Meadows Mental Health Policy Institute

Texas Mental Health Research Framework

March 22, 2018

TEXAS STATE of MIND

THE MEADOWS MENTAL HEALTH POLICY INSTITUTE FOR TEXAS

Contents

Digital Appendices

Resources compiled during the creation of this report are available online at the MMHPI website. These documents are well-suited for digital distribution.

Appendix A: http://texasstateofmind.org/wp-content/uploads/2017/09/Untitled-attachment-00504.pdf

This spreadsheet comprises a representative sample of mental health research projects currently underway at some of the Texas medical schools. These studies are categorized into the five proposed focus areas to demonstrate the relevance of the Framework to future projects at and among these institutions.

Appendix B: **Forthcoming – pending source permissions**

Serving as a source of information on mental health research grants, this collection of PDFs and spreadsheets was used in the Research Funding Analysis. A compilation of historical grant making across the United States (with separate Texas documents) can be referenced for each focus area. Public (governmental) and private funding sources are distinguished from each other, especially in the PDF file organization. MMHPI hopes that making this research available will lead to new grant opportunities, furthering the impact of this Framework.

Executive Summary

The Meadows Mental Health Policy Institute (MMHPI) prepared the Texas Mental Health Research Framework (Framework) upon the request of the chairs of academic departments of psychiatry in the state of Texas and behavioral health leaders in state government in an effort to promote synergistic collaborations in mental health research.

We organized the Framework by marshaling the perspectives of psychiatry leaders across all of Texas's academic medical centers to define five focused areas of mental health research that have the greatest potential for improving the behavioral health of Texans. Three of the five focus areas have been identified as top priorities given the increasing mental health needs of Texans affected by Hurricane Harvey and the significant impact they have on the quality of life for many children, youth, and adults. We established these focus areas through extensive consultation with leading researchers and university stakeholders. The report appendix identifies existing, externally-funded research activities in each focus area that are underway at Texas university psychiatry departments.

The Framework builds upon existing research efforts and funding opportunities, with the goal of using these efforts to develop a shared statewide strategy that increases the volume, scope, and quality of mental health and substance use disorder research in Texas. To provide context for the Framework, we conducted a comparative survey of other research consortiums, which is summarized in this report. The Framework also identifies potential funders for each focus area, including public and private donors.

The Framework's objectives are as follows:

1. **Establish Texas as a national leader in mental health and substance use disorder research.** This can be accomplished by coordinating existing efforts into a statewide strategy that defines focus areas of research that would clearly benefit Texans and through which Texas has the most potential to achieve and sustain a leadership role. The Framework is based on research being conducted in schools of psychiatry; in the future, it will need to be scaled to include other disciplines related to brain health. The Framework outlines a collaborative and integrated approach that university systems can apply to research in the areas of basic science, clinical services, and population health. It will allow Texas to be the first state in the nation to establish a statewide research framework intended to "make a difference" in the areas of mental health and substance use disorders.

2. **Produce results for Texans and their families.** The Framework was designed to produce results in areas that make a difference to Texans and their families. Its focus areas target conditions that afflict millions of Texans, including children and their families, the growing workforce, and veterans, among others. These needs can be met by emphasizing early

detection and intervention, advancing technology and clinical interventions, and implementing population health strategies.

3. **Address the behavioral health workforce crisis.** Texas suffers from an acute shortage of behavioral health professionals, including psychiatrists, psychologists, psychiatric nurses, counselors, therapists, and social workers. There is a particularly pronounced workforce shortage in rural and economically disadvantaged communities. University initiatives that attract top faculty, resources, and students will help Texas academic medical institutions strengthen their capacity for behavioral health research and allow them to train and retain a greater number of skilled professionals to meet the needs of Texans.

4. **Enhance the impact of the Health and Human Services Commission's Texas Statewide Behavioral Health Strategic Plan.** The Texas Statewide Behavioral Health Strategic Plan (Strategic Plan) is a multi-faceted, multi-year effort to improve behavioral health services for all Texans (see https://hhs.texas.gov/sites/default/files/050216-statewide-behavioral-health-strategic-plan.pdf). Effective research is one important component of the Strategic Plan, and this Framework can fulfill this component. The Framework addresses other elements of the Strategic Plan by connecting research to other key priorities, such as early intervention, expansion of treatment access, improved integration of primary and mental health care services, and population health.

5. **Use scarce taxpayer resources as leverage for investment.** By implementing the Framework, Texas will be in a better position to compete for public and private research grants from across the country and the world. Research into brain health, and its connection to mental illness, is at the cusp of major breakthroughs; Texas has the opportunity to lead in developing profitable business models for research in this area. Once this research strategy is viable, and the potential results are made clear, state leaders in economic development can present a plan for attracting capital investments and creating jobs.

Introduction

In spite of recent advancements, Texas behavioral health care systems continue to face challenges in effectively addressing the mental health needs of Texans. The Texas Statewide Behavioral Health Strategic Plan (Strategic Plan) tackles these challenges by outlining gaps in services and defining goals to advance mental health care in the state. This Strategic Plan identifies five goals that mirror the five initiatives Hyde and Vecchio (2015) identified to improve the nation's mental health care system: (1) increasing prevention, treatment, and recovery services for mental health disorders; (2) expanding the mental health care workforce; (3) expanding the collaborative use of health information technology (HIT); (4) promoting awareness of mental illness among the public; and (5) investing in research.[1] In addition, the Strategic Plan also aims to "develop clinical research and innovation in behavioral health by fiscal year 2021."[2] MMHPI developed this Framework, in partnership with medical school faculty and state leadership, as a resource for policymakers as they consider the research component of the Strategic Plan.

During the past three sessions, the Texas legislature has advanced significant improvements in the state mental health care system. In 2013, Texas policymakers proposed the provision of a mental health coordinator appointment through the 2014-15 General Appropriations Act (S.B. 1).[3] In the following legislative session, the 2016-17 General Appropriations Act (H.B. 1) created the Statewide Behavioral Health Coordinating Council, which at the time comprised the 18 state agencies that obtain general revenue behavioral health funds, to establish the Strategic Plan for fiscal years 2017-2021.[4]

The culture of collaboration among policymakers in the area of mental and behavioral health care supported the creation of the Texas Statewide Behavioral Health Strategic Plan. All Texas state agencies delivering mental health and substance use disorder services have made a commitment to work together to coordinate behavioral health services, system infrastructures, and human resources. The intention of this effort is to provide more effective and streamlined mental health care, ultimately leading to expanded access to behavioral health services for both children and adults. Through like-minded action, these agencies will attempt to enhance early detection and prevention of mental illness among Texans.

---

[1] Hyde, P. S., J.D., & Vecchio, P. D. (2015, February 18). *Five point plan to improve the nation's mental health*. Retrieved from https://blog.samhsa.gov/2015/02/18/five-point-plan-to-improve-the-nations-mental-health/

[2] Texas Health and Human Services Commission. (2016). *Texas statewide behavioral health strategic plan* (rep.). Retrieved at: https://hhs.texas.gov/sites/default/files/050216-statewide-behavioral-health-strategic-plan.pdf

[3] 83rd Legislature, Regular Session, 2013, Article II, Health and Human Services Commission, Rider 82.

[4] 84th Legislature, Regular Session, 2015, Article IX, Section 10.04.

Mental health research faces particular challenges of being underfunded and undervalued. In 2017, the National Institute of Mental Health (NIMH) granted approximately $1.5 billion dollars, which is less than 5% of the total budget ($33 billion) for the National Institutes of Health.[5] During that year, Texas grantees received a total of $25 million from NIMH, representing less than 2% of federal mental health research dollars.[6] The same holds true for the National Institute on Drug Abuse (NIDA), which has a $1 billion budget, $25 million of which was awarded to Texas institutions.[7, 8] Although Texas is the nation's second largest state, boasting almost 9% of the United States population (27.5 million), this funding does not reflect a proportionate distribution of resources.[9]

The current climate of psychiatric research conducted at Texas medical schools reflects an operating model that emphasizes individually-proposed, grant-funded academic and clinical studies. Research projects carried out at institutions across the state are executed independently, with limited awareness of the vast number of topics currently under study elsewhere. The impetus for collaboration among medical research centers stems from the need to coordinate the focus of psychiatry research projects while providing a network to facilitate augmented funding. The Framework meets this need by summarizing the top research priorities, assembling a list of the current work in the field, and presenting potential funding sources.

We began planning for the Framework proposal in 2016, first consulting extensively with stakeholders in academic research across the Texas university systems as well as with mental health policymakers. The chairs of psychiatry from the Texas medical schools played a crucial role in the conception of the Framework. After more than a year of meetings with stakeholders and leaders, we determined that there was a need for an inter-institutional research initiative that would foster collaborative studies, expand funding opportunities, and support a research framework that leads to improved mental health for Texans.

---

[5] U.S. Department of Health & Human Services. (2016, February 16). *FY 2017 budget in brief - NIH*. (2016, February 16). Retrieved from https://www.hhs.gov/about/budget/fy2017/budget-in-brief/nih/index.html
U.S. Department of Health & Human Services

[6] National Institutes of Health Research Portfolio Online Reporting Tools (Report). (2017, August 21). *NIH awards by location & organization*. Retrieved from https://report.nih.gov/award/index.cfm

[7] U.S. Department of Health & Human Services. (2016, February 16). *FY 2017 budget in brief - NIH*. (2016, February 16). Retrieved from https://www.hhs.gov/about/budget/fy2017/budget-in-brief/nih/index.html

[8] National Institutes of Health Research Portfolio Online Reporting Tools (RePORT). (2017, August 21). *NIH awards by location & organization*. Retrieved from https://report.nih.gov/award/index.cfm

[9] Sawe, B. E. (2016, November 17). *U.S. states ranked by population*. Retrieved from http://www.worldatlas.com/articles/us-states-by-population.html

Comparative Research Consortium Assessment

During the creation of the Framework, we conducted a comparative analysis of three research consortiums to identify common themes that could inform the proposal. The consortiums we studied included the Cancer Prevention and Research Institute of Texas (CPRIT);[10] the Semiconductor Research Corporation (SRC), including StarNet;[11] and the Lone Star Stroke Consortium (LSS).[12] These three research coalitions exhibit common successes that inspired the design of the Framework, including: (1) multiple institutions collaborating on research goals; (2) clearly defined areas of research; (3) the use of a peer-review process; (4) a combination of private and public funding sources; (5) an established governing body; and (6) an organizational structure that reflects that of the university system(s).

Recommendations

Research Methodologies

Within mental health research, there are three principal classes of study design: (1) basic science, (2) clinical, and (3) translational research. Basic science research increases our understanding of natural phenomena, especially the biological mechanisms of disease pathology and etiology. Clinical research applies scientific knowledge gained from basic research to develop new medicines and therapies for patient care. These two classes of research are vital to advancing mental health care in Texas. However, an interdisciplinary approach to research is essential to improving the broader mental health care system. Translational research incorporates the basic and clinical sciences with the expertise of various fields of study, such as epidemiology, behavioral science, psychology, sociology, political science, public policy, economics, communications, and data informatics. Translational population health research is becoming particularly significant because of its potential for increased cooperation between medicine and public health.

---

[10] CPRIT is a government research program funded by a voter-approved bond package. Its main areas of focus include prevention and early detection, childhood cancers, computational biology, and analytic methods. See: Cancer Prevention Research Institute of Texas. (2017). *About CPRIT*. Retrieved from http://www.cprit.state.tx.us/about-cprit/

[11] SRC prioritizes longer-term projects (10-15 years) in areas such as spintronics, nanomaterials, and beyond-CMOS technologies. With a membership of 46 universities, StarNet allows for inter-institutional cooperation. University faculty administer individual programs and all report to an industry-assigned director who is assisted by the SRC Advisory Board. See: Semiconductor Research Corporation. (2017). *About STARnet*. Retrieved from https://www.src.org/program/starnet/about/

[12] LSS is funded by state appropriations and focuses on research in preventative strategies, acute emergency treatment, rehabilitation, and nurse-driven acute stroke care that incorporates data from rural and underserved Texas communities. See: Lone Star Stroke Consortium. (2017). *About LSS*. Retrieved from http://lonestarstroke.com/about-2/

Focus Areas

The Framework narrows the diverse array of mental health research topics into five specific focus areas. This list of areas is not comprehensive, but it does highlight major psychiatric diseases, including depression, first episode psychosis, substance use disorders, bipolar disorder and schizophrenia, and community systems research.[13] The chairs of the departments of psychiatry across Texas have prioritized the *first three research focus areas*: depression, first episode psychosis, and substance use disorders. Communities affected by Hurricane Harvey as well as many children, youth, and adults would benefit from focused research efforts in these three areas to improve their quality of life. Collaborative research in these areas across academic institutions in Texas would not only have an impact on the state's population, but also lead the nation as a powerful example of synergy.

1. Depression

Major depression is a mood disorder characterized by a variety of physical and psychological signs and symptoms, including a persistently sad, empty, or irritable mood and a loss of interest or pleasure in all or almost all activities. The illness takes its toll by impairing social, occupational, or other important areas of functioning in both children and adults. Major depressive disorder affects approximately 16.7 million adults (6.7%) in the U.S., [14] including an estimated 1.5 million in Texas (7.3%).[15] After adjusting for difference in age and sex, veterans are at a 21% greater risk of death by suicide than the U.S. adult civilian population, with substantially higher rates in the younger years (ages 18–39).[16] And about 272,000 adolescents, or 11.5% of all adolescents ages 12–17 in Texas, have a major depressive episode in a given year.[17] Mood disorders, including both major depression and bipolar disorder, pose a great risk for suicide. However, prompt diagnosis and early intervention can save lives. The recently developed Integrated Behavioral Health (IBH) model attempts to screen for a number of mental health issues, including depression and anxiety, which are often co-occurring, in both pediatric and adult primary health care settings. Further innovations in preventing, identifying, and

---

[13] Nationwide prevalence estimates for mental and behavioral health conditions are calculated by the application of 12-month prevalence findings from the National Comorbidity Survey-Replication and the National Survey of Drug Use and Health to the 2016 population estimate developed by the U.S. Census Bureau. Texas populations are based on 2015 population estimates.

[14] Kessler, R.C., et al. (2005). Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS_R). *Archives of Gen Psychiatry, 62*(6), 617-627.

[15] Holzer, C., Nguyen, H., & Holzer, J. (2015). *Texas county-level estimates of the prevalence of severe mental health need in 2015*. Dallas, TX: Meadows Mental Health Policy Institute.

16 U.S. Department of Veterans Affairs. (2016) *Suicide among veterans and other Americans.* Retrieved from https://www.mentalhealth.va.gov/docs/2016suicidedatareport.pdf.

[17]Substance Abuse and Mental Health Services Administration. (2017). *Behavioral health barometer: Texas, volume 4: Indicators as measured through the 2015 National Survey on Drug Use and Health, the National Survey of Substance Abuse Treatment Services, and the Uniform Reporting System*. HHS Publication No.SMA-17–Baro-16-States-TX. Rockville, MD: Substance Abuse and Mental Health Services Administration. _ _

treating depression are paramount to reducing the burden of this disease and its impact on disability and suicide for the current population and future generations.

Future Directions in Research and Treatment: Although there are already many effective treatments for depression, current research efforts are attempting to discover inventive therapies that could quickly produce positive clinical outcomes. Once considered to be a dangerous recreational drug, ketamine has sparked growing interest because of its ability to reduce depressive and suicidal symptoms in treatment-resistant cases.[18] Genetic studies are probing the hereditary factors associated with depression. The connection between major depression and other physical illnesses, such as diabetes and cardiovascular disease, confirms the need for integrated treatment (IBH) of co-occurring chronic conditions, as well as continued research into the connection between mental and physical health. Researchers are seeking new medications, psychotherapies, and brain stimulation techniques to yield promising advances in the field of psychiatry. Finally, innovations in treatment delivery through telepsychiatry, mobile applications, and online self-directed treatment programs are expanding access to mental health care, especially through early detection of depressive symptoms.[19] Collaborative research projects in depression would have a significant impact on the overall health trajectories of children, youth, and adults across the state.

2. First Episode Psychosis (FEP)

Psychosis is a mental state characterized by impaired thinking and perceptions that make it difficult for a person to distinguish what is real and what is not. Common features of the psychosis include hallucinations and delusions, along with marked behavioral changes. Each year, an estimated 100,000 young people have psychotic symptoms, while as much as 3% of the population will have a psychotic episode in their lifetime.[20] Psychosis can indicate an underlying mental illness, such as schizophrenia, major depression, or bipolar disorder; a substance use disorder; or other neurological disorders. First Episode Psychosis (FEP) refers to the initial onset of psychotic symptoms. Coordinated Specialty Care (CSC) treatment programs, which attempt to intervene during this critical time period, focus on decreasing the severity of the first episode while preventing future recurrence.[21] The expansion of FEP services highlights a shift in the standard of care for psychosis, in which evidence-based practices inform team-based approaches to patient care.

---

[18] Beltran, J. (2017, June 21). *Study answers why ketamine helps depression, offers target for safer therapy*. University of Texas Southwestern Medical Center. Retrieved from http://www.utsouthwestern.edu/newsroom/news-releases/year-2017/june/ketamine-protein-monteggia.html

[19] Substance Abuse and Mental Health Services Administration. (2017, May 12). *Depression*. Retrieved from https://www.samhsa.gov/treatment/mental-disorders/depression#future

[20] National Alliance on Mental Illness. (2017). *Early psychosis and psychosis*. Retrieved from https://www.nami.org/earlypsychosis.

[21] NAMI (2017).

Future Directions in Research and Treatment: The early detection and treatment of psychosis in young people has recently garnered much attention. Emerging evidence demonstrates that prompt and appropriate treatment upon the first manifestation of psychosis can mitigate long-term disability, potentially decreasing the frequency and severity of future episodes. Current research efforts indicate that it is plausible to identify people who are at risk or demonstrating early signs of psychosis. Ideally, early intervention with FEP would prevent the complete onset of schizophrenia or other psychoses.

3. Substance Use Disorders

Substance use disorders (SUDs) are defined as the clinical presentation of maladaptive and damaging consumption of psychoactive substances; addiction and dependence are present in severe cases. Nearly 8 of every 100 Texans has a substance use disorder.[22] This includes 5 in 100 youth (almost 140,000) and 8 in 100 adults (1.65 million). In Texas, 7% of individuals have an alcohol-related SUD, of whom nearly half are considered to have a moderate to severe condition (46%). Additionally, 2% of individuals live with a drug-related SUD, of whom two thirds have a moderate or severe condition. Co-occurring disorders are of particular concern among people involved with the criminal justice system, people who are homeless, and veterans.[23] Substances commonly involved in SUDs in the United States include opioids, stimulants, cannabis (marijuana), tobacco, and hallucinogens. Substance use disorders are becoming more prevalent and have a significant impact on both youth and adults, prompting the need for more research into the clinical management of SUDs and the populations that need services.[24]

Future Directions in Research and Treatment: The National Institute on Drug Abuse has established research priorities at the federal level, which include: (1) intravenous drug use and HIV/AIDS; (2) marijuana; (3) abuse of amphetamine and other stimulants; (4) synthetic or designer drug abuse; (5) inhalant abuse; (6) tobacco use during pregnancy; and (7) drugged driving.[25] New treatment approaches are targeting people with co-occurring mental health and substance use disorders, facilitating improved care for both conditions simultaneously. While the current opioid epidemic and resulting death toll has brought the issue of substance use

---

[22] Substance Abuse and Mental Health Services Administration (SAMHSA) (2015). *Behavioral Health Trends in the United States: Results from the 2014 National Survey on Drug Use and Health* (HHS Publication No. SMA 15-4927, NSDUH Series H-50).

[23] Substance Abuse and Mental Health Services Administration. (2016, March 08). *Co-occurring disorders*. Retrieved from https://www.samhsa.gov/disorders/co-occurring

[24] Substance Abuse and Mental Health Services Administration. (2016, March 08).

[25] National Institute on Drug Abuse. (n.d.). *Research priorities*. Retrieved from https://www.drugabuse.gov/international/research-priorities

disorders to the forefront of public awareness, research in this area has lagged behind the need. For Texas in particular, behavioral health leaders have identified both opioid and stimulant use as major concerns affecting both urban and rural populations.

4. Bipolar Disorder and Schizophrenia

While major depression is a severe mental illness that can be significantly incapacitating for individuals, bipolar disorder (particularly type I) and schizophrenia are more likely to involve disruptive behaviors (mania, psychosis) that can present challenges for public systems, including public safety.

Bipolar disorder (often referred to by the public as "manic-depression") is a mood disorder involving periods of depression and mania (persistently elevated, expansive, or irritable mood and persistently increased activity or energy). There are two forms of the illness: bipolar I includes episodes of depression and mania, while bipolar II, a less severe form of bipolar disorder, includes episodes of depression and hypomania (mild mania); both can involve equally severe depressive symptoms. Bipolar disorder affects approximately 3.5 million adults nationwide, including 280,000 Texans, which represents 1.4% of the adult population.[26]

Schizophrenia is a mental disorder that can cause substantial disability resulting from symptoms of delusions, hallucinations, disorganized speech, disorganized behavior, and negative symptoms (e.g., flat affect, reduced feelings of pleasure, decreased speaking). Approximately 1.2 million American adults (0.5%), including 100,000 Texans, have schizophrenia in a given year.[27]

These two mental disorders present similar challenges for the individual, their family, and society, as well as for the clinicians who treat these illnesses. Psychosis and severe mania require specialized care, often including inpatient treatment. Bipolar disorder and schizophrenia are believed to be related because they share some common genes and environmental triggers (schizoaffective disorder, which exhibits features of both, is one example of this theory). Bipolar disorder and schizophrenia have the potential to be significantly disabling, reinforcing the necessity of research into the genetics, etiology, early detection, early intervention, and treatment of these psychiatric disorders.

---

[26] Merikangas et al. (2007). Lifetime and 12-month prevalence of bipolar spectrum disorder in the National Comorbidity Survey Replication. *Archives of Gen Psychiatry, 64*(5), 543-552.

[27] McGrath, J., Saha, S., Chant, D., & Welham, J. (2008). Schizophrenia: A concise overview of incidence, prevalence, and mortality. *Epidemiologic Reviews*, *30*(1), 67–76.

Future Directions in Research and Treatment (Bipolar Disorder): Research into the origin of bipolar disorder is attempting to reveal the biomarkers and genes associated with its development. This information could be used to develop treatments that specifically target the constellation of symptoms in each patient, along the lines of personalized medicine. Genetic research could improve the detection of familial inheritance patterns, potentially enabling the prediction of disease onset and promotion of early interventions in future generations. Brain function studies could better define risk factors, disease course, and neuropsychiatric treatments. Finally, research into environmental factors that play a crucial role in the development of bipolar disorder could lead to improvements in daily functioning, allowing people to lead active and meaningful lives.[28]

Future Directions in Research and Treatment (Schizophrenia): Present-day research on schizophrenia is investigating the influence of genetics, neurodevelopment, life experience, and environmental factors on the development of this illness. From a population health perspective, studies are analyzing the racial and ethnic disparities in diagnosing schizophrenia and accessing treatment for the illness. In addition, a new era of psychiatric care is emerging, particularly the emphasis on targeting the first episode of psychosis (FEP) in patients with schizophrenia or other major mental health disorders (see below for more details on FEP). Research into treatment modalities is attempting to implement early intervention strategies and evaluate the effectiveness of a combined approach to psychiatric and medical care for this high-risk population.[29]

5. Community Systems Research (Population Health)

There has been a recent emphasis on the health outcomes of groups of people, especially within value-based reimbursement frameworks such as accountable care organizations (ACOs). Research that focuses on the health outcomes of populations and communities seeks to improve the health of the entire population by determining ways to alter the social determinants of health, which comprise demographic factors such as socioeconomic status; educational, economic, and job attainment; access to health care; public safety; living conditions; social mores; and culture.[30] Separate, but complementary to the goals of public

---

[28] Substance Abuse and Mental Health Services Administration. (2017, May 12). *Bipolar disorder*s: *Future directions in research and treatment.* Retrieved from https://www.samhsa.gov/treatment/mental-disorders/bipolar-disorders#future-directions

[29] Substance Abuse and Mental Health Services Administration. (2017, May 15). *Schizophrenia*: *Future directions in research and treatment.* Retrieved from https://www.samhsa.gov/treatment/mental-health-disorders/schizophrenia#future-directions-research-treatment

[30] Office of Disease Prevention and Health Promotion. (2017). *Social determinants of health*. Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health

health, population health research aims to uncover community deficits and needs to better understand the underlying causes of poor health outcomes and to understand more precisely the interventions that can improve those outcomes. Applying these principles to mental health research could particularly enhance efforts in primary prevention of mental illness. Insight into the effects of socioeconomic deprivation, adverse childhood experiences (ACEs), poverty, and discrimination within communities will allow mental health care professionals to more effectively identify children, and youth, and adults who are at risk for mental illness based on their life experience.

Future Directions in Research and Treatment: Public health approaches to mental health care can use population-based interventions to influence changes in health behaviors and to identify and rectify community factors that contribute to mental illness and poor health. In addition, measures for promoting mental health can reduce the stigma of mental illness in society, particularly in the workplace. Population health interventions can also emphasize primary prevention efforts, including local outreach, education, and screening in primary care settings. Mental health policy that prioritizes translational research would promote interventions for improving the social determinants of health and building stronger and healthier communities, which can foster greater resilience within at-risk populations. A particularly important tool in this research is the use of large, integrated data sets that capture prevalence, utilization, access, and cost measures as well as other variables relevant to population health. The use of such data can identify groups of individuals within communities who are most in need of services and whose utilization of services is most costly. This data can also identify the impact of interventions designed to improve access and reduce cost.

Innovation

Innovation in the conception, design, and focus of mental health research studies offers the potential to accelerate advancements in mental health care and inspire the development of novel treatment modalities that could revolutionize behavioral health care services. Research into the Framework's five areas of focus can cultivate a culture of innovation among mental health researchers by incorporating creativity, originality, and productive, goal-oriented inquiry.

An example of innovative research approaches comes from Canada. The Canadian government has highlighted the necessity of funding sustainable, long-term projects around the world. The Grand Challenges Canada (GCC) Global Mental Health program supports "Bold Ideas with Big Impact" in an attempt to improve treatments and expand access to mental health care. Each grant proposal must demonstrate "Integrated Innovation, [which] is the coordinated application of scientific/technological, social and business innovation to develop solutions to complex challenges. This approach does not discount the singular benefits of each of these types of innovation alone, but rather highlights the powerful synergies that can be realized by aligning all three. Integrated Innovation recognizes that scientific/technological innovations

have a greater chance of going to scale to achieve global impact and sustainability if they are developed from the outset in conjunction with appropriate social and business innovations."[31] This model represents the impact that the Framework aspires to achieve, not only by affecting research, but also by producing changes in the interactions between society and mental health care services.

Institutions across the nation have prioritized brain health research initiatives that span many clinical disciplines. Researchers have established a neurobiological basis for mental illness, yet there is still a need for greater understanding of the exact pathological processes that underlie the physical and behavioral manifestations of psychiatric disorders. Collaboration between different schools of thought could yield breakthroughs in neuroscience; psychiatry's central role in mental health research can be complemented and enhanced by research in neuroscience, neurology, neuroradiology, neurosurgery, cognitive science, and physical medicine and rehabilitation, providing greater opportunities to bridge the gap between specialties that, when allowed to collaborate freely, are well-suited to engage in visionary projects with potentially unmatched results. This innovative thinking and like-minded action constitute the foundation of the Research Framework.

As a requirement for accepting grant proposals under the Research Framework, study plans should fulfill one of four innovation criteria: (1) improving primary prevention and early detection of mental illness; (2) developing inventive treatments and therapies, including new psychopharmacological agents; (3) applying biomedical sciences to the research of psychiatric phenomena; or (4) nurturing public-private medical partnerships, especially those focused on population health.

Research Funding Analysis

After an extensive analysis of funding resources, we have identified a group of mental health grant makers, along with a catalog of both public and private grants awarded over the past 15 years in each focus area. Our efforts were supported by the Regional Foundation Library at the University of Texas at Austin, which provided access to the Foundation Center database, a comprehensive directory of funding activities in specific areas of mental health research. This information will be made available to medical schools in order to facilitate augmented funding from these grant makers in Texas. We intend to highlight private donors as a source of grants given the rather volatile state of federal research funding, which comprises a substantial portion of research support.

[31] Singer, P., & Brook, D. (2010, September). *Integrated innovation*. Toronto, ON: Grand Challenges Canada / Grands Défis Canada. Retrieved from http://www.grandchallenges.ca/funding-opportunities/integrated-innovation/

We have identified 100 private grant makers that have historically awarded mental health research funding in Texas. Many of these foundations are based in Texas, while others are located in other states. Altogether, these organizations (with $21 billion dollars in total assets) have awarded over $1 billion dollars to grantees (not solely to mental health researchers). The Framework aims to amplify state funding of mental health research, with the understanding that it can be matched with independent awards.

As an emerging field of study, First Episode Psychosis (FEP) is the focus of only a few research grants across the nation. Only six awards totaling $4.5 million were documented as specifically funding FEP treatment evaluation, with only one based in Texas; five of these were federal grants. Although this is a disappointing finding, one reason for the limited number of grants is that these specifically targeted research into FEP, while most grants were focused on expanding treatment services alone. The Framework intends to make FEP a centerpiece of Texas mental health research successes, stressing the importance of this field and the need for future study.

Including federal funding, there were 291 grants for bipolar disorder research, totaling almost $80 million; 10 of these grants ($4.5 million) were for Texas-based research. A subset of 117 private awards amounted to $10 million, with only $600,000 (two grants) funding Texas institutions. Schizophrenia research fared better, with 439 public and private grants totaling $158 million, with 16 Texas grants amounting to $4 million. There were 47 private grants ($6 million) nationally, one of which was a $350,000 award to a Texas medical school. Over the past 15 years, $238 million have been designated for projects targeting bipolar disorder and schizophrenia. Only $16 million came from private sources, mainly because the awards were smaller in comparison to federal grants.

Substance use disorder funding is more complicated because of the wide variety of areas being studied within this field. Including both private and public sources, 4,014 grants were documented nationwide, 135 of which were for Texas institutions; about half of these grants were from private grant makers, which is promising. The Texas grants totaled $26.5 million, with $5 million in private donations. We closely examined opioid abuse research funding in particular, finding that, in Texas, only six grants have been awarded for opioid abuse research, all of which were from the federal government. Current research in this area is predominantly supported by the National Institutes of Health.

Excluding substance use disorders as a group, depression is by far the most heavily researched psychiatric disorder. There were 781 private and public grants for depression research nationwide, representing $178 million in aggregate, 29 ($6 million) of which were for Texas recipients. Private funders awarded 367 grants totaling $51 million; of these awards, eight were given to Texas researchers, which equates to $700,000 in funds. In general, a larger proportion

of private grants is available for research on depression than for research on bipolar disorder and schizophrenia.

Population mental health research is garnering increased attention from researchers and funders alike. We identified nine grant makers on the national level that have historically focused on the areas of community, translational, or public health research. There were 117 grants, including government endowments, for population health research, totaling $21 million. Thirteen of these grants funded Texas studies with a total of $2 million.

Conclusion

The Texas Mental Health Research Framework serves as a proposal for advancing the strategy and funding of psychiatric research at Texas medical schools. This plan calls for establishing an inter-institutional coalition and emphasizes the need for a collaborative effort targeting five critical areas in the current behavioral health landscape. This team-directed endeavor requires participation from all key players in the field, sharing a common, transformative vision of Texas as a national leader in mental health research. The Framework does not explicitly define the exact nature of this collaborative effort; the medical schools must provide this self-directed leadership.

MMHPI developed the Research Framework with guidance from psychiatrists and university leaders across the state, with the goal of devising a strategy to meet the current and future mental health care needs of Texans. The inevitable benefits to basic science, clinical practice, and public health validate the need for a coordinated and collective research effort. Moreover, the groundwork laid by the Framework provides a blueprint for expanding research into other brain health disciplines such as neuroscience, neurology, neuroradiology, and neurosurgery, among others.

A hallmark of this proposal is the inclusion of population health research as a key component of improving the mental health of Texans. Behavioral health care resources in their current state have been unable to fully address the needs of Texans living with mental illness. Research into new treatments and therapies is of limited benefit if those services cannot be delivered. Translational research that examines the health of populations can enhance the understanding of the social and environmental underpinnings of mental disorders and help grassroots initiatives implement these findings to benefit local communities. The social determinants of health can be improved, which would then support the treatment of populations as a whole, while enhancing efforts in the primary prevention of mental illness.

By broadening mental health research in Texas, the Framework will foster an environment conducive to expanding the mental health care workforce. The success of workforce improvements related to the Framework depend on Texas medical schools attracting quality

researchers and clinicians who are willing to explore the fringes of current knowledge. Stimulating research activity in Texas medical schools and universities, and training more mental health professionals at these institutions as a result, could bolster the behavioral health care workforce.

The next steps for implementing this policy will include an endorsement of the concept from the chairs of psychiatry and their respective medical schools, as well as ongoing discussions with university system leaders. The Health and Human Services Commission may consider the Framework as it develops the research component in Section 2.2 of the Strategic Plan. In the long term, this proposal may be presented to the legislature for consideration and potential appropriation of funds.

As a private, non-profit, non-partisan mental health policy organization, MMHPI strives to produce lasting change so children, youth, and adults in Texas can obtain effective, efficient behavioral health care, when and where they need it. We recognize the vital role of research in improving mental health care services. Our state faces many challenges in delivering accessible, affordable, and effective treatment. While research is only one part of the solution, investment in academic research can facilitate the discovery of innovative solutions to the behavioral health needs of Texans. Through development and implementation of the Texas Mental Health Research Framework, MMHPI aspires to help position Texas as a national leader in collaborative mental health research.