavioral health concerns, as compared to those with more mental health training and/or less stigmatized beliefs about SMI. Interestingly, out of 13 possible distractor items, licensed physicians endorsed the greatest number of distractor items (m = 5.5, sd = 3.4) compared to physician assistants (m = 3.9, sd = 3.0) and nurse practitioners (m = 3.9, sd = 2.6). While not statistically significant, these findings demonstrated that nurse practitioners and physician assistants were similar in their endorsement of distractor items, yet licensed physicians tended to endorse more behavioral health concerns and medical co-morbidities of SMI that are not actually supported by the scientific literature. This finding could be due to the large number of patients reportedly seen by licensed physicians in the current sample, as seeing many patients could skew perceptions about the types of conditions and concerns presented by patients with SMI. Further, nurse practitioners reported seeing more SMI-specific patients per week compared to physicians and physician

assistants, which may explain why they were less likely to endorse distractor items as compared to licensed physicians who reportedly see more patients each week overall. On the other hand, the current study also found that providers' self-reported number of patients with SMI seen per week was not related to number of correctly identified medical comorbid conditions ($r = 0.158$, $p = 0.160$), correctly identified behavioral health concerns ($r = 0.115$, $p = 0.306$), distractor medical conditions identified ($r = -0.060$, $p = 0.888$), or distractor behavioral health concerns ($r = -0.091$, $p = 0.419$). This could be due to the fact that all providers reported seeing a relatively low number of patients with SMI each week, in general.

Next, the current study found support for the hypothesis that rural providers with more mental health training would report greater feelings of comfort and confidence in treating patients with SMI. While these two variables were significantly correlated, this relationship cannot be assumed causal, and thus it is important to consider additional variables that could contribute to this relationship. For example, it is possible that years of direct care experience and exposure to treating patients with SMI may also influence providers' ability to comfortably and confidently treat these patients while also decreasing stigmatizing and negative attitudes towards SMI populations. If this is the case, it would be important for providers to gain experience with persons with SMI early on during their professional careers in order to increase comfort and confidence in treating these patients while minimizing the misconceptions or stigma that may otherwise develop about these patients. Presumably, this will optimize care for patients with SMI in rural settings and promote better long-term health outcomes. Given that confidence and comfort in treating patients with SMI were highly associated with one another, it is possible that increasing clinical experience with patients with SMI could increase both comfort and confidence. Interestingly, number of years providing direct patient care was significantly

associated with comfort in treating patients with SMI ($r = 0.26$, $p = 0.015$) but not with confidence in treating patients with SMI ($r = 0.18$, $p = 0.096$). This suggests that the longer providers practice in the field, they may feel more at ease in treating these patients but they do not seem to think they're better equipped to do so. These findings are consistent with research demonstrating that providers reportedly deny having the correct knowledge and experience to treat SMI (Lester et al., 2005), think that they have difficulty with treating behavioral health concerns by themselves (Robohm, 2017), and do not feel confident in treating patients with SMI (Lam et al., 2015).

Findings from the current study were mixed regarding the influence of mental health training on overall stigma towards persons with SMI. While stigma scores from the ECT and DMISS were positively correlated, the DMISS score was inversely associated with mental health training score, and stigma as measured by the ECT and mental health training score were unrelated. One explanation for this finding is that the ECT is brief in comparison with the DMISS, and does not capture stigma as broadly. Further, missing data from unanswered items made it impossible to calculate ECT scores for several participants. Participants also answered the ECT last in the survey, which may have led to fatigue, frustration with the forced-choice format of the instrument, or negative reactions to the way the questions were written. For example, a few participants wrote comments in the margins when completing the ECT such as "This is a stupid question" and "I will not answer this, it is ridiculous." Some of these participants elected to not answer these questions, resulting in about 10% of missing data for the ECT ($n = 9$) and 11% missing data for DMISS ($n = 10$). Regardless, the finding that mental health training inversely predicted stigma (as measured by DMISS) is crucial because it suggests that exposure to more mental health training may facilitate fewer negative perceptions about

patients with SMI, allowing providers to better serve these populations in rural primary care settings. It is also possible that individuals who hold fewer stigmatizing views toward persons with SMI may intentionally seek out mental health-focused trainings and therefore have a higher mental health training score.

Regarding the measurement instruments used – in particular the stigma scales – some differences emerged that may have resulted from variations in construct or predictive validity. For example, the mental health training score significantly predicted stigma when measured by DMISS, but not ECT. Thus, DMISS may be a better predictor of stigma within this sample since it was not as truncated as the ECT; it simply includes more items. That being said, the DMISS subscales of Treatability and Recovery both have a relatively low number of items (3 items and 2 items, respectively) of the 28 total items that make up the overall scale. This may help explain why recovery and treatment scores on the DMISS were not related to comfort or confidence in treating patients with SMI, nor were they related to one's reported likelihood to refer patients out to other providers. Of note, the treatability subscale of the DMISS had a Cronbach's alpha of only 0.57, suggesting that there may have been some disagreement in correspondence between those two items for the current study. It is also possible that providers, regardless of stigma regarding recovery and treatability, were more likely to refer out to other providers depending upon availability of resources, as mental health resources tend to be scarce in rural regions (Bird, Dempsey, & Hartley, 2001). Future research should investigate stigma and willingness to refer to other providers while utilizing more comprehensive, validated stigma scales while also controlling for mental health resources in each region investigated.

Finally, the current study asked providers to estimate the number of patients they see each week, both with SMI and overall. This hypothesis was intended to be an exploratory

component of the research. Licensed physicians reported seeing the most patients per week on average, followed by nurse practitioners and physician assistants. This general trend was consistent with most of the other findings above, with licensed physicians having the most mental health training, direct patient care experience, reported comfort, and reported confidence in treating patients with SMI, and physician assistants reporting the least of all variables. Regarding patients with SMI, nurse practitioners reported seeing the most per week, while physician assistants reported the least. It is important to consider that while physicians reported seeing the most patients overall, it is possible they may have been seeing them indirectly as supervisors (e.g., using a precepting model with resident physicians). This could be problematic, considering the fact that nurse practitioners and physician assistants have least experience, least comfort, least confidence, and most stigma, but may be more likely to have the most contact with patients with SMI in rural primary care clinics.

The estimated average number of patients with SMI reportedly seen per week (i.e., 4.4 – 8.8 in the current sample), compared to overall patients seen per week (i.e., 44.3 – 70.8 in the current sample) is somewhat consistent with literature noting that about 10% of patients are seen within rural primary care clinics for mental health-related concerns (Geller, 1999). However, this literature is not focused solely SMI, but mental health concerns in general. Therefore it is possible that the literature might actually underestimate the number of patients presenting with mental health-related concerns, if our sample is correct. Additionally, patients with SMI tend to not present to primary care clinics at a rate which would be expected given the population who are diagnosed with SMI conditions (Daumit et al., 2002; NIMH, 2014), suggesting that the number of persons in rural areas with SMI may be higher than 10%. This underscores the importance of mental health-focused training for primary care providers, as 1 in 10 patients with

mental health concerns present within rural primary care clinics that may not have access to specialty mental health providers. This need is exacerbated in light of the fact that providers within the current sample estimated that approximately 10% of their patients are characterized by SMI, which involves an even greater level of mental health need and understanding. Interestingly, self-reported number of patients with SMI seen per week was not related to number of correctly identified medical comorbid conditions, correctly identified behavioral health concerns, or distractors endorsed. This finding is seemingly counterintuitive, as more experience with a population would presumably make one more likely to correctly identify medical and behavioral health concerns while less likely to endorse distractor items. However, this was not the case within this sample. One explanation for this is that the self-reported estimates of patients with SMI could be inaccurate, as providers were asked to "estimate" without necessarily reviewing charts or using any quantitative data to support their estimate. In order to determine how many patients with SMI are actually seen in rural primary care clinics, future research might involve formal chart review to determine whether these numbers are accurate. Research suggests that mental health concerns are often misdiagnosed or underdiagnosed by PCPs (Badger et al., 1999), which may mean that the providers in this sample underestimated the number of patients with SMI, thus impacting the ability to detect a relationship between exposure or experience and the ability to accurately identify common comorbidities. This is concerning, as research suggests that patients with SMI are more likely to benefit from treatment the sooner their conditions are detected and treated (Perkins et al., 2005). Another explanation for this finding could be that seeing a higher number of patients with SMI does not necessarily determine whether or not one is better at correctly identifying medical and behavioral concerns. If this is the case, it calls for a need in improving providers' abilities to

detect these concerns. It is also possible that participants may have overestimated the percentage of their patient caseload with SMI because they may require more effort, more time, may be more salient, etc., which could potentially have implications for their greater comfort and confidence in treating those patients.

The current study evidences a number of limitations. First, there are methodological limitations. As participating clinics were identified via internet search, rural clinics without websites were not included. This could represent an important subsample of rural healthcare providers. Additionally, some clinic websites did not include specific provider names or credentials. Thus, the current study is limited in that not all rural clinics and providers were equally likely to be selected for participation. Second, data collection was challenging. Many survey packets were returned (n = 40) due to the rural care facilities having "no mail receptacle" or "no receipt by this name at this address." It is also likely that additional surveys were not received by providers or potentially lost upon return. Due to the nature of rural primary care clinics, it is likely that a combination of factors contributed to the low returned mail rate, including the possibility that clinics were no longer open, providers had moved to new locations, or that they were closed to receiving unsolicited mail. It is also possible that providers were simply busy or disinterested in the study and thus did not wish to participate. Additionally, of the providers who did complete surveys, there were some missing data, including basic demographic information. Specifically, not all participants listed all of their degrees with each corresponding date of degree awarded. For example, while Bachelor's degrees are required prior to earning a higher level of degree (e.g., a medical degree, nurse practitioner, professional degree), such information was often not provided (missing degree data n = 54). Further, some participants skipped items on the validated measures and other survey questions, or even skipped entire

sections of the survey packet. Therefore, results may not be fully representative due to limitations in data collection and respondent reporting.

Additionally, there were demographic differences among those providers who did respond. Regarding age, a greater majority of licensed physicians were in the older age categories, with 44.8% reporting themselves as 55 or older, in comparison with only 27.2% of NPs and 20% of PAs. In contrast, PAs were quite young in comparison, with 70% of PAs under the age of 45, which was only true for 40.9% of NPs and 32.8% of physicians. These differences may point to generational differences in training as well as the emergence of newer professions (i.e., nurse practitioners and physician assistants) over time relative to the profession of medical physicians. Further, the current sample, while balanced across genders, yielded more licensed physicians who were male (63.8% male, 36.2% female) as compared to physician assistants (30% male, 70% female) and nurse practitioners (18.2% male, 81.8% female). It is possible that gender socialization, particularly given the age of the medical physicians in the sample, might have resulted in more males attending medical school, whereas relatively more females became nurse practitioners. Similarly, trends in higher education reflecting more than 75% of females attaining post-graduate degrees compared to males in many health professions in the current U.S. educational landscape (Boniol et al., 2019; World Health Organization, 2016). and the comparatively youthful age of those in the nurse practitioner and physician assistant categories may further drive this effect. The number of professionals from each background is also a limitation, due to that fact that most participants were licensed physicians (n = 57), followed by nurse practitioners (n = 22), and the least were physician assistants (n = 10). This may have allowed for licensed physicians to demonstrate greater variability in responding simply because there were relatively more of them within the sample. Thus, findings from professional

subgroups with lesser representation may not generalize to the same degree. Future research should include broader representation of participants within these professional groups, as well as other rural primary care providers, such as clinical pharmacists.

Additionally, the current sample mostly included participants from the West (*n* = 36; 40%), followed by the South (*n* = 25; 27.8%) and the Midwest (*n* = 20; 22.2%), with the fewest from the Northeast (*n* = 9; 10.0%). According to the most recently available US Census data (2019), the populations across these regions are somewhat consistent with those of the current sample, with the South including the highest population in the US (125,580,448 people; 38.3%), followed by the West (78,347,268 people; 23.9%) the Midwest (68,329,004 people; 20.8%), and the Northeast (55,982,803 people; 17.1%). Further, the potential participants targeted were in rural locales, which are comparatively uncommon in the Northeast. It is possible that a higher number of participants from all regions could yield different results than what has been found here.

It is important to acknowledge that the mental health training score, as was calculated for the current study, is an imperfect measurement. While the mental health training score reflected an attempt to standardize the types and amount of mental health training in a quantitative manner (i.e., from 0 – 11), the specifics of trainings (e.g., length, exact type, quality, or date of didactic/experiential training) were not examined. Future research should seek to understand how the length, types, and quality of these trainings may impact providers when it comes to their knowledge and perceptions regarding patients with SMI.

Due to the self-report nature of data collection within the current study, another limitation is that providers' responses may have been influenced by social desirability (Fisher, 1993). While the current methodology attempted to decrease socially desirable answering by allowing

participants to be anonymous and utilizing a stigma scale that presents as a "knowledge test" (i.e., ECT), there is still a possibility that participants did not want to portray themselves in a negative light, especially since they reported their professional credentials and region. Similarly, participants may not be aware of their biases and therefore may not report stigmatizing views.

In closing, healthcare resources are scarce in rural America (Annapolis Coalition, 2007; Bird, Dempsey, & Hartley, 2001; Thomas et al., 2009). This is especially detrimental given that rural populations demonstrate increased rates of behavioral health risks and serious medical conditions (Befort et al., 2012; Bolin et al., 2015; Daumit et al., 2002; Hartley, 2004; Matthews et al., 2017; Morden et al., 2009), but lack access to healthy lifestyle options, including healthy food sources or places to safely exercise (Gilbert et al., 2017). This combination makes it crucial for primary care providers to be knowledgeable and experienced in a broad range of medical, behavioral, and mental health issues for vulnerable populations. This is especially true for persons with SMI who are medically and psychologically vulnerable (Dixon et al., 1999; Morden et al., 2009) and represent 9.8 million Americans (NIMH, 2014; Saha et al., 2005; Saunders & Goodwin, 2010). Current statistics on patients with SMI who visit rural primary care providers are lacking, but there is some evidence that only a small minority of this population receive primary care services in clinics across the US (Daumit et al., 2002; NIMH, 2014). One major barrier may be stigma from providers, as research has shown stigma toward patients with SMI, as reported by PCPs themselves (Lam et al., 2013; Lawrie, 1998). Stigma may limit or prohibit efforts to provide optimal care to patients with SMI, as some physicians have reported skepticism about treatment efficacy and assume that patients are less able to manage their conditions (Hori et al., 2011). The literature suggests that education about SMI may assist in decreasing such stigmatized perceptions and allow providers to feel more comfortable working

with patients who have SMI (Lam et al., 2015) while also increasing positive attitudes towards these patients (Hardy, 2012).

The current study adds to the existing knowledge base by exploring important questions about primary care providers working with patients with SMI in rural primary care clinics. While mental health training differs significantly across various professional backgrounds, it also appears to play an important role in lower levels of stigma specific to SMI, consistent with previous literature (Lam et al., 2015). Future research should investigate the direction of this relationship, as it is possible that mental health training could contribute to decreased stigma and decreased stigma could also increase one's interest in obtaining more mental health training (e.g., electives, additional outside trainings). Further, providers with more mental health training reported feeling more comfortable and confident in treating patients with SMI, which is also consistent with previous literature (Lam et al., 2015). Further, amount of mental health training did not predict correct identification of behavioral health comorbidities, illustrating the need for mental health training to focus on behavioral in addition to medical components of health. This is also consistent with the literature demonstrating that while PCPs acknowledge that their patients have behavioral health needs, providers do not always feel that they have adequate training, nor do they feel comfortable addressing these behavioral concerns (Robohm, 2017). Taken altogether, the results from this study suggest that training programs may be able to better prepare rural providers to work with patients with SMI by integrating didactic and experiential mental/behavioral health-focused trainings early on to provide them with the necessary knowledge to optimally treat these patients.

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APPENDICES

Appendix A. Demographic Questions

Please check all boxes that apply for the following questions:

1. What is your age?
   - 18-24 years old
   - 25-34 years old
   - 35-44 years old
   - 45-54 years old
   - 55-64 years old
   - 65-74 years old
   - 75 years or older

2. What is your gender?
   - Male
   - Female
   - Other: _____

3. What is your ethnicity?
   - White
   - Hispanic or Latino
   - Black or African American
   - Native American or American Indian
   - Asian / Pacific Islander
   - Mixed Race
   - Other: _____

4. What is your current geographic region?
   - Northeast (CT, MA, ME, NH, NJ, NY, PA, RI, VT).
   - Midwest (IA, IL, IN, KS, MI, MN, MO, NE, ND, OH, SD, WI).
   - South (AL, AR, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV, and District of Columbia).
   - West (AK, AZ, CA, CO, HI, ID, MT, OR, NV, NM, UT, WA, WY).

5. What degrees have you received?
   - Associate degree: _____
   - Bachelor's degree: _____
   - Master's degree: _____
   - Professional degree: _____
   - Doctorate degree: _____
   - Medical degree (e.g., M.D., D.O.): _____

- Other: _____

6. What is your current job title?
   - Medical Resident (Circle one or fill in blank: M.D., D.O.): _____
   - Physician Assistant
   - Nurse (Circle one or fill in blank: RN, LPN): _____
   - Nurse Practitioner (DNP): _____
   - Licensed Physician (Circle one or fill in blank: M.D., D.O.): _____
   - Other: _____

7. Please list the year(s) that you graduated with each medical/professional degree(s):
   _____
   _____
   _____
   _____
   _____

8. How many years of direct patient care experience have you had thus far? _____

9. How many licensed providers provide direct patient care at your clinic? _____

Appendix B. Mental Health Knowledge and Experience

1. Have you ever had any mental health-related training?
   - Yes
   - No

2. Please indicate all types of mental health training have ever received:
   - Mental health-related coursework during training;
     - 1 mental health-related course
     - 2 mental health-related courses
     - 3 mental health-related courses
     - More than 3 mental health-related courses
   - Psychiatric rotation(s);
     - 1 psychiatric rotation
     - 2 psychiatric rotations
     - 3 psychiatric rotations
     - More than 3 psychiatric rotations
   - Continuing Education (CE) trainings related to mental health
   - Additional mental health trainings: _____

For the following questions, Serious Mental Illness (SMI), defined as having a diagnosis of Schizophrenia, Bipolar Spectrum Disorders, or any other Psychosis-related Disorders.

3. Please check all *medical comorbidities* that apply for patients with SMI:
   - Arthritis[1]
   - Asthma[1]
   - Cardiovascular Disease/Hypertension[1]
   - Chronic Pain[1]
   - COPD[1]
   - Diabetes[1]
   - Emphysema[1]
   - Hepatitis C[1]
   - HIV/AIDS[2]
   - Human Papilloma Virus[2]
   - Irritable Bowel Syndrome[2]
   - Leprosy[2]
   - Multiple Sclerosis[2]
   - Obesity[1]
   - Pneumonia[1]
   - Sexually Transmitted Diseases[2]
   - Stroke[1]

     **Medical conditions supported by the literature[1]*

     **Medical conditions not supported by the literature[2]*

4. Please check all *behavioral problems* that apply for patients with SMI:
   - Aggression[2]
   - Alcohol Use[1]

- Deceptiveness[2]
- Gambling[2]
- Illicit Drug Use[1]
- Impulsivity[2]
- Legal Involvement[2]
- Malingering[2]
- Nonadherence to Medications[1]
- Risky Sexual Behaviors[2]
- Sedentary Lifestyle[1]
- Tobacco Use[1]
- Poor Diet[1]

**Behavioral problems supported by the literature[1]*
**Behavioral problems not supported by the literature[2]*

5. Who treats *behavioral health problems* with patients with SMI?
   - Myself
   - Other provider(s) *within* my clinic: _____
   - Other provider(s) *outside* of my clinic (referral): _____
   - I don't know

	Not likely at all	Somewhat likely	Likely	Very likely	I don't know
6. How likely are you to manage the person's mental health concerns yourself?	1	2	3	4	0
7. How likely are you to refer the person out for additional mental health care?	1	2	3	4	0

	Not comfortable at all	Somewhat comfortable	Comfortable	Very comfortable	I don't know
8. How **comfortable** are you when it comes to treating patients with SMI?	1	2	3	4	0

	Not confident at all	Somewhat confident	Confident	Very confident	I don't know
9. How **confident** are you when it comes to treating patients with SMI?	1	2	3	4	0

Appendix C. Day's Mental Illness Stigma Scale (DMISS; Day et al., 2007)

Please indicate the extent to which you agree or disagree with the statements listed below. Please select only one answer for each question.

	Completely Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Completely Agree
1. There are effective medications for SMI that allow people to return to normal and productive lives.[1]	1	2	3	4	5	6	7
2. I don't think that it is possible to have a normal relationship with someone with SMI.[2]	1	2	3	4	5	6	7
3. I would find it difficult to trust someone with SMI. [2]	1	2	3	4	5	6	7
4. People with SMI tend to neglect their appearance.[3]	1	2	3	4	5	6	7
5. It would be difficult to have a close meaningful relationship with someone with SMI. [2]	1	2	3	4	5	6	7
6. I feel anxious and uncomfortable when I'm around someone with SMI.[4]	1	2	3	4	5	6	7
7. It is easy for me to recognize the symptoms of SMI.[5]	1	2	3	4	5	6	7
8. There are no effective treatments for SMI. [1R]	1	2	3	4	5	6	7
9. I probably wouldn't know that someone has SMI unless I was told.[5-R]	1	2	3	4	5	6	7
10. A close relationship with someone with SMI would be like living on an emotional roller coaster. [2]	1	2	3	4	5	6	7

11. There is little that can be done to control the symptoms of SMI. 1-R	1	2	3	4	5	6	7
	Completely Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Completely Agree
12. I think that a personal relationship with someone with SMI would be too demanding. 2	1	2	3	4	5	6	7
13. Once someone develops SMI, he or she will never be able to fully recover from it.6-R	1	2	3	4	5	6	7
14. People with SMI ignore their hygiene, such as bathing and using deodorant.3	1	2	3	4	5	6	7
15. SMI prevents people from having normal relationships with others. 2	1	2	3	4	5	6	7
16. I tend to feel anxious and nervous when I am around someone with SMI.4	1	2	3	4	5	6	7
17. When talking with someone with SMI, I worry that I might say something that will upset him or her. 4	1	2	3	4	5	6	7
18. I can tell that someone has SMI by the way he or she acts.5	1	2	3	4	5	6	7
19. People with SMI do not groom themselves properly.3	1	2	3	4	5	6	7
20. People with SMI will remain ill for the rest of their lives.6-R	1	2	3	4	5	6	7
21. I don’t think that I can really relax and be myself when I’m around someone with SMI.4	1	2	3	4	5	6	7

22. When I am around someone with SMI I worry that he or she might harm me physically.[4]	1	2	3	4	5	6	7

	Completely Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Completely Agree
23. Psychiatrists and psychologists have the knowledge and skills needed to effectively treat SMI.[7]	1	2	3	4	5	6	7
24. I would feel unsure about what to say or do if I were around someone with SMI.[4]	1	2	3	4	5	6	7
25. I feel nervous and uneasy when I'm near someone with SMI. [4]	1	2	3	4	5	6	7
26. I can tell that someone has SMI by the way he or she talks.[5]	1	2	3	4	5	6	7
27. People with SMI need to take better care of their grooming (bathe, clean teeth, use deodorant).[3]	1	2	3	4	5	6	7
28. Mental health professionals, such as psychiatrists and psychologists, can provide effective treatments for SMI.[7]	1	2	3	4	5	6	7

Treatability[1], Relationship Disruption[2], Hygiene[3], Anxiety[4], Visibility[5], Recovery[6], Professional Efficacy[7]

Appendix D. Error Choice Test (ECT; Michaels & Corrigan, 2013)

KNOWLEDGE TEST ABOUT MENTAL ILLNESS

This is a test of your knowledge about mental illness. The questions on the test are taken from findings of scientific research. Read each question carefully and select the response that you consider to be the correct answer. THERE IS NO PENALTY FOR GUESSING.

1. One type of psychotherapy, cognitive-behavioral therapy, has been shown to reduce the psychotic symptoms of schizophrenia.
    a. True
    b. False

2. Considering people with schizophrenia, what is the average number of separate hospitalizations for their mental illness over a one-year period of time?
    a. 4 or more
    b. 2 or less

3. People with severe mental illness cannot maintain private residences.
    a. True
    b. False

4. People with schizophrenia should be allowed to use an online dating service.
    a. True
    b. False

5. People with schizophrenia make up what percent of the homeless population?
    a. 5%
    b. 25%

6. Adolescents with schizophrenia are frequently truant from school.
    a. True
    b. False

7. People with severe mental illness are capable of establishing an intimate long-term relationship of a sexual nature.
    a. True
    b. False

8. People with schizophrenia benefit the least from services like psychotherapy.
    a. True
    b. False

9. People with schizophrenia are likely to steal from their family members.
    a. True
    b. False

10. Based on the capabilities of people with schizophrenia, school counselors should recommend beginning a job-training program rather than continuing in the regular curriculum.
    a. True
    b. False

11. For those with serious mental illness, what percent of treatment should be dedicated to medication compliance?
    a. Greater than 80%
    b. Less than 50%

12. Neglectful parenting is somewhat responsible for the beginning of a serious mental illness.
    a. True
    b. False

13. A person with schizophrenia is capable of being a physician or medical doctor.
    a. True
    b. False

14. The divorce rate among the general population is about 50%. What is the divorce rate among people who experience mental illness?
    a. Greater than 70%
    b. Less than 50%

Appendix E. Introductory Letter

Dear Primary Care Provider:

My name is Dr. Jill Stinson, and I am an Associate Professor in the Department of Psychology at East Tennessee State University. Lydia Eisenbrandt, MA, a doctoral candidate in my research lab, and I are working on a research project to better understand the personal experiences of primary healthcare providers who work with patients who have a serious mental illness (SMI; or diagnoses of schizophrenia, bipolar spectrum disorders, and other psychotic spectrum disorders). We would like for you to complete a brief survey questionnaire that we have mailed to many rural primary care providers across the U.S. It should only take about 15 minutes to complete. You will be asked questions about your training in behavioral health care, experiences with patients with SMI, and understanding of the needs of the SMI population. Responding to these questions about your beliefs and experiences may present an inconvenience, though you may also experience benefit from the opportunity to express yourself and your knowledge of this population of patients. This study will contribute to a greater scientific understanding of the needs of providers who serve patients with SMI in rural communities.

The survey is completely anonymous and confidential. In other words, there will be no way to connect your name, practice, or other identifying information with your responses. If you do not want to fill out the survey, it will not affect you in any way. There are no alternative procedures except to choose not to participate in the study. Participation in this research study is voluntary. You may refuse to participate. You can quit at any time. If you quit or refuse to participate, the benefits or treatment to which you are otherwise entitled will not be affected. The only persons who will have access to your data are research study staff and the ETSU IRB, should they request permission to view study data.

If you have any research-related questions or problems, you may contact me at stinson@etsu.edu or (423) 439-4772. Also, the chairperson of the Institutional Review Board at East Tennessee State University is available at (423) 439-6054 if you have questions about your rights as a research participant. If you have any questions or concerns about the research and want to talk to someone independent of the research team or you can't reach the study staff, you may call an IRB Coordinator at (423) 439-6055 or (423) 439-6002.

Sincerely,

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