DEPARTMENT OF VETERANS AFFAIRS
Clay Hunt Suicide Prevention for American Veterans (SAV) Act

2019 Annual Report: VA Mental Health Program and Suicide Prevention Services Independent Evaluation

Prepared for:
U.S. Congress
Washington, D.C. 20515

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Prepared by:
Booz | Allen | Hamilton
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Executive Summary

The mental health and well-being of our nation’s Veterans continues to be a top priority for the U.S. Department of Veterans Affairs (VA). Recent results regarding VA services utilization and diagnoses among Veterans show that, in FY2018, approximately 35 percent of Veterans using VHA had a possible mental health diagnosis. Seventy-three percent of those Veterans used outpatient mental health services, and a smaller number used inpatient services (2.72 percent) or residential mental health services provided by VA (1.63 percent; Greenberg et al., 2019) (displayed in Figures 1 and 2 below).

**Figure 1. Prevalence of Mental Illness Among Veterans Using VA Services**

*Note: Greenberg & Hoff, 2019.*
To further support Veterans’ mental health and well-being, in 2015 the Clay Hunt Suicide Prevention for American Veterans Act (or the Clay Hunt SAV Act, Public Law 114-2) (2015a) was enacted to support the provision of effective mental health and suicide prevention services by the Veterans Health Administration (VHA). A cornerstone of the Act is a requirement for an annual independent, third-party evaluation of VA mental health care programs and suicide prevention services to assess the effectiveness and cost-effectiveness of these programs, and to document Veterans’ level of satisfaction with the mental health care they receive from VHA. Further Congressional guidance required the evaluation report to also document the extent to which VA services achieve positive mental health outcomes specifically for female Veterans, as well as for male Veterans, and to evaluate the extent to which VA prescribers adhere to the VA/DoD Clinical Practice Guideline for Management of Opioid Therapy for Chronic Pain.

In 2015, VA entered into an agreement with Enterprise Resource Performance, Inc. (ERPi)—a Service-Disabled Veteran-Owned Small Business—and its research partners, including Booz Allen Hamilton, collectively known as the Clay Hunt Evaluation Team, for this independent evaluation to assess the program effectiveness of, cost-effectiveness of, and Veteran satisfaction with mental health programs and suicide prevention services provided by VA. The Clay Hunt Evaluation Team (Evaluation Team) submitted the First Annual Report of the Clay Hunt Act Evaluation Initiative to the Secretary of Veterans Affairs in October of 2018. In both the First Annual Report (2018) and this Second Annual Report (2019), findings of our evaluation of the following VA mental health programs were included:

- General Mental Health Services (GMHS)
- Primary Care-Mental Health Integration (PC-MHI)
- Specialized Substance Use Disorder Services (SUD)
- Specialized Services for Posttraumatic Stress Disorder (Specialized PTSD)
- Therapeutic and Supported Employment Services (TSES)
- Psychosocial Rehabilitation and Recovery Centers (PRRC)
- Intensive Community Mental Health and Recovery (ICMHR) Services

**Figure 2. Mental Health Service Utilization by Veterans With a Possible Mental Illness.**

*Note: Greenberg & Hoff, 2019.*
• Posttraumatic Stress Disorder-Residential Rehabilitation Treatment Programs (PTSD-RRTP)
• Acute Inpatient Mental Health Services (AIMHS)

For each program, valid, reliable, and widely accepted measures of mental health status and symptoms—including those related to PTSD, substance use, mental and physical functioning, and community integration—or of program-specific outcomes were analyzed.

The results of the evaluation found that most of the mental health programs that could be evaluated for the Clay Hunt SAV Act Independent Evaluation demonstrated an improvement in mental health symptoms or functioning for the Veterans who use them. In addition, programs were found to be equally effective for female and male Veterans.

One of the key findings in the First Annual Report (2018) was that 72.4 percent of Veterans participated in two or more mental health programs within the same year. Veterans also entered programs through a variety of pathways. For example, some Veterans were admitted to acute inpatient mental health services after having participated in outpatient services, while others may have entered VA services for the first time beginning with AIMHS after an acute episode that was then followed by entry into other VA mental health services. For the Second Annual Report, the Evaluation Team expanded the methodological and statistical approaches used in the previous evaluation to further explain and uncover characteristics of the type and pattern of mental health care that Veterans receive within VA and, where feasible, to identify how differences in intensity and pattern of mental health care are associated with differences in the clinical and cost-effectiveness of programs. In addition, in accordance with the Clay Hunt SAV Act, additional analyses were conducted to identify whether programs were effective in reducing suicidal ideation (SI) and suicidal behavior (SB).

For the First Annual Report, the Clay Hunt Evaluation Team also reviewed “best practices” in the field of mental health and provided the Secretary with recommendations for their integration into VA services. For the Second Annual Report, we report the extent to which the VA has implemented the best practices recommended in 2018. The Evaluation Team also, once again, completed interviews with experts within VA, other government agencies, and non-governmental institutions to develop recommendations for the improvement of mental health and suicide prevention programs for Veterans. Given the challenging work required of VA mental health clinicians, the Second Annual Report includes recommendations related to best practices not only for meeting the needs of Veterans, but also for meeting the needs of the VA personnel that care for them, so that they can continue to provide the most effective services available for Veterans. This year, five best practices have been recommended, as summarized in Table 65 and detailed in Chapter 6.

The Clay Hunt Evaluation Team’s Approach

The Clay Hunt Evaluation Team relied on data from (1) VA service utilization for mental health and non-mental health services from Veterans Information Systems and Technology Architecture (VISTA); (2) outcome and performance data collected by NEPEC; (3) clinical costs data from VA Managerial Cost Accounting System (MCA); (4) data related to prescriptions of opioids and other pain medications from VA Pharmacy Benefits Management Services; and (5) data collected annually through the Veterans’ Outcomes Assessment (VOA) Program managed by NEPEC.

Key Findings

The findings from the Second Annual 2019 Clay Hunt (SAV) Act Independent Evaluation are summarized below for each program.
General Mental Health Services (GMHS)

GMHS represents the largest group of MH services within VHA, providing a full range of outpatient MH care. Core services provided include intake assessment, evidence-based therapy (psychotherapy and pharmacotherapy), and care coordination.

- Overall, Veterans who participated in GMHS experienced statistically significant improvement from intake to follow-up in symptoms related to mental distress, mental functioning, and daily functioning. They also self-reported that they had experienced improvement (perceived improvement) during the last three months.
- At intake, on average, Veterans had mental distress scores that were below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. However, the magnitude of improvements in mental distress varied by diagnosis and age. GMHS participants with PTSD and depression had greater improvements in mental distress. Younger Veterans (35 years and younger) had greater improvements in mental distress than older Veterans (36 years and older).
- The magnitude of improvements in mental functioning also varied by diagnosis. GMHS participants with PTSD, depression, or anxiety diagnoses (either alone or comorbid) showed greater improvement in mental functioning than Veterans without those diagnoses. However, despite these improvements, mental functioning for these Veterans remained below the norm for the U.S. population.
- Veterans in GMHS showed improvement in daily functioning, and Veterans with PTSD or depression diagnoses showed even greater improvements in daily functioning compared to those with other diagnoses. Younger to middle-aged Veterans (65 years and younger) had greater improvements in daily functioning than older Veterans. Although all Veterans showed improvement, their scores remained above the population norm at discharge compared to the U.S. population (i.e., the degree of disability was above the norm).
- GMHS is successful in reducing the severity of suicidal ideation and behavior among Veterans. Overall, Veterans in GMHS reported less severe levels of suicidal ideation and behavior from baseline to follow-up. Furthermore, the more severe the SI, the greater the movement to less severe levels of SI.
- There were no significant gender differences in levels of improvement on measures of mental health, suicidal ideation and behavior, and physical functioning; male and female Veterans achieved similar levels of improvement.
- Overall, Veterans report high satisfaction with services they received in GMHS, with 56 percent of male Veterans and 60 percent of female Veterans reporting that they received “high quality” care.

Primary Care–Mental Health Integration (PC-MHI)

Primary Care–Mental Health Integration (PC-MHI) services have been implemented by VA to increase the availability of mental health services for issues such as depression, anxiety, alcohol misuse (e.g., abuse, heavy drinking, and/or problem drinking), and PTSD within the primary care setting to increase access to care and overcome the stigma of receiving care in a mental health clinic.

- Veterans who received services in PC-MHI experienced statistically significant improvement from intake to follow-up in mental distress, mental functioning, and daily functioning.
• At intake, on average, Veterans had scores on measures of mental distress that were slightly below the threshold for serious mental illness, and improvements were detected over time. PC-MHI participants with PTSD and depression diagnoses had greater improvements in mental distress. Younger Veterans (35 years and younger) had greater improvements in mental distress than older Veterans (36 years and older).
• Although all Veterans showed improvement in mental functioning, younger Veterans (35 years and younger) had greater improvements than older Veterans (36 years and older). Despite these improvements, functioning scores remained below the population norm at discharge. Thus, more remains to be done to improve the extent to which PC-MHI services improve Veterans’ mental functioning.
• PC-MHI services are designed to support both the primary care and mental health needs of Veterans. However, among Veterans participating in PC-MHI, there were no significant improvements in physical functioning from intake to follow-up.
• PC-MHI is effective at reducing suicidal ideation and behavior among participating Veterans. Veterans who entered services with low levels of suicidal ideation remained at low levels, and Veterans who entered PC-MHI with higher severity levels of suicidal ideation had significantly lower levels at follow-up.
• Overall, Veterans who used PC-MHI reported that they had improved and were satisfied with the quality of the services they received, with 61 percent of male Veterans and 60 percent of female Veterans reporting “high quality” care.

Specialized Substance Use Disorder Program (SUD)

The Specialized SUD outpatient program is designed to meet the needs of Veterans with SUD, particularly those Veterans with new onset, severe, or complex conditions (e.g., mental health and general medical comorbidities). The SUD outpatient program provides two types of outpatient care: standard care, in which Veterans receive a lower number of encounters (individual and/or group therapy) per week; and intensive outpatient program (IOP) care, in which Veterans receive four or more SUD treatment encounters within one week.
• There were significant reductions in substance use and in risk factors related to substance use among Veterans who participated in SUD services. Male Veterans had a greater decrease in risk factors compared to female Veterans.
• Veterans in Specialized SUD Services also experienced significant improvements in mental distress and mental functioning.
• IOP services resulted in a greater decrease in substance use, greater decrease in risk factors for substance use, and greater improvements in mental distress compared to non-intensive services.
• Veterans in the SUD Program also experienced declines in suicidal ideation and suicidal behavior. The program appears to be most beneficial for those with the most severe suicidal ideation. Those who reported active suicidal ideation with intent, method, or plan at intake were more likely to report no ideation at baseline than to remain the same.
• Veterans reported that they had improved as a result of participation in the SUD Program and were satisfied with the services they received, with about 52 percent of male Veterans and 62 percent of female Veterans reporting “high quality” care.

Specialized Posttraumatic Stress Disorder (PTSD) Program

Specialized Posttraumatic Stress Disorder Services provide a continuum of care from outpatient PTSD specialists and PTSD Clinical Teams (PCTs) through specialized inpatient units, brief-
treatment units, and residential rehabilitation programs. This evaluation focused on the outpatient Specialized PTSD program. The primary goal is to help Veterans reduce symptoms of PTSD as well as any other comorbid disorders and to improve overall functioning and quality of life.

- Veterans receiving specialized PTSD services experienced clinically significant improvement in PTSD symptoms from intake to 3-month follow-up. There were no differences in the magnitude of improvements based on gender, race, age, or mental health diagnosis, indicating that services were equally effective in reducing PTSD symptoms for all groups of Veterans.
- Veterans also experienced improvements from intake to 3-month follow-up in mental distress and functioning, regardless of their gender.
- Veterans in the Specialized PTSD program experienced a significant increase in substance use between intake and 3-month follow-up, however the increase was small and likely not clinically significant. This finding is consistent with other research with Veterans, which describes that there is a high level of relapse in substance use after PTSD treatment. Nonetheless, this indicates that more could be done to provide integrated treatment for comorbid PTSD and SUD disorders among Veterans.
- Specialized PTSD services were also effective at decreasing suicidal ideation and suicidal behavior.
- Veterans of both genders reported high satisfaction with the quality of care received in the Specialized PTSD Program.

**Therapeutic and Supported Employment Services (TSES)**

Therapeutic and Supported Employment Services (TSES) are based on a recovery-oriented model and offer a variety of employment skills and restoration services. TSES are offered to Veterans with psychiatric diagnoses who express a desire to obtain employment and work skills. Three separate types of TSES programs were evaluated: Transitional Work (TW), Supported Employment (SE), and Community-Based Employment Services (CBES).

- At discharge from TW, 36 percent of Veterans had competitive employment (CE), and 92 percent had obtained at least one job placement during their program participation.
- At discharge from SE, 35 percent of Veterans had competitive employment, and 44 percent had obtained at least one job during their program participation.
- At discharge from CBES, nearly 37 percent of Veterans had obtained competitive employment, and nearly half of Veterans in CBES (49 percent) had obtained at least one job during their program participation.
- Overall, across all three TSES programs, Veterans who were most likely to obtain CE did not have a SUD diagnosis, had fewer than five comorbidities, were not receiving SSI/SSDI or NSCP, and stayed in the TSES programs longer.
- Across all three programs, gender was not a significant predictor of whether competitive employment was obtained.

**Psychosocial Rehabilitation and Recovery Centers (PRRC)**

The PRRC program is an outpatient multidisciplinary treatment program that provides services to Veterans living with severe and persistent mental illness (e.g., schizophrenia, bipolar disorder, PTSD) with significant functional impairment. PRRC provides services, in addition to clinical services, to enable these Veterans to become integrated into their communities and to cope with mental health stigma or other difficulties they may experience within their communities.
PRRC was effective at reducing internalized stigma and increasing community engagement for Veterans who participated in the program, but these impacts are small and may not have clinical significance.

Veterans participating in PRRC also experienced improvements from intake to 180-day follow-up in depression, suicidal ideation, mental well-being, and daily functioning.

Participation in PRRC was associated with decreases in suicidal ideation for many Veterans. At intake, 40.8 percent of PRRC participants expressed SI. At follow-up, 14.8 percent had remitted SI (defined as the presence of SI at intake but not at follow-up), 25.9 percent experienced persistent SI (defined by the presence of SI at both intake and follow-up). A small proportion of PRRC participants (7.3 percent) experienced onset SI (defined as the absence of SI at intake but the presence of SI at follow-up).

The majority of Veterans (96 percent) in PRRC expressed high satisfaction with the services provided, with female Veterans reporting higher levels of satisfaction than male Veterans.

### Intensive Community Mental Health Recovery (ICMHR) Services

Intensive Community Mental Health Recovery (ICMHR) Services were initially designed for Veterans with high use (30 days cumulative) of inpatient care during the year prior to entry into the program. The goal was to provide Veterans discharged from acute inpatient mental health services (AIMHS), and particularly those with serious mental illness (SMI), such as schizophrenia or bipolar disorder, with support and intensive outpatient mental health services in order to reduce subsequent admission. However, because VA has expanded access to these services, it is also possible for Veterans who do not have a DSM diagnosis of SMI or who have had few or no prior admissions to acute inpatient mental health services to participate in the ICMHR program. Participation in ICMHR is expected to reduce use of AIMHS and emergency room services.

- Comparisons of AIMHS stays between ICMHR participants and a comparable group of Veterans showed that Veterans who participated in ICMHR services had significantly greater AIMHS utilization than control group Veterans at six months, one year, and two years from the start of ICMHR services.
- Veterans in the ICMHR treatment group had significantly fewer ER visits than Veterans in the comparison group six months, one year, and two years post-ICMHR start date.
- Participation in ICMHR is associated with decreases in ER visits overall but remains associated with high costs for ER utilization.
- Analyses of data related to ICMHR participants from FY2012 to FY2017 suggest that prior admission to AIMHS, diagnosis of bipolar disorder, homelessness or receiving homeless services, and marital status are the variables that best characterized Veterans who enter the ICMHR program. However, unlike in the early implementation of ICMHR, when 87 percent of ICMHR participants had a diagnosis of psychosis and 76 percent were hospitalized for more than six months prior to their admission to ICMHR, Veterans currently participating in ICMHR are less likely to have prior use of AIMHS or a diagnosis of psychosis. Thus, ICMHR may wish to consider what outcomes are now the most appropriate for the program and put systems in place to monitor those outcomes instead.
- Female Veterans reported higher satisfaction with the overall quality of services received from the ICMHR program.
• Program satisfaction is high among ICMHR patients. However, in terms of the major objectives of reducing hospital admissions, lengths of stay, or ER visits, the program does not appear to be cost-effective.

• There are several caveats that must be considered in interpreting our evaluation findings for ICMHR:
  o The program outcomes we report may be impacted by unobservable differences between the ICMHR participants and the non-treatment comparison group related to severity of mental illness.
  o For the analyses presented in this report, due to the large variability in the number of encounters with ICMHR services among program participants, Veterans with four or more ICMHR encounters were identified as members of the ICMHR treatment group and those with less than four visits were assigned to the control group. It may not be appropriate to use hospitalization as the primary outcome measure with relatively low utilizers. In addition, it may be necessary to reconsider whether using four encounters as the marker of “ICMHR treatment” is the most appropriate metric.
  o ICMHR is comprised of three different program models. It is possible that some program models are more effective than others or that, in general, cost-effectiveness may be impacted by variations in the services available within each model. For the analyses presented in this report, the data did not include information that would have allowed for disaggregation of results by program model.

Future analyses should address all the issues raised above, and program decision-makers should weigh the current study limitations when considering any changes in policy or program management.

Post-Traumatic Stress Disorder-Residential Rehabilitation Treatment Program (PTSD-RRTP)

VA operates approximately 8,000 mental health residential beds nationwide for Veterans with a wide range of presenting problems, illnesses, and rehabilitation care needs, including serious mental disorders such as schizophrenia and major depression, substance use disorders, comorbid conditions, homelessness, and vocational/employment/social needs. For this evaluation, only the PTSD-RRTP program was included.

• From admission to discharge, Veterans experienced a clinically significant reduction in PTSD symptoms. However, from discharge to four-month follow-up after discharge, Veterans’ PTSD symptoms increased, but not by a clinically significant degree. This suggest that gains while participating in PTSD-RRTP were somewhat moderated after discharge.

• The findings show a statistically significant, but small, reduction in substance use from admission to four-month follow-up among Veterans who participated in PTSD-RRTP.

• For Veterans who received Cognitive Processing Therapy-Individual and Prolonged Exposure, longer program stay was associated with less improvement. Therefore, longer program stay may not be as beneficial for these Veterans.

• Veterans receiving other types of Evidence-Based Treatment (EBT) care (CPT Group, Partial EBT, EBT prior to the RRTP program) or no EBT at all, showed a greater decrease in PTSD symptoms with longer LOS. This indicates that longer program stay was beneficial for these Veterans.
• Completing the full course of an Evidence-Based Treatment was associated with making positive change very quickly. Once that is complete, the Veteran may not benefit from longer stay in PTSD-RRTP.
• The majority of PTSD-RRTP participants had been in a residential treatment program in the year prior to admission to PTSD-RRTP (nearly 58 percent). An additional 14 percent had been in AIMHS prior to the residential admission. After PTSD-RRTP, most Veterans (nearly 35 percent) went to another RRTP program.
• After PTSD-RRTP discharge, Veterans who received care from GMHS, outpatient Specialized PTSD, and other VA inpatient services experienced the greatest decrease in substance use from admission to four-month follow-up. However, Veterans who received care from non-VA facilities experienced increase in substance use from admission to four-month follow-up. This suggests that care from certain VA MH programs post-discharge may help to decrease or prevent relapse in substance use.
• There were no significant differences in findings based on gender.
• Overall, around 60 percent of Veterans (both male and female) were “completely satisfied” or “pretty much satisfied” with their experience in PTSD-RRTP.
• It is expected that a stay in PTSD-RRTP will reduce the likelihood of admission to acute inpatient mental health services and reduce use and cost of other outpatient mental health services. The analyses showed that, for Veterans who participated in PTSD-RRTP, use of both inpatient and outpatient mental health services, of outpatient primary care services, and of other RRTP programs decreased significantly in the year following discharge from the program, as compared to utilization in the year prior to the index PTSD-RRTP admission.

Acute Inpatient Mental Health Services (AIMHS)

Acute Inpatient Mental Health Services (AIMHS) refers to inpatient care that is provided to Veterans who require hospitalization due to severe and/or acute mental health symptoms, including suicidality. Inpatient units provide evidence-based treatments in the context of recovery-oriented principles in a safe, controlled environment. The main goal of this level of care is to stabilize the Veteran as safely and efficiently as possible and to continue treatment at the least restrictive and most appropriate level of mental health care.

• The majority (99 percent) of Veterans admitted to AIMHS had at least one outpatient mental health encounter in the year prior to their admission to AIMHS.
• For this Second Annual report, the Evaluation Team performed sequence analysis to discover the various sequences or pathways of mental health services that Veterans followed before admission to AIMHS and one year after discharge. In the year prior to AIMHS admission, the majority (32 percent) of Veterans received services only from GMHS, while 25 percent received services through mental health services other than those currently being evaluated. After discharge from AIMHS, 43 percent of Veterans continued to receive the same pattern of mental health services that they received prior to admission to AIMHS. Most Veterans (59 percent) either returned to or entered GMHS immediately after discharge from AIMHS. Forty-one percent of hospitalized Veterans either concurrently or subsequently enrolled in specialized mental health programs such as SUD or Specialized PTSD services. Future evaluations will explore how the sequence and timing of services Veterans receive from VA may impact their long-term mental health outcomes.
• Analyses of mental health and primary care cost for Veterans admitted to AIMHS confirmed findings previously reported in the First Annual Report. Utilization and costs
for all mental health and primary care services increased significantly from pre-admission to one year post-discharge for Veterans admitted to AIMHS. However, the analyses also show that, by two years post-discharge from AIMHS, both utilization and costs are significantly lower than pre-admission levels. Decline in service utilization and cost two years post-discharge among Veterans admitted to AIMHS occurred for both male and female Veterans.

**Evaluation of VA Clinical Practice Guidelines for Opioid Therapy for Chronic Pain**

- VA appears to adhere closely to the VA/DoD Clinical Practice Guideline (CPG) for Opioid Therapy for Chronic Pain, with some room for improvement.
- Overall, trends indicate a shift toward safer prescribing practices, greater monitoring of Veterans on long-term therapy who are at highest risk for substance use disorder and/or suicide, and increased assessment of Veterans’ mental health diagnoses, of Veterans’ prior history of suicide attempts, and of state prescription drug monitoring programs prior to initiation of opioid therapy.
- VA prescribers appear to carefully monitor Veterans placed on long-term opioid therapy.
  - Follow-up appointments at 30 days, 60 days, and 90 days or each month after an opioid is prescribed occurred for 94 to 97 percent of Veterans.
  - Monthly follow-up visits also occurred for 73 percent of Veterans with a SUD that were not participating in SUD treatment.
  - Evidence of checking the state prescription drug monitoring program was available for 71 percent of Veterans on long-term opioid treatment.
- Despite the high level of compliance with the VA OTG, there are recommended areas of improvement.
- In FY2018, only 34 percent of Veterans on long-term opioid therapy had a Signed Informed Consent Form, representing a decline from FY2017 figures. This indicates a potential need to improve patient-provider communication regarding the risks and benefits of opioid use.
- About 45 to 56 percent of opioid prescriptions provided in FY2018 were for dosages greater than 50 MME. Greater effort is needed to ensure that Veterans receive the lowest dosages of opioids appropriate for their individual conditions.

**Impact of VA Mental Health Services on Suicidal Ideation and Behavior**

- In addition to the program-specific findings related to suicidal ideation and suicidal behavior summarized above, overall, across GMHS, PC-MHI, SUD, and Specialized PTSD programs, Veterans experienced improvement (movement to lower severity levels) in both SI and SB. Overall, Veterans were 1.85 times more likely to report less severe SI at follow-up than to remain at the same level of SI as they reported at baseline. Veterans were also 4.88 times more likely to report a lower severity of SB at follow-up. These are very promising findings, given the relationship among suicidal ideation, suicidal behavior, and death by suicide.
- Veterans in AIMHS were the most likely to report less severe SI and SB at follow-up.

**Conclusions**

As suicide rates remain high, particularly for at-risk Veterans, VA must continue to innovate and strategize ways to cost-effectively improve mental health services, outreach, and prevention. VA should continue to be guided by evidence-based best practices, including those originating...
outside VA. Tackling this issue will require strengthened public-private partnerships, improved clinical training, and a continuous, non-blaming quality improvement approach. Chapter 6 of this report includes recommended best practices in mental health and suicide prevention. The best practice recommendations presented in this report are intended to inform VA’s efforts to address Veteran suicide and improve VA mental health programs and services in the coming year.
Chapter 1: Introduction

The mental health and well-being of our nation’s Veterans continues to be a top priority for the U.S. Department of Veterans Affairs (VA). As part of this mission, VA utilizes data-driven strategies and invests in improving access to services and the quality of care Veterans receive, particularly regarding suicide prevention. In recent years, VA has expanded existing services and launched new ones, including the Veterans Crisis Line (VCL), Operation S.A.V.E. (Signs, Ask, Validate, Encourage, and Expedite), and the Mayor’s and Governor’s Challenge, and has partnered with the departments of Defense and Homeland Security to support Veterans during their transition from military to civilian life (U.S. Department of Veterans Affairs [VA], 2019b). The Maintaining Internal Systems and Strengthening Integrated Outside Networks (MISSION) Act, signed into law on June 6, 2019, will further expand this goal by strengthening the VA health care system and offering more health care options, including greater access to community-based resources (VA, 2019c). VA’s mental health programs, from general mental health clinics to specialized services, play a pivotal role in preventing death by suicide and are the focus of this independent evaluation.

The Clay Hunt Suicide Prevention for American Veterans Act (or the Clay Hunt SAV Act, Public Law 114-2) (2015a) was enacted to ensure that Veterans who have mental health needs or are at risk for suicide and who seek treatment through the Veterans Health Administration (VHA) health care system have access to effective mental health care programs and suicide prevention services. The Act was named in honor of Clay Hunt, a Marine Corps Veteran who served with distinction in Iraq and Afghanistan and then struggled with depression and posttraumatic stress disorder after returning home. Tragically, he died by suicide in 2011 at the age of 28. The Act directed the Secretary of Veterans Affairs to arrange for an independent third-party evaluation of the mental health care programs and suicide prevention practices at the Department of Veterans Affairs. The following is stated in the law:

In addition to the requirements specified in the initial Clay Hunt SAV Act, the Female Veteran Suicide Prevention Act (H.R. 2915) (2015–2016) specifically included women as a population of interest and the Clay Hunt Suicide Prevention for American Veterans Act Senate Report 114-34 (2015b) added the requirement that an evaluation of opioid prescribing and safety be performed. The Clay Hunt SAV Act required the Secretary to submit interim reports to Congress by

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1 This is only a selection of efforts and not intended to be an exhaustive list of new and expanded VA mental health efforts.
September 30, 2016 and 2017, and annual reports beginning in December 2018 on VA’s mental health care programs and suicide prevention services. This is the second annual report.

In accordance with the Clay Hunt SAV Act (Clay Hunt, 2015a), in 2016, in collaboration with the Office of Mental Health and Suicide Prevention (OMHSP), the Clay Hunt Evaluation Team compiled a list of mental health programs to consider for evaluation based on available data. In 2018, Enterprise Resource Performance, Inc. (ERPi), Booz Allen Hamilton, and their research partners—collectively known as the Clay Hunt Evaluation Team—delivered to the VA the First Annual Report to Congress (ERPi/Booz Allen Hamilton/Altarum, 2018), detailing the results of an evaluation of nine mental health programs and suicide prevention services administered by VHA; analyses of VA data related to prescriptions of opioids and other pain medications; and best practice recommendations.

In 2019, for the Second Annual Report, the Clay Hunt Evaluation Team (Evaluation Team) once again included the nine VA mental health programs listed below for the 2019 Annual Report.

<table>
<thead>
<tr>
<th>VA Mental Health Programs Included in the 2019 Clay Hunt Annual Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Mental Health Services (GMHS)</td>
</tr>
<tr>
<td>2. Primary Care—Mental Health Integration (PC-MHI)</td>
</tr>
<tr>
<td>3. Specialized Substance Use Disorder Services (SUD)</td>
</tr>
<tr>
<td>4. Specialized Services for Posttraumatic Stress Disorder (Specialized PTSD)</td>
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<tr>
<td>5. Therapeutic and Supported Employment Services (TSES)*</td>
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<tr>
<td>6. Psychosocial Rehabilitation and Recovery Centers (PRRC)</td>
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<tr>
<td>7. Intensive Community Mental Health and Recovery (ICMHR) Services</td>
</tr>
<tr>
<td>8. Posttraumatic Stress Disorder—Residential Rehabilitation Treatment Programs (PTSD-RRTP)</td>
</tr>
<tr>
<td>9. Acute Inpatient Mental Health Services (AIMHS)</td>
</tr>
</tbody>
</table>

*Note: TSES was undergoing a name change to VHA Vocational Services at the time this report was written.

As was done previously, this year’s evaluation was designed to describe the extent to which programs have a significant and positive impact in meeting the mental health needs of all Veterans receiving care and whether levels of impact differ for female and male Veterans (Chapter 3). However, the 2019 evaluation expands the methodological and statistical approaches used in the fiscal year (FY) 2018 evaluation (ERPi/Booz Allen Hamilton/Altarum, 2018) to more fully explain and uncover characteristics of the type and pattern of mental health care that Veterans receive within VA and, where feasible, how differences in intensity and patterns of mental health care are associated with differences in the clinical effectiveness, suicide related outcomes, and cost-effectiveness of programs. The Evaluation Team also examined suicide related outcomes (suicidal ideation and suicidal behavior) for each of the programs, where possible.

The Evaluation Team also conducted exploratory analyses for PTSD-RRTP and AIMHS to describe the pattern of services that Veterans received pre-admission and post-discharge. Furthermore, the timeframe was extended for the cost analyses to examine changes in program costs or “cost shifts” one- and two-years post-discharge from AIMHS.

As required by the Clay Hunt SAV Act, the Evaluation Team also examined differences in the impact of VA mental health programs and services for female and male Veterans, investigated the extent to which VA physicians follow the VA Clinical Practice Guidelines for Opioid Therapy
for Chronic Pain (Chapter 4), and explored suicidal ideation and suicidal behavior (Columbia Scale—C-SSRS) (Chapter 3 and Chapter 5).

Based on the review and identification of best practices in mental health services that were conducted by the Evaluation Team, as mandated by the Clay Hunt SAV Act, recommendations for improving VA mental health services and an update on VA progress with 2018 recommendations are found in Chapter 6.
Chapter 2: Data Strategies and Methods Overview

This chapter describes the approaches adopted by the Clay Hunt Evaluation Team to gather data for the evaluation. The chapter includes the following sections:

- Data selection and quality assurance process: Describes the process followed for verifying the quality and accuracy of the data provided for the evaluation.
- Clinical metrics used to assess program outcomes: Describes the metrics used to assess outcomes associated with each of the nine programs selected for the evaluation.
- Methods overview: Briefly describes the approach for missing data, sample weighting, and selecting comparison groups where feasible. Details can be found in Appendix A.

Data Selection and Quality Assurance Process

After working in collaboration with OMHSP and the Northeast Program Evaluation Center (NEPEC) to determine the programs that would be the focus of this evaluation, the Evaluation Team developed an evaluation design matrix that included evaluation questions, metrics, and available data sources. This included data related to Veterans’ levels of participation in mental health programs, the costs associated with VA service utilization, and opioid prescribing patterns. It was necessary that sources of data include “metrics that are common among and useful for practitioners in the field of mental health care and suicide prevention” (Clay Hunt, 2015b). Based on these criteria, as specified in Table 1 below, the independent evaluation relied on data from (1) VA service utilization for mental health and non-mental health services from Veterans Information Systems and Technology Architecture (VISTA); (2) outcome and performance data collected by NEPEC; (3) clinical costs data from VA Managerial Cost Accounting System (MCA); (4) data related to prescriptions of opioids and other pain medications from VA Pharmacy Benefits Management Services; and (5) data collected annually through the Veterans’ Outcomes Assessment (VOA) Program managed by NEPEC. Much of this data is extracted using the Corporate Data Warehouse (CDWWork), the enterprise-wide VHA data model, as noted in Table 1 below.

TABLE 1. DATA SOURCES AND VARIABLES FOR THE 2019 EVALUATION

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterans Information Systems and Technology Architecture (VISTA) <em>(extracted from CDWWork)</em></td>
<td>Demographics, general medical and mental health diagnoses, Elixhauser scores, hospitalizations, referrals, re-admissions, encounters with VA programs and services/VHA service utilization, adverse events, types and pattern of services received, and timing of services/dates.</td>
</tr>
<tr>
<td>VA Northeast Program Evaluation Center (NEPEC)</td>
<td>Clinical assessments and program participation information collected by VA Mental Health (MH) programs.</td>
</tr>
<tr>
<td>VA Managerial Cost Accounting System (MCA) <em>(extracted from MCA Clinic Stop and Treating Specialty Cost Reports)</em></td>
<td>Unit costs by outpatient clinic stop code and inpatient treating specialty.</td>
</tr>
<tr>
<td>VA Pharmacy Benefits Management Services <em>(extracted from CDWWork)</em></td>
<td>Data related to frequency and quantity of prescriptions for all drugs including opioids, benzodiazepines, muscle relaxants, sleep aids, antidepressants, anti-</td>
</tr>
</tbody>
</table>
Veterans Outcomes Assessment (VOA) survey (NEPEC)

Self-reported baseline and follow-up assessments of functional status, quality of life, mental health symptoms, substance use, suicidality, and Veteran reports of the quality of care received.

The use of secondary electronic health record (EHR) data represents a promising step toward decreasing research and evaluation costs while strengthening our understanding of health systems and patient outcomes. However, as mentioned in the 2018 report, there are concerns and limiting factors to consider when using EHR (Zozus et al., 2014). Therefore, the National Institutes of Health (NIH) have developed recommendations for EHR data quality assessment, which the Evaluation Team has followed (Weiskopf et al., 2013; Kahn et al., 2012).

Once data were received, researchers completed the data assessment steps shown in Table 2 below for each dimension of data quality.

<table>
<thead>
<tr>
<th>TABLE 2. Data Quality Assessment</th>
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<tr>
<td><strong>Dimension</strong></td>
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</table>
| Completeness | • Run descriptive statistics to produce the count of total records in the data set, a list of variables, and the number of cases per variable. Confirm with the sender the number of records and variables in the data received.  
  • Identify missing variables and values within variables. |
| Accuracy | • Examine values for each variable to ensure clear understanding of the meaning of each value.  
  • Examine the query, if available, to ensure the data received are what was expected.  
  • Examine values for each variable for conformity with expected values.  
  • Examine the coding script (SAS code) to ensure understanding of how covariates and outcomes are constructed.  
  • Compare the coding instructions provided for variables that are based on established mental health measures against instructions provided in coding manuals or published articles related to the measure to ensure consistency and adherence to standards.  
  • Generate a list of questions related to meaning of values; identify out-of-range values; generate a list of questions related to coding of covariate or outcome variables that are based on established mental health measures. |
| Consistency | • Review coding instructions for covariate and outcome variables that are measured at baseline and follow-up to ensure the same coding procedure is followed.  
  • Compare descriptive statistics for baseline and follow-up covariate and outcome variables to identify issues that could potentially not be explained by actual improvements. (For example: Are follow-up scores exceedingly higher or lower than baseline?) |
Once the data were considered acceptable using the process described above, the results of the data quality assessment process were delivered as written correspondence to NEPEC that detailed the number of cases and variables within the data sets, identified specific issues within the data, and listed questions requiring verification before analyses could proceed.

The specific analytical approaches used to determine the impact and cost-effectiveness of programs, once data were verified, are described in Chapter 3 within each program.

Clinical Metrics Used to Assess Program Outcomes

One of the greatest challenges associated with the evaluation required by the Clay Hunt SAV Act was identifying readily available clinical measures that could be used to assess the outcomes associated with participation in mental health services.

For the purposes of the Clay Hunt Evaluation, the Evaluation Team used the VOA to assess general health and functioning; mental health-related symptoms, behaviors, and well-being; experience with VA health care; and suicidality among Veterans participating in VA mental health programs and suicide prevention services.

The specific clinical measures within the VOA that were used to assess the clinical outcomes associated with participation in VA mental health programs included the following:

1. **Kessler Psychological Distress Scale (K6)** is a measure of general psychological distress that has been widely used as a screener for mood disorders and anxiety. The K6 asks respondents how frequently they experience symptoms of psychological distress (e.g., feeling so sad that nothing can cheer you up) during the past 30 days (Kessler et al., 2002).

2. **Brief Addiction Monitor (BAM) Survey** is used in VA settings to monitor clinical outcomes of SUD care as part of measurement-based care. It has been validated as an outcome measure sensitive to change. The questions relate to drug and alcohol use, as well as to information surrounding self-care (Cacciola et al., 2013). For this evaluation, the Full BAM scale was utilized for the SUD program and the “use subscale” of the BAM was utilized for the Specialized PTSD program.

3. **The PTSD Checklist for DSM-5 (PCL-5)** is a 20-item self-report measure that assesses the presence and severity of posttraumatic stress disorder (PTSD) symptoms. Items on the PCL-5 correspond to DSM-5 criteria for PTSD. The PCL-5 can be used to quantify and monitor symptoms over time, to screen individuals for PTSD, and to assist in making a provisional diagnosis of PTSD (Blevins et al., 2015; National Center for Posttraumatic Stress Disorder, 2016). The VA National Center for PTSD (2019) considers a score change of at least 10 points to be clinically significant. A score change of at least 5 points suggests the Veteran has responded to treatment but is not considered clinically significant. This measure is only available for PTSD programs.

4. **SF-12 Health Survey (SF-12)** is composed of 12 items assessing physical function, role limitations due to physical health problems, bodily pain, general health, social functioning (2 items), role limitations due to emotional problems, and emotional well-being. These items can be aggregated into two summary measures: The Physical Component Summary (PCS) and Mental Component Summary (MCS) scores (Ware et al., 1996).

5. **World Health Organization Disability Assessment Schedule 2.0 (WHODAS)** questions are designed to assess Veterans’ difficulties in daily living (daily functioning) due to health conditions, communicating with others, getting around, and administering self-care (Federici et al., 2017; WHO, 1988).
6. **Short Warwick-Edinburgh Mental Well-being Scale (SWEMW)** was developed for use as a population-based measure of mental well-being (Stewart-Brown et al., 2009).

7. **The Experience of Care and Health Outcomes (ECHO) Survey** questions ask about the experiences of adults who have received mental health or substance abuse services through a health plan in the previous 12 months. For the VOA, the ECHO mental health module was included, but some questions that were not applicable to VA integrated health settings were omitted (Daniels et al., 2004). ECHO Survey is the result of a collaborative effort to merge the Consumer Assessment of Behavioral Health Survey (CAHBS) and the Mental Health Statistics Improvement Program (MHSIP) Survey (AHRQ, 2019).

8. **Columbia-Suicide Severity Rating Scale (C-SSRS)** questions help identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (Posner et al., 2007).

9. **Consumer Assessment of Healthcare Providers and Systems (CAHPS)** survey items ask Veterans to evaluate their level of satisfaction with the services they received from VA and with their communication with VA providers (Dyer et al., 2012).

To implement the VOA process, NEPEC identified all Veterans eligible for the VOA on a weekly basis. For Veterans participating in outpatient programs, an intake VOA is administered within two weeks of entry into a program and a follow-up VOA is administered three months later. For Veterans admitted to inpatient care, an intake VOA is administered within two weeks after discharge from care and a follow-up VOA is administered within three months after discharge. It is important to note that the population for VOA is based on newly enrolled Veterans in each program and not the whole population of Veterans participating in the program. **Newly enrolled Veterans are defined as:** Veterans who began services in the fiscal year and had not been enrolled in the six months prior to their intake. However, some of these Veterans may have received the service at an earlier time point. Inclusion for outpatient programs required a second outpatient encounter to select for Veterans beginning treatment, rather than those who were being seen for evaluations only.
The selection criteria and administration process for participation in the VOA are illustrated in Figure 3 below.

**Selection Criteria and Administration Process for the VOA**

![Diagram showing the selection criteria and administration process for the VOA](image)

**Figure 3. Selection Criteria and Administration Process for the VOA**
Table 3 below lists the programs assessed with clinical measures selected for inclusion in the VOA. Not all measures listed below were included in the final analyses, as some were not appropriate outcomes to consider for a given program. Furthermore, while there are conceptual differences in what is measured below, there are robust correlations between these measures.

**TABLE 3. PROGRAMS AND MEASURES ASSESSED WITH THE VOA PROGRAM**

<table>
<thead>
<tr>
<th>Program</th>
<th>Measures of Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Mental Health Services (GMHS)</td>
<td>The Short Warwick-Edinburgh Mental Well-being Scale (SWEMW)</td>
</tr>
<tr>
<td></td>
<td>Kessler Psychological Distress Scale (K6)</td>
</tr>
<tr>
<td></td>
<td>SF-12 Health Survey (SF-12) (Mental Component Score)</td>
</tr>
<tr>
<td></td>
<td>WHO Disability Assessment Schedule (WHODAS)</td>
</tr>
<tr>
<td></td>
<td>Experience of Care and Health Outcomes Survey (ECHO)</td>
</tr>
<tr>
<td></td>
<td>Brief Addiction Monitor (BAM) Survey (<em>Use subscale</em>)</td>
</tr>
<tr>
<td></td>
<td>Columbia-Suicide Severity Rating Scale (C-SSRS)</td>
</tr>
<tr>
<td>Primary Care-Mental Health Integration (PC-MHI)</td>
<td>SWEMW</td>
</tr>
<tr>
<td></td>
<td>K6</td>
</tr>
<tr>
<td></td>
<td>SF-12 (Mental Component and Physical Component Scores)</td>
</tr>
<tr>
<td></td>
<td>WHODAS</td>
</tr>
<tr>
<td></td>
<td>ECHO</td>
</tr>
<tr>
<td></td>
<td>BAM (<em>Use subscale</em>)</td>
</tr>
<tr>
<td></td>
<td>C-SSRS</td>
</tr>
<tr>
<td>Specialized Substance Use Disorder (SUD) Services</td>
<td>BAM (<em>Full</em>)</td>
</tr>
<tr>
<td></td>
<td>SWEMW</td>
</tr>
<tr>
<td></td>
<td>K6</td>
</tr>
<tr>
<td></td>
<td>SF-12 (Mental Component)</td>
</tr>
<tr>
<td></td>
<td>ECHO</td>
</tr>
<tr>
<td></td>
<td>BAM (<em>Use subscale</em>)</td>
</tr>
<tr>
<td></td>
<td>C-SSRS</td>
</tr>
<tr>
<td>Specialized Posttraumatic Stress Disorder Services (Specialized PTSD)</td>
<td>PTSD Checklist (PCL-5)</td>
</tr>
<tr>
<td></td>
<td>BAM (<em>Use subscale</em>)</td>
</tr>
<tr>
<td></td>
<td>SWEMW</td>
</tr>
<tr>
<td></td>
<td>K6</td>
</tr>
<tr>
<td></td>
<td>SF-12 (Mental Component)</td>
</tr>
<tr>
<td></td>
<td>ECHO</td>
</tr>
<tr>
<td></td>
<td>C-SSRS</td>
</tr>
<tr>
<td>Acute Inpatient Mental Health Services (AIMHS)*</td>
<td>SWEMW</td>
</tr>
<tr>
<td></td>
<td>SF-12 (Mental Component and Physical Component Scores)</td>
</tr>
<tr>
<td></td>
<td>K6</td>
</tr>
<tr>
<td></td>
<td>WHODAS</td>
</tr>
<tr>
<td></td>
<td>ECHO</td>
</tr>
<tr>
<td></td>
<td>BAM (<em>Use subscale</em>)</td>
</tr>
<tr>
<td></td>
<td>C-SSRS</td>
</tr>
</tbody>
</table>

*Note: AIMHS participants completed the VOA within 2 weeks of discharge, therefore the baseline and follow-up measures were not appropriate for a pre-post program evaluation comparison. Instead, for AIMHS, the Evaluation Team conducted a pathways analysis and cost-effectiveness analysis.

In FY2018, there were **225,621** Veterans who were eligible for the VOA. Overall, **10.56 percent** of the contacted Veterans agreed to complete the baseline VOA. The number of Veterans who
completed both the baseline and follow-up VOA represent **6.81 percent** of the total population originally contacted. The response rate achieved for the VOA is comparable to the typical response rate (around 9 percent) that has been achieved in the last decade in telephone surveys conducted in the United States (Kohut et al., 2012).

In all analyses presented in Chapter 3, sample weighting was used to adjust for nonresponse within each program. The detailed methods are described in Appendix A.

**Methods Overview: Missing Data, Sample Weighting, and Creating Comparison Groups**

Because different analytical approaches were used for each program, a summary description of each program’s methods of analysis and results is included in Chapter 3, with detailed results provided in Appendix B. Below are overall approaches that relate to all or several of the programs.

**Missing Data**

Missing data are a common challenge in health research. Researchers usually address missing data by including only complete cases in the analysis—those individuals who have no missing data in any of the variables required for analysis. However, results of such analyses can be biased. Furthermore, the effect of missing data in several variables often leads to exclusion of a substantial proportion of the original sample, which in turn causes a substantial loss of precision and power.

The biases produced by missing data are particularly pronounced in studies that use self-report instruments. Reasons for missing data are commonly classified as: missing completely at random (i.e., no systematic explanation), missing at random (i.e., any systematic difference can be explained by observed values), and missing not at random (i.e., systematic differences exists that cannot be explained by observed variables or in the characteristics of respondents). Within the Clay Hunt Evaluation, missing values occur for the following four reasons:

- **Refusals/Non-response to Baseline and Follow-up:** Veterans may refuse to participate in the VOA. Refusals may include Veterans that do not answer the telephone when reached by the administrators of the VOA or who refuse to participate when contacted by VOA administrators. In such cases, no baseline or follow-up data are available.
- **Non-response to Follow-up:** Veterans may complete baseline measures but fail to complete follow-up measures.
- **Program Dropout:** Non-response to follow-up occurs because the Veteran has dropped out of services before full treatment has been received (particularly for cost analyses).
- **Item Non-response:** Veterans participate in baseline and follow-up measures but fail to complete items on the VOA or on the measures administered by the program.

To examine the representativeness of the VOA, the Evaluation Team conducted chi-squared tests to compare VOA baseline and VOA follow-up characteristics with VOA-eligible population characteristics. The results presented in Appendix A indicate that due to non-responses in baseline and follow-up VOA, Veterans in the VOA baseline and the VOA follow-up have significantly different characteristics from Veterans in the overall VOA-eligible population. In addition to the missing data due to non-responses to the entire VOA, there are missing data because Veterans failed to answer all items related to a specific measure or failed to answer some items within a measure.

To determine the best approach to address item non-response, the Evaluation Team conducted simulation studies (using K6) to compare six (6) commonly used imputation techniques and
test for the accuracy of imputed values when compared to real values. Details on the simulation studies are included in Appendix A. Below is an overview.

- **Random Selection**: The imputed value is a randomly selected value from 1 to 5.
- **Preceding Response**: Replicate the preceding question's response to impute the missing response.
- **Group Mean**: Replace the missing value using other Veterans’ average responses on the items.
- **Individual Mean**: Replace the missing value using Veterans’ average responses on other items of K6 in this simulation study.
- **Regularized Interpolation of Individual Mean and Single Regression**: This method generalizes the individual mean method by running a regression model to predict missing values, with a regularization penalty function which penalizes differences in coefficients in the model.
- **Multiple Imputation (MI)**: The MI procedure in SAS (proc MI) imputes the missing values.

Based on the results of the imputation simulation, the Multiple Imputation (MI) SAS (proc MI) was selected and applied to impute the missing values. The imputation is carried out in three steps. The missing data are filled twenty times, generating twenty complete unique data sets. Each data set is analyzed separately to calculate a mean and a standard deviation. Then, the results from each analysis are combined to produce an overall mean and standard deviation for each missing value. This data imputation technique demonstrated the best accuracy to replace all the missing items in the VOA and is used throughout analysis of programs.

**Sample Weighting**

A commonly used approach to correct for imperfections in the survey sample that may lead to bias is applying sampling weights. There are different reasons for the imperfections in survey sample such as non-coverage of the population, over/under representation of subgroups within the population, non-response to survey, and dropout in overtime sampling. By applying sampling weights, survey researchers can adjust the weighted sample distribution to make it similar to the target population distribution, and correct bias due to non-responses and unequal probabilities of subgroup selection.

To add sampling weights, we applied the design weight through different programs. In other words, a weight was applied to adjust the different selection probability of each program. Next, key demographic variables (e.g., gender, race, age group) were considered to adjust for the differences between VOA sample and VOA-eligible population. Finally, weights were applied based on propensity of responses using logistic regression to adjust non-responses. Details of this approach can be found in Appendix B.

**Creating Comparison Groups**

In the 2018 evaluation, it was found that 72.4 percent of Veterans participated in two or more mental health programs within the same year. Veterans also entered programs through a variety of pathways. For example, some Veterans were admitted to AIMHS after having participated in outpatient services, while others entered VA services for the first time beginning with AIMHS after an acute episode that was then followed by entry into other VA mental health programs or services.

The different pathways through which Veterans enter the VA mental health system and Veterans’ participation in multiple mental health programs presented several challenges for the evaluation. First, the variability in how Veterans appropriately enter the mental health system and the fact
that treatments are tailored to the specific needs of each Veteran make it difficult to identify the “usual care” that should serve as the comparison for assessing the effectiveness of each program. Second, because most Veterans with a mental health diagnosis are enrolled in two or more mental health programs, it may not be possible to construct a true control or comparison group against which participants in each VA mental health program may be compared to obtain a clear estimate of effectiveness. However, there are variations within VA mental health programs that can allow for estimation of differences in effectiveness across different models of program delivery. For example, VA Specialized Posttraumatic Stress Disorder Services provide a variety of evidence-based therapies. Substance Use Disorder programs are provided as an intensive outpatient program model (IOP), in which Veterans receive more than four SUD services per week, or a non-intensive model, in which Veterans may receive only one brief service per week, such as participation in a support group.

In 2019, where feasible, the Evaluation Team completed comparative analyses designed to investigate whether different models of the same VA mental health program are equally effective in meeting the mental health needs of both female and male Veterans. Where feasible, propensity score matching (PSM) was used to construct comparison groups. If sample sizes did not permit the use of PSM, appropriate variables were used as covariates to examine program effects.

Setting the Stage for Future Evaluation

For the First Annual Report in 2018, the Evaluation Team used traditional methods for evaluating pre- and post-treatment outcomes associated with program participation. The evaluation examined the impacts of individual programs. However, because VA is a coordinated system of care, Veterans enter mental health services through a variety of routes and participate in multiple mental health programs simultaneously and sequentially. Therefore, it is likely that improvements in mental health outcomes for Veterans involve multiple processes and patterns of care.

To capture the complexity of how Veterans with mental health disorders and those at risk of suicide are served within the VA, this year’s evaluation analyzed the pattern of care that Veterans receive over more than a 90-day or one-year period. This involved using data mining techniques to examine which patterns and timing of mental health services are most effective in meeting the mental health needs of Veterans. This allows us to provide VA with treatment models for Veterans that are aligned to specific mental health diagnoses and to the unique characteristics of Veterans.

Therefore, we continue to build upon previous evaluation methods in order to expand the types of questions that can be answered through these data. The hope is that this will lead to a richer understanding of the Veteran’s experience, pathways of care, and outcomes for VHA programs.
Chapter 3: Mental Health Program Descriptions, Methods, Clinical Results, and Cost-Analysis/Cost-Effectiveness by Program

The following chapter provides a description of each of the nine VA mental health programs evaluated and an overview of specific methods and results by program. For statistically significant findings reported below, a p-value of $\leq 0.05$ was used (details of results in Appendix B). Where appropriate, a sample size (n) is reported in the footnote for each graph.

General Mental Health Services (GMHS)

Program Description
General Mental Health Services (GMHS) represents the largest group of mental health services within VHA. GMHS provides Veterans with a full range of outpatient mental health care services that are aligned with their clinical needs and are designed to improve their functioning and quality of life. The program provides intake assessment, evidence-based therapy (psychotherapy and pharmacotherapy), and care coordination. Additional services may include the following:

- Patient and family education
- Referrals, as needed, to residential and inpatient or specialty and complementary care such as CBT for sleep problems or yoga for anxiety
- Consultation for special emphasis problems (e.g., posttraumatic stress disorder)
- Case management that ensures Veterans have appropriate access to the right level of care management and coordination through their mental health treatment coordinator
- Psychosocial services and coordination with other VA programs (e.g., homeless program) and community resources

The primary goals of GMHS are to address Veterans’ mental health symptoms, improve their functioning, and increase their quality of life.

Evaluation Questions

- What were the characteristics and clinical diagnoses of Veterans enrolled in GMHS?
- What were the clinical outcomes associated with participation in GMHS?
- Did outcomes differ for male and female Veterans? Did outcomes differ by age or race? Did outcomes differ by mental health diagnosis?
- What were Veterans’ level of satisfaction with GMHS by gender?
- Does participation in GMHS lead to a reduction in suicidal ideation and behavior (C-SSRS)?

Methods
Data for the GMHS analyses were derived from the VOA baseline, the VOA follow-up, and additional demographic variables, mental health diagnoses, and program participation information.
extracted from medical records for each Veteran who completed the VOA. As noted in the methods section of this report (Chapter 2), individual responses of Veterans who completed the VOA were weighted to adjust for sampling and response rates and to ensure that findings could generalize to the population of Veterans that started receiving GMHS in FY2018. Mixed-effect model was then used to examine the differences between the baseline results and the follow-up results on the SWEMW, K6, SF-12, and WHODAS measures, controlling facility as random effect. These analyses also examined differences between male and female Veterans, by age, across Veterans from different racial groups, and across veterans with different mental health diagnosis. Because ECHO is a patient experience survey asking about patients’ improvement in past three months, the follow-up ECHO scores were not compared with baseline scores. Mixed-effect models were used to examine differences between male and female Veterans, by age, across Veterans from different racial groups, and across Veterans with different mental health diagnosis. Details of analysis results are presented in Appendix B.

Table 4 below shows outcome measures used to evaluate this program and the psychological constructs they assess.

As the evaluation of GMHS does not entail a comparative design, no cost-effectiveness analysis was completed for GMHS.

**TABLE 4. DESCRIPTION OF GMHS PROGRAM MEASURES**

<table>
<thead>
<tr>
<th>Description of GMHS Program Measures</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Short Warwick-Edinburgh Mental Well-Being Scale (SWEMW)</td>
<td>Mental well-being</td>
</tr>
<tr>
<td>Kessler Psychological Distress Scale (K6)</td>
<td>Mental distress</td>
</tr>
<tr>
<td>SF-12 Health Survey (MCS)</td>
<td>Mental functioning</td>
</tr>
<tr>
<td>World Health Organization Disability Assessment Schedule (WHODAS)</td>
<td>Daily functioning</td>
</tr>
<tr>
<td>Experience of Care and Health Outcomes Survey (ECHO)</td>
<td>Perceived improvement</td>
</tr>
<tr>
<td>Columbia-Suicide Severity Rating Scale (C-SSRS)</td>
<td>Helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs</td>
</tr>
</tbody>
</table>

**GMHS Program Population Description**

In FY2018, as displayed in Table 5 below, there were 115,166 Veterans who enrolled in the GMHS program and were eligible to participate in the VOA. Most of these Veterans were male (83 percent), with female Veterans constituting 16.7 percent, which is comparable to their overall representation within the military (Council on Foreign Relations, 2019). The majority of GMHS participants were diagnosed with depression, PTSD, and anxiety which occur either alone or in combination (i.e., comorbid). About 26 percent of Veterans in GMHS had an SUD co-morbidity. The largest group of Veterans who enrolled in GMHS in FY2018 were White (around 62 percent). Black Veterans represented 22 percent of the total number of participants, Hispanic represented around 1 percent, with the rest of the sample identifying as other/unknown (nearly 15 percent).
Table 5. Characteristics of Veterans Newly Enrolled in GMHS and VOA Eligible in FY2018

<table>
<thead>
<tr>
<th>Characteristics of Veterans Newly Enrolled in GMHS and VOA Eligible in FY2018</th>
<th>Total Number (n=115,166)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>95892</td>
<td>83.26</td>
</tr>
<tr>
<td>Female</td>
<td>19274</td>
<td>16.74</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>71221</td>
<td>61.84</td>
</tr>
<tr>
<td>Black</td>
<td>25628</td>
<td>22.25</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>16739</td>
<td>14.54</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1578</td>
<td>1.37</td>
</tr>
<tr>
<td><strong>AGE GROUP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>27274</td>
<td>23.68</td>
</tr>
<tr>
<td>36-65 years</td>
<td>62064</td>
<td>53.89</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>25828</td>
<td>22.43</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>69536</td>
<td>60.38</td>
</tr>
<tr>
<td>PTSD</td>
<td>54654</td>
<td>47.46</td>
</tr>
<tr>
<td>Anxiety</td>
<td>43274</td>
<td>37.58</td>
</tr>
<tr>
<td>SUD</td>
<td>30489</td>
<td>26.47</td>
</tr>
<tr>
<td>SMI**</td>
<td>16440</td>
<td>14.28</td>
</tr>
<tr>
<td>Other MH</td>
<td>4954</td>
<td>4.30</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

Clinical Findings

Overall, GMHS participants had statistically significant improvement from intake to follow-up in the following outcomes:

- Mental distress (K6)
- Mental functioning (SF-12 (MCS))
- Daily functioning (WHODAS)

There were no significant changes in:

- Mental well-being (SWEMW)

On average, GMHS had similar impacts, regardless of Veteran’s race or gender on these measures.

At intake, on average, Veterans had scores for mental distress (K6) that were below the threshold for serious mental illness (SMI) (as described by Furukawa et al. [2003], score of 19), and they experienced statistically significant improvements over the 90-day period that was assessed. There were no significant differences by race or by gender. However, the magnitude of improvements in mental distress (K6) varied by diagnosis and age of participants (displayed below in Figures 4-6). GMHS participants with PTSD and depression had greater improvements in mental distress. Younger Veterans (35 years and younger) had greater improvements in mental distress than older Veterans (36 years and older).
Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. There were no significant differences by race or by gender. n=8,556
GMHS—Mental Distress (Measured by K6) Changes from Intake to Follow-up by Age Group

Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. There were no significant differences by race or by gender. n=8,556
The magnitude of improvements in **mental functioning (SF-12 (MCS))** varied by diagnosis (displayed below in Figures 7-9). GMHS participants with PTSD, depression, and anxiety diagnoses showed greater improvement in mental functioning than Veterans without those diagnoses. Although Veterans showed improvement, the mental functioning scores remained below the population norm (norm-referenced score of 45 for the U.S. general population).

**Figure 7. GMHS Program Mental Functioning (Measured by SF-12 (MCS)) Changes from Intake to Follow-up by PTSD Diagnosis.**

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference (Ware et al., 1998). Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and although they improved within 90 days of treatment, their mental functioning scores remained below the population norm. There were no significant differences by race or by gender. n=8,556
GMHS-Mental Functioning (Measured by SF-12) Changes from Intake to Follow-up by Depression Diagnosis

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference (Ware et al., 1998). Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and although they improved within 90 days of treatment, their mental functioning scores remained below the population norm. There were no significant differences by race or by gender. n=8,556

GMHS-Mental Functioning (Measured by SF-12) Changes from Intake to Follow-up by Anxiety Diagnosis

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference (Ware et al., 1998). Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and although they improved within 90 days of treatment, their mental functioning scores remained below the population norm. There were no significant differences by race or by gender. n=8,556
The magnitude of improvements in daily functioning (WHODAS) varied based on the diagnosis and age of participants. Veterans diagnosed with PTSD or depression showed greater improvements in daily functioning, but no differences were found for participants diagnosed with serious mental illness (SMI), SUD, or anxiety. Younger to middle-age Veterans (<65) had greater improvements in daily functioning than older Veterans (65 years and older). Although Veterans showed improvement, the WHODAS score remained above the population norm for level of difficulties at discharge (norm-referenced score of 6.3) (i.e. the degree of disability was above the norm).

*FIGURE 10. GMHS PROGRAM DAILY FUNCTIONING (MEASURED BY WHODAS) CHANGES FROM INTAKE TO FOLLOW-UP BY PTSD DIAGNOSIS.*

Lower scores reflect improvement. The WHODAS assesses difficulties in completing daily activities in communication, interpersonal relationships, completing work and household roles, self-care, and civic participation. Scores range from 0 to 48. The mean score for people with mental disorder has been found to be 6.3 (SD=7.1; Andrews et al., 2009). Baseline scores for GMHS participants and at discharge remained above the threshold but decreased significantly for all Veterans by 90-days post-discharge. There were no significant differences by race or by gender. n=8,556
Lower scores reflect improvement. The WHODAS assesses difficulties in completing daily activities in communication, interpersonal relationships, completing work and household roles, self-care, and civic participation. Scores range from 0 to 48. The mean score for people with mental disorder has been found to be 6.3 (SD=7.1; Andrews et al., 2009). Baseline scores for GMHS participants and at discharge remained above the threshold but decreased significantly for all Veterans by 90-days post-discharge. There were no significant differences by race or by gender. n=8,556
The results of the analysis indicate that, among Veterans newly enrolled in GMHS, there were no significant changes in mental well-being (SWEMW) from intake to follow-up. A higher score is considered to indicate “better” mental well-being (Stewart-Brown, 2009). The average score at intake for Veterans was 20.6, and the average score at follow-up was 20.6. As mentioned, there were no significant changes from intake to follow-up, and Veterans’ well-being was below the population norm reference score of 23.6 at both intake and follow-up (the Health Survey for England is the closest norm-based estimate currently available) (Ng Fat, 2017).

The **ECHO scale measures perceived improvement** (over the past three months) with scores ranging from 3 to 15, where higher scores indicate greater perceived improvement. This analysis looked at follow-up scores only. Female Veterans in GHMS reported **significantly greater improvement** at follow-up compared to male Veterans (Figure 13 below). There were also significant group differences in perceived improvement at follow-up by mental health diagnosis. Veterans with anxiety reported **significantly greater improvement** at follow-up, while Veterans with depression reported the least improvement (Figure 14 below).

![GMHS—Perceived Improvement at Follow-up (Measured by ECHO) by Gender](image)

**FIGURE 13.** GMHS Program Perceived Improvement (Measured by ECHO) at Follow-up by Gender.

The perceived improvement scale within the ECHO Survey used for this evaluation comprises three items asking patients to compare their current health status with what it was in the three previous months. Scores range from 3 to 15, with higher scores indicating greater perceived improvement (Daniels et al., 2004; AHRQ, 2019). There were significant differences by gender and MH diagnosis. n=5,552
Figure 14. GMHS Program Perceived Improvement (Measured by ECHO) at Follow-up by Diagnosis.

The perceived improvement scale within the ECHO Survey used for this evaluation comprises three items asking patients to compare their current health status with what it was in the three previous months. Scores range from 3 to 15, with higher scores indicating greater perceived improvement (Daniels et al., 2004; AHRQ, 2019). There were significant differences by gender and MH diagnosis.

Results by Gender

There were no statistically significant differences by gender across any measures.

Veteran Satisfaction

Overall, Veterans report high satisfaction with services they received in GHMS. Most males (56 percent) reported “high quality” care, and most females (66 percent) reported “high quality” care. There were no statistically significant differences between genders. Patient ratings of quality are the closest proxy for Veteran satisfaction currently available in the data.
Impact of GMHS Program on Suicidal Ideation and Behavior—Columbia-Suicide Severity Rating Scale (C-SSRS) Methods and Results

Methods

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Research shows that an individual exhibiting even a single behavior identified by the scale is 8 to 10 times more likely to die by suicide (Posner et al., 2011).

For scoring and evaluation purposes, it is recommended that the suicidal ideation (SI) and suicidal behavior (SB) components be analyzed separately (Nilsson, et al., 2013). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). Suicidal behavior was coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer et al., 2011; Gipson et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care.

Descriptive analysis examined the changes in the proportion of Veterans reporting SI and SB in the three months from baseline to follow-up. Wilcoxon signed-rank test examined the significance of those changes in SI. To compare baseline and follow-up SB, an aggregated SB binary variable was created (1=reported any SB including preparatory acts or behavior, suicidal attempts, and suicide attempts that required medical care; 0=no SB). Chi-squared tests examined the significance of changes in this aggregated SB variable. Ordinal logistic regression compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). When the statistical assumption (parallel line assumption) of ordinal logistic regression was not met, multinomial logistic regression also compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). Because of the small sample size of Veterans who reported SB at follow-up, binary logistic regression, comparing baseline SB and
follow-up SB (controlling for demographics, MH diagnosis, and lifetime SI and SB), was conducted for all programs instead of each program.

C-SSRS Findings

Veterans in GMHS reported less severe levels of SI at follow-up than at baseline as displayed in Figures 16-17 below. This indicates GMHS is effective at reducing SI among participating Veterans.

**Figure 16. GMHS Program Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Baseline.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=5616
**Figure 17. GMHS Program Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Follow-up.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=5616

Furthermore, within the ordinal logistic regression model (Model A) and the multinomial logistic regression model (Model B) (shown in Table 6 below), the results indicate that Veterans reported less severe levels of SI at follow-up compared to baseline.

- In Model A, Veterans were 1.56 times more likely to be in a less severe level of SI at follow-up compared to baseline.
- In Model B, Veterans who reported passive SI at baseline were likely to report the same level of SI at follow-up, associated with an insignificant 0.94 odds ratio. Among Veterans who reported active SI (non-specific or with or without intent, method, or plan), it was more likely to report no SI than to remain at the same level, with significant odds ratios of 2.04, 1.93, 3.37, and 3.77, respectively. The more severe the SI at baseline, the greater the movement to no SI at follow-up.
- This suggests that among Veterans who participated in GMHS, Veterans who entered services with lower severity SI remained at low levels of SI, and significant improvement occurred among Veterans who entered GMHS with higher severity SI.
<table>
<thead>
<tr>
<th>Effect</th>
<th>Model A: Ordinal Logistic Regression</th>
<th>Model B: Multinomial Logistic Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Point Estimate</td>
<td>95% Wald Confidence Limits</td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>1.558</td>
<td>1.423</td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>2.039</td>
<td>1.654</td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>3.374</td>
<td>2.362</td>
</tr>
</tbody>
</table>

*Note: Significant finding as indicated by p-value of ≤ 0.05.
The Columbia Scale also asks Veterans about suicidal behavior (SB). At follow-up, fewer Veterans reported any SB (Figure 18 below).

**FIGURE 18. GMHS PROGRAM PERCENT OF VETERANS WITH SUICIDAL BEHAVIOR AT BASELINE AND FOLLOW-UP.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal behavior is coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer, et al., 2011; Gipson, et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care. *n=5616

*Note: Only significant difference between baseline and follow-up is for “Any Suicide Behavior” category.

**Conclusions**

GMHS represents the largest group of MH services within VHA, providing a full range of outpatient MH care. The GMHS program is successful in improving key outcomes of mental distress, mental functioning, and daily functioning, regardless of a Veteran’s race or gender. There is room for improvement, however, as even with significant improvements, Veterans still fall below general population norms after 3 months for mental functioning and daily functioning. Furthermore, for the outcome of mental well-being, Veterans of both genders did not experience significant improvements and fell below the general population norm. However, as mentioned, the Warwick-Edinburgh measure of well-being was specifically designed to measure positive aspects of mental health and defines well-being as enjoyment and pleasure in life (e.g., feeling good about life), satisfaction with interpersonal relationships, and a sense of self-acceptance, competence, and autonomy (Tenant, et al., 2007; Haver, et al., 2015). It may be that while participation in GMHS alleviates negative symptoms within the 3-month period assessed for this evaluation, well-being is something that improves after treatment (Feinstein, 1987; Rottenberg, 2019) and requires a longer time period to acquire, as has been suggested in the literature. Another interpretation for these findings is simply that there is a complex relationship between distress and well-being, such that decreases in distress may not be directly associated with feelings of well-being (Rafanelli, et al., 2000), especially when symptoms have been longstanding; in such cases, chronic...
psychosocial life stressors may continue to affect quality of life and wellness even after symptoms begin to improve. Although the Evaluation Team used the longest available follow-up time given the data that existed, future evaluations may be able to capture meaningful change even on well-being, with longer periods of follow-up.

Overall, Veterans in GMHS reported less severe levels of suicidal ideation from baseline to follow-up. Furthermore, the more severe the SI, the greater the movement to less severe levels of SI. These are positive findings indicating that GMHS was successful in reducing the severity of suicidal ideation and behavior among participants. (Refer to Chapter 5 for an overall analysis of the Columbia Scale and comparison between programs.)

On the measure of perceived improvement, female Veterans reported greater improvement compared to male Veterans. Furthermore, those with anxiety reported greater improvement compared to other diagnoses. This is an important finding, because a patient’s perceived improvement has been found to be associated with adherence to treatment and recovery (Petrie & Weinman, 2012). Finally, it is reassuring to see that Veteran satisfaction with GMHS is high, suggesting that the care they received was patient-centered and respectful of the individual’s needs and values (Xu, 2015).

Primary Care–Mental Health Integration (PC-MHI) services have been implemented by VA to increase the availability of mental health services for issues such as depression, anxiety, alcohol misuse (i.e., abuse, heavy drinking, and/or problem drinking), and PTSD within the primary care setting so that specialty mental health services/programs can focus on patients with severe or chronic mental illness. This enhances access, increasing the availability of mental health providers and improving the acceptability of these services for Veterans who may be uncomfortable receiving services in traditional mental health settings. It also provides immediate mental health care to Veterans receiving VA primary care services. PC-MHI clinicians provide initial assessments and collaborative care in the primary care setting and may refer Veterans with complex treatment needs to specialized mental health clinic settings, if needed. The primary goals of PC-MHI are:

- Provide immediate access to clinical assessment and appropriate collaborative care and treatment for those experiencing mental health symptoms (either ad hoc or in response to screening)
- Practice collaborative, stepped, and measurement-based care, including appropriate longitudinal follow-up, to address common mental health conditions for the primary care population
- Enable the optimal functioning of patient aligned care teams (PACT) through collaborative decision support and interdisciplinary consultation with co-located mental health providers
- Prevent the development of more severe symptoms through early recognition and intervention
Evaluation Questions

- What were the characteristics and clinical diagnoses of Veterans enrolled in PC-MHI services?
- What were the clinical outcomes associated with participation in PC-MHI services?
- Did outcomes differ for male and female Veterans? Did outcomes differ by age or race? Did outcomes differ by mental health diagnosis?
- What were Veterans’ levels of satisfaction with PC-MHI services by gender?
- Does participation in PC-MHI lead to a reduction in suicidal ideation and behavior (C-SSRS)?

Methods

Data for the PC-MHI analyses were derived from the VOA baseline, the VOA follow-up, and additional demographic variables, mental health diagnoses, and program participation information extracted from medical records for each Veteran who completed the VOA. As noted in the methods section of this report (Chapter 2), individual responses of Veterans who completed the VOA were weighted to adjust for sampling and response rates, and to ensure that findings could generalize to the population of Veterans that started receiving PC-MHI in FY2018. Mixed-effect model was then used to examine the differences between the baseline results and the follow-up results on the SWEMW, K6, SF-12, and WHODAS measures, controlling facility as random effect. These analyses also examined differences between male and female Veterans, by age, across Veterans from different racial groups, and across veterans with different mental health diagnosis. Because ECHO was patient experience survey asking patients’ improvement in past three months, the follow-up ECHO scores were not compared with baseline scores. Mixed-effect models were used to examine differences between male and female Veterans, by age, across Veterans from different racial groups, and across Veterans with different mental health diagnosis. Details of analysis results are presented in Appendix B.

Table 7 below shows outcome measures used to evaluate this program and the psychological constructs they assess.

<table>
<thead>
<tr>
<th>Description of PC-MHI Program Measures</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Short Warwick-Edinburgh Mental Well-Being Scale (SWEMW)</td>
<td>Mental well-being</td>
</tr>
<tr>
<td>Kessler Psychological Distress Scale (K6)</td>
<td>Mental distress</td>
</tr>
</tbody>
</table>
| SF-12 Health Survey (PCS and MCS) | Physical functioning (PCS)  
Mental functioning (MCS) |
| World Health Organization Disability Assessment Schedule (WHODAS) | Daily functioning |
| Experience of Care and Health Outcomes Survey (ECHO) | Perceived improvement |
| Columbia-Suicide Severity Rating Scale (C-SSRS) | Helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs |

Because evaluation of PC-MHI does not entail a comparative design, there is no cost analysis for PC-MHI.
PC-MHI Program Population Description

In FY2018, as displayed in Table 8 below, there were 43,175 Veterans who were newly enrolled in the PC-MHI program and were eligible for the VOA. Most Veterans participating in PC-MHI were male (nearly 83 percent), with female Veterans comprising around 17 percent, which is comparable to their overall representation within the military. The majority of these PC-MHI participants were diagnosed with depression, anxiety, and PTSD which occur either alone or in combination (i.e., comorbid). Nearly 17 percent of Veterans in PC-MHI had an SUD co-morbidity. The largest group of participants in FY2018 were White (nearly 60 percent). Black participants represented nearly 24 percent of the total number of participants, Hispanic less than 2 percent, and with the rest of the sample identifying as other/unknown (15 percent).

**Table 8. Characteristics of Veterans Newly Enrolled in PC-MHI and VOA Eligible in FY2018**

<table>
<thead>
<tr>
<th>Characteristics of Veterans Newly Enrolled in PC-MHI and VOA Eligible in FY2018</th>
<th>Total Number (n=43,175)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>35738</td>
<td>82.77</td>
</tr>
<tr>
<td>Female</td>
<td>7437</td>
<td>17.23</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>25573</td>
<td>59.23</td>
</tr>
<tr>
<td>Black</td>
<td>10301</td>
<td>23.86</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>6603</td>
<td>15.29</td>
</tr>
<tr>
<td>Hispanic</td>
<td>698</td>
<td>1.62</td>
</tr>
<tr>
<td><strong>AGE GROUP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>9423</td>
<td>21.83</td>
</tr>
<tr>
<td>36-65 years</td>
<td>22807</td>
<td>52.82</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>10945</td>
<td>25.35</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>24799</td>
<td>57.44</td>
</tr>
<tr>
<td>PTSD</td>
<td>14607</td>
<td>33.83</td>
</tr>
<tr>
<td>Anxiety</td>
<td>17105</td>
<td>39.62</td>
</tr>
<tr>
<td>SUD</td>
<td>7190</td>
<td>16.65</td>
</tr>
<tr>
<td>SMI**</td>
<td>2327</td>
<td>5.39</td>
</tr>
<tr>
<td>Other MH Diagnosis</td>
<td>757</td>
<td>1.75</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

Clinical Findings

Overall, PC-MHI participants had *statistically significant improvement* from intake to follow-up in the following outcomes:

- Mental distress (K6)
- Mental functioning (SF-12 (MCS))
- Daily functioning (WHODAS)

There were no significant changes in:

- Physical functioning (SF-12 (PCS))
- Mental well-being (SWEMW)
At intake, on average, Veterans had scores on mental distress (K6) that were slightly below the threshold for serious mental illness (score of 19 (SMI as defined by Furukawa et al., 2013)), and they experienced statistically significant improvements over the 90-day period that was assessed. There were no significant differences by race or by gender. However, the magnitude of improvements in mental distress (K6) did vary by age and diagnosis of participants (displayed below in Figures 19-21). PC-MHI participants with PTSD and depression diagnoses had greater improvements in mental distress. Younger Veterans (35 years and younger) had greater improvements in mental distress than older Veterans (36 years and older).

**FIGURE 19.** PC-MHI Program Mental Distress (Measured by K6) Changes from Intake to Follow-up by PTSD Diagnosis.

Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans with PTSD had scores that were slightly below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. There were no significant differences by race or by gender. n=3,596
Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans with depression had scores that were slightly below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. There were no significant differences by race or by gender.

n=3,596
Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, younger Veterans (<35 years old) had scores that were below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. Younger Veterans had greater improvement in mental distress than older Veterans (>35 years old). There were no significant differences by race or by gender. n=3,596

Figure 21. PC-MHI Program Mental Distress (Measured by K6) Changes from Intake to Follow-up by Age Group.
The magnitude of improvements in mental functioning (SF-12) also varied by diagnosis and age (displayed below in Figures 22-24). Veterans with PTSD and depression showed greater improvement in mental functioning than Veterans without these diagnoses. Younger Veterans (35 years and younger) had greater improvements in mental functioning than older Veterans (36 years and older). Although Veterans showed improvement, the mental functioning scores remained below the population norm (norm-referenced score of 45 for the U.S. general population).

**FIGURE 22.** PC-MHI Program Mental Functioning (Measured by SF-12) Changes from Intake to Follow-up by PTSD Diagnosis.

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference. Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and although they improved within 90 days of treatment, their mental functioning scores remained below the population norm. There were no significant differences by race or by gender.

n=3,596
The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference. Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and although they improved within 90 days of treatment, their mental functioning scores remained below the population norm. There were no significant differences by race or by gender. 

n=3,596

**FIGURE 23.** **PC-MHI PROGRAM MENTAL FUNCTIONING (MEASURED BY SF-12) CHANGES FROM INTAKE TO FOLLOW-UP BY DEPRESSION DIAGNOSIS.**
The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference. Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and although they improved within 90 days of treatment, their mental functioning scores remained below the population norm. There were no significant differences by race or by gender. n=3,596
The magnitude of improvements in daily functioning (WHODAS) varied based on diagnostic status of participants (displayed below in Figures 25-27). PC-MHI participants diagnosed with PTSD, depression, and SMI showed greater improvements in daily functioning, but no differences were found for participants diagnosed with anxiety or SUD. Although some Veterans showed improvement, the average daily functioning score remained above the mental health clinical population norm for level of difficulties at discharge (score of 6.3).

**Figure 25. PC-MHI Program Daily Functioning (measured by WHODAS) Changes from Intake to Follow-up by PTSD Diagnosis.**

Lower scores reflect improvement. The WHODAS assesses difficulties in completing daily activities in communication, interpersonal relationships, completing work and household roles, self-care, and civic participation. Scores range from 0 to 48. The mean score for people with mental disorder has been found to be 6.3 (SD=7.1; Andrews et al., 2009). Baseline scores for PC-MHI participants at intake and at discharge remained above the threshold but decreased significantly for all Veterans by 90-days post-discharge. There were no significant differences by race or by gender. n=3,596.
Lower scores reflect improvement. The WHODAS assesses difficulties in completing daily activities in communication, interpersonal relationships, completing work and household roles, self-care, and civic participation. Scores range from 0 to 48. The mean score for people with mental disorder has been found to be 6.3 (SD=7.1; Andrews et al., 2009). Baseline scores for PC-MHI participants at intake and at discharge remained above the threshold but decreased significantly for all Veterans by 90-days post-discharge. There were no significant differences by race or by gender. n=3,596
FIGURE 27. PC-MHI PROGRAM DAILY FUNCTIONING (MEASURED BY WHODAS) CHANGES FROM INTAKE TO FOLLOW-UP BY SMI DIAGNOSIS.

Lower scores reflect improvement. The WHODAS assesses difficulties in completing daily activities in communication, interpersonal relationships, completing work and household roles, self-care, and civic participation. Scores range from 0 to 48. The mean score for people with mental disorder has been found to be 6.3 (SD=7.1; Andrews et al., 2009). Baseline scores for PC-MHI participants at intake and at discharge remained above the threshold but decreased significantly for all Veterans by 90-days post-discharge. There were no significant differences by race or by gender. n=3,596
The **ECHO scale measures perceived improvement** (over the past three months) with scores ranging from 3 to 15, where higher scores indicate greater perceived improvement. This analysis looked at follow-up scores only. There were no significant differences by gender in perceived improvement at follow-up. There were significant group differences by MH diagnosis (Figure 28 below). Veterans with anxiety reported greater improvement at follow-up than Veterans with SMI or depression (either alone or comorbid).

![Figure 28. PC-MHI Program Perceived Improvement (Measured by ECHO) at Follow-up by Diagnosis.](image)

**The perceived improvement scale within the ECHO Survey used for this evaluation comprises three items asking patients to compare their current health status with what it was in the three previous months. Scores range from 3 to 15, with higher scores indicating greater perceived improvement (Daniels et al., 2004; AHRQ, 2019). There were no significant differences by gender but significant differences by MH diagnosis. n=2,371**

The results of the analysis indicate that among Veterans newly enrolled in PC-MHI, there were no significant changes in mental well-being (SWEMW) from intake to follow-up. As mentioned previously, a higher score is considered to indicate “better” mental well-being (Haver et al., 2015). The average score at intake for this sample of Veterans was 19.7, and the average score at follow-up was 19.6. In addition, Veterans’ well-being was below the population norm reference score of 23.6 at both intake and follow-up (the Health Survey for England is the closest norm-based estimate currently available) (Ng Fat, 2017); however, studies have shown that the norm-based estimates for the SWEMW do not vary significantly across cultures (Stewart-Brown, 2013, Taggart et al., 2013). Furthermore, while scores did not significantly improve, the scores for Veterans in PC-MHI fell within a normal mental health clinical population range of 19.28 (SD 3.921) to 23.32 (SD 4.873) (Shah et al, 2018).

There were also no significant impacts on physical functioning (SF-12 (PCS)) or substance use (BAM-use subscale).

The lack of improvement in mental well-being (SWEMW) and physical functioning (SF-12 (PCS)) could suggest that there was not sufficient time to resolve all mental and physical health problems that may have brought the Veteran to treatment. It is promising that participants had symptom
reduction on the other measures, which indicates that they were experiencing some improvement, but it is likely that they would benefit from additional treatment in order to attain a state of wellness.

Results by Gender
There were no statistically significant differences by gender across any measures.

Veteran Satisfaction
Overall, Veterans report high satisfaction with services they received in PC-MHI (Figure 29 below). Most males (61 percent) reported “high quality” care and most females (60 percent) reported “high quality” care. Patient ratings of quality are the closest proxy for Veteran satisfaction currently available in the data.

![Veteran Satisfaction Results for PC-MHI by Gender](image)

**FIGURE 29.** **PC-MHI Program Veteran Satisfaction by Gender.**

*Note: n=3,596*

Impact of PC-MHI Program on Suicidal Ideation and Behavior—Columbia- Suicide Severity Rating Scale (C-SSRS) Methods and Results

Methods
The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Research shows that an individual exhibiting even a single behavior identified by the scale is 8 to 10 times more likely to die by suicide (Posner et al., 2011).

For scoring and evaluation purposes, it is recommended that the suicidal ideation (SI) and suicidal behavior (SB) components be analyzed separately (Nilsson et al., 2013). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). Suicidal behavior was coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer et al., 2011; Gipson et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care.
Descriptive analysis examined the changes in the proportion of Veterans reporting SI and SB in the three months from baseline to follow-up. Wilcoxon signed-rank test examined the significance of those changes in SI. To compare baseline and follow-up SB, an aggregated SB binary variable was created (1=reported any SB including preparatory acts or behavior, suicidal attempts, and suicide attempts that required medical care; 0=no SB). Chi-squared tests examined the significance of changes in this aggregated SB variable. Ordinal logistic regression compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). When the statistical assumption (parallel line assumption) of ordinal logistic regression was not met, multinomial logistic regression also compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). Because of the small sample size of Veterans who reported SB at follow-up, binary logistic regression, comparing baseline SB and follow-up SB (controlling for demographics, MH diagnosis, and lifetime SI and SB), was conducted for all programs instead of each program.

C-SSRS Findings

Veterans in PC-MHI reported less severe levels of SI at follow-up than at baseline, as displayed in Tables 30-31 below. This indicates PC-MHI is effective at reducing SI among participating Veterans.

![PC-MHI—Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Baseline](image)

**Figure 30. PC-MHI Program Percent of Veterans with Suicidal Ideation in Past 3 Months at Baseline.**

*The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=2402*
The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=2402

Furthermore, in both statistical Models A and B (shown in Table 9 below), results indicate that Veterans reported less severe levels of SI at follow-up as compared to baseline.

- In Model A, Veterans were 1.60 times more likely to be in a less severe level of SI at follow-up compared to baseline.
- In Model B, Veterans who reported passive SI at baseline were likely to report the same level of SI at follow-up, associated with an insignificant 0.94 odds ratio. Among Veterans who reported active SI (with or without intent, method, or plan), it was more likely to report no SI than to remain at the same level, with significant odds ratios of 2.68, 2.20, 2.97, and 5.49, respectively. The more severe the SI at baseline, the greater the movement to no SI at follow-up.
- This suggests that among Veterans who participated in PC-MHI, Veterans who entered services with lower severity SI remained at low levels of SI, and significant improvement occurred among Veterans who entered PC-MHI with higher severity SI.
TABLE 9. PC-MHI PROGRAM COLUMBIA SCALE SI ODDS RATIO ESTIMATES; MODEL A AND MODEL B

<table>
<thead>
<tr>
<th>Effect</th>
<th>Point Estimate</th>
<th>95% Wald Confidence Limits</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model A: Ordinal Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>1.595</td>
<td>1.363</td>
<td>1.866</td>
</tr>
<tr>
<td><strong>Model B: Multinomial Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline vs. Follow-up Suicidal Ideation (SI) (ref= No SI)</td>
<td>0.940</td>
<td>0.781</td>
<td>1.132</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI (ref= No SI)</td>
<td>2.677</td>
<td>1.744</td>
<td>4.109</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI w/method, no intent or plan</td>
<td>2.204</td>
<td>1.466</td>
<td>3.315</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI w/method and intent</td>
<td>2.967</td>
<td>1.594</td>
<td>5.52</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI w/method, intent, and plan</td>
<td>5.488</td>
<td>2.869</td>
<td>10.496</td>
</tr>
</tbody>
</table>

*Note: Significant finding as indicated by p-value of ≤ 0.05.
The Columbia Scale also asks Veterans about suicidal behavior (SB). At follow-up, fewer Veterans reported SB than at baseline (Figure 32 below).

**FIGURE 32. PC-MHI PROGRAM PERCENT OF VETERANS WITH SUICIDAL BEHAVIOR AT BASELINE AND FOLLOW-UP.**

The Columbia Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal behavior is coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer, et al., 2011; Gipson, et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care. n=2402

*Note: Only significant difference between baseline and follow-up is for “Any Suicide Behavior” category.

**Conclusions**

Similar to GMHS, Veterans receiving PC-MHI services experienced significant improvement in outcomes of mental distress, mental functioning, and daily functioning. However, even with improvement, Veterans still fall below the general population norms. Younger Veterans (less than 35 years old) had greater improvement in mental distress and mental functioning compared to older Veterans, although older Veterans perceived their improvement to be greater. These findings are consistent with recent research in which younger Veterans receiving treatment for depression in PC-MHI were more likely to achieve remission than older Veterans receiving the same treatment (Rossum et al., 2017). However, in FY2018, Veterans 36 years or older constituted 79 percent of those served in PC-MHI (SMITREC/OMHSP, 2019). Further research is needed to identify underlying factors (other than age) that explain the differential age-dependent outcomes in order to improve services for older Veterans in PC-MHI. The PC-MHI program may benefit from exploring what can be done to tailor services more specifically to the needs of older Veterans in order to provide more Veteran-centric care.

Also similar to GMHS, Veterans in PC-MHI did not experience significant change in the outcome of mental well-being. As previously mentioned, it may simply be that the relationship between absence of distress and well-being is complex such that feelings of well-being emerge only after treatment and sustained gains in symptom levels. Future evaluations of the VA PC-MHI program
should be longitudinal in nature to investigate the nature of well-being within a Veteran population over a longer period of time.

Veterans’ perceived improvement at follow-up differed significantly by MH diagnosis. Veterans with anxiety reported the greatest improvement compared to other diagnoses, which as mentioned previously, is an important indication of other positive health outcomes and quality of care. There were no differences between male and female Veterans on perceived improvement. Similarly, Veterans of both genders expressed high satisfaction with PC-MHI services.

Overall, Veterans in PC-MHI reported less severe levels of suicidal ideation from baseline to follow-up. Veterans also reported less SB at follow-up compared to baseline. Furthermore, the more severe the SI at baseline, the greater the movement to less severe levels of SI at follow-up. These are positive findings indicating that PC-MHI was successful in reducing the severity of suicidal ideation and behavior among participants. (Refer to Chapter 5 for an overall analysis of the Columbia Scale and comparison between programs.)

Specialized Substance Use Disorder Services (SUD)

Outpatient

Program Description

The Specialized SUD outpatient program is designed to meet the needs of Veterans with SUD, particularly those Veterans with new onset, severe, or complex conditions (e.g., mental health and general medical comorbidities). The SUD outpatient program provides two types of outpatient care:

- **SUD Treatment Outpatient Clinics** - SUD Treatment Outpatient Clinics provide settings for initial and continuing outpatient care to Veterans with SUD other than those engaged in opioid agonist treatment in a regulated opioid treatment program.

- **Intensive Outpatient SUD Treatment** - Intensive Outpatient Programs (IOP) for SUD provide a specialized form of care whose intensity falls between residential or inpatient care and the more traditional models of outpatient care.

Some of the Veterans in the SUD program also receive medication-assisted treatment (MAT). MAT is the use of medications in combination with counseling and behavioral therapies for the treatment of substance use disorders.

The goal of the program is to help Veterans to recover from SUD and any co-occurring conditions the Veteran wants to address. The intended outcomes of the SUD Outpatient programs are improved quality of life, reduction in use/days of use, reduction in harm, prevention of relapse, and overall improvement in Veterans' functioning.

Evaluation Questions

- What were the characteristics and clinical diagnoses of Veterans enrolled in SUD outpatient services?
- What were the clinical outcomes associated with participation in SUD outpatient services? Did outcomes differ by treatment type (standard outpatient SUD vs. IOP)?
• Did outcomes differ for male and female Veterans? Did outcomes differ by age or race? Did outcomes differ by mental health diagnosis?
• What were Veterans' levels of satisfaction with SUD services by gender?
• Does participation in SUD lead to a reduction in suicidal ideation and behavior (C-SSRS)?

Methods

Data for the SUD program analyses were derived from the VOA baseline, the VOA follow-up, and additional demographic variables, mental health diagnoses, and program participation information extracted from medical records for each Veteran who completed the VOA. As noted in the methods section of this report (Chapter 2), individual responses of Veterans who completed the VOA were weighted to adjust for sampling and response rates, and to ensure that findings could generalize to the population of Veterans who started receiving SUD services in FY2018. Analysis examined standard outpatient as well as intensive outpatient (IOP). For the purpose of these analyses, treatment is considered to be IOP if a Veteran has four or more SUD treatment encounters within one week. To examine the effectiveness of the SUD program, the analysis utilized a mixed-effects model. The random effect was the facility variable, and the fixed effect variables were time, gender, race, age, IOP, and diagnoses (SMI, PTSD, depression, anxiety, and other MH). These analyses also examined differences between male and female Veterans, by age, and across Veterans from different racial groups. Details of analysis results are presented in Appendix B.

Table 10 below shows outcome measures used to evaluate this program and the psychological constructs they assess. Based on the objectives of the SUD program, the primary outcomes of interest are from the BAM measure (substance use, risk factors for substance use, and protective factors for substance use). All other outcomes listed below are secondary outcomes that may also be attained through participation in the program for some Veterans.

TABLE 10. DESCRIPTION OF SUD PROGRAM MEASURES

<table>
<thead>
<tr>
<th>Measures of Outcome</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief Addiction Monitor (BAM) Survey (Full Scale)</td>
<td>Substance use, risk factors for substance use, and protective factors for substance use</td>
</tr>
<tr>
<td>The Short Warwick-Edinburgh Mental Well-Being Scale (SWEMW)</td>
<td>Mental well-being</td>
</tr>
<tr>
<td>Kessler Psychological Distress Scale (K6)</td>
<td>Mental distress</td>
</tr>
<tr>
<td>SF-12 Health Survey (MCS)</td>
<td>Mental functioning (MCS)</td>
</tr>
<tr>
<td>WHO Disability Assessment Schedule (WHODAS)</td>
<td>Daily functioning</td>
</tr>
<tr>
<td>Experience of Care and Health Outcomes Survey (ECHO)</td>
<td>Perceived improvement</td>
</tr>
<tr>
<td>Columbia-Suicide Severity Rating Scale (C-SSRS)</td>
<td>Helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs</td>
</tr>
</tbody>
</table>

Because evaluation of the SUD program does not entail a comparative design, there is no cost analysis for the SUD program.
SUD Program Population Description

In FY2018, as displayed in Table 11 below, there were 17,369 Veterans who were newly enrolled in the SUD program and were eligible for the VOA. Most Veterans who participated in SUD treatment were male (92 percent), which is slightly greater than their overall representation within the military. Female Veterans constituted nearly 8 percent, which is lower than their overall representation within the military (Council on Foreign Relations, 2019). The majority were diagnosed with SUD, followed by depression, PTSD, and anxiety, which occur either alone or in combination (i.e., comorbid). While 94 percent of participants had an SUD diagnosis, nearly 6 percent of Veterans did not. The largest group of participants in FY2018 were White (56 percent). Black Veterans represented 30 percent of the total number of participants, with the rest of the population identifying as other/unknown (12 percent) and Hispanic (1 percent).

**Table 11. Characteristics of Veterans Newly Enrolled in the SUD Program and VOA Eligible in FY2018**

<table>
<thead>
<tr>
<th>Characteristics of Veterans Newly Enrolled in the SUD Program and VOA Eligible in FY2018</th>
<th>Total Number (n=17,369)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16006</td>
<td>92.15</td>
</tr>
<tr>
<td>Female</td>
<td>1363</td>
<td>7.85</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>9851</td>
<td>56.72</td>
</tr>
<tr>
<td>Black</td>
<td>5223</td>
<td>30.07</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>2090</td>
<td>12.03</td>
</tr>
<tr>
<td>Hispanic</td>
<td>205</td>
<td>1.18</td>
</tr>
<tr>
<td><strong>AGE GROUP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>3785</td>
<td>21.79</td>
</tr>
<tr>
<td>36-65 years</td>
<td>11375</td>
<td>65.49</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>2209</td>
<td>12.72</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>9118</td>
<td>52.5</td>
</tr>
<tr>
<td>PTSD</td>
<td>7185</td>
<td>41.37</td>
</tr>
<tr>
<td>Anxiety</td>
<td>5296</td>
<td>30.49</td>
</tr>
<tr>
<td>SUD</td>
<td>16370</td>
<td>94.25</td>
</tr>
<tr>
<td>SMI**</td>
<td>2752</td>
<td>15.84</td>
</tr>
<tr>
<td>Other MH Diagnosis</td>
<td>1060</td>
<td>6.1</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

Clinical Findings

The results of the analysis indicate that, among Veterans newly enrolled in SUD, there was a statistically significant reduction in substance use (measured by BAM substance use subscale) (Figure 33 below). There was also a statistically significant reduction in risk factors related to substance use (measured by BAM risk factor subscale) (Figure 34 below). Male Veterans had a greater decrease in risk factors compared to female Veterans (see Figure 39 below for gender differences).
The “use” subscale of the BAM is based on three items assessing frequency of use of prescription opioids, illegal substances, and alcohol, with scores ranging from 0 to 12. If a patient scores a 1 or greater, it calls for further examination and clinical attention (Veterans Health Administration, 2011). Overall, Veterans significantly reduced substance use from baseline to follow-up. n=971

The "risk factors" subscale of the BAM assesses exposure to factors likely to increase risk of substance use. A decrease in scores indicated lower risk for substance use. Veterans in the IOP had greater reduction in risk factors than Veterans who received non-intensive services. n=971
Additionally, overall, SUD participants had *statistically significant improvements* from intake to follow-up on the following outcomes:

- Mental distress (K6)
- Mental functioning (SF12 (MCS))

Veterans in the IOP program showed a greater improvement on measures of substance use, risk factors for substance use, and mental distress than those in the non-intensive group.

At intake, on average, Veterans had scores that were below the threshold for serious mental illness (score of 19), and they experienced statistically significant improvements from intake to follow-up. However, the magnitude of improvements in mental distress (K6) varied by diagnosis and program within SUD (displayed below in Figures 35-36). Veterans in the IOP group had greater improvement in mental distress than those in the non-intensive program. Participants with depression had greater improvements in mental distress compared to those with other diagnoses.

![SUD—Mental Distress (Measured by K6) Changes from Intake to Follow-up by IOP Group](image)

**FIGURE 35. SUD PROGRAM MENTAL DISTRESS (MEASURED BY K6) OVERALL CHANGES FROM INTAKE TO FOLLOW-UP AND BY IOP GROUP.**

Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. Veterans in the IOP group experienced greater improvements than those in the non-intensive program. There were no significant differences by race or by gender. n=971
Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, and they experienced statistically significant improvements over the 90-day period that was assessed. Veterans with a diagnosis of depression experienced greater improvements than those without a depression diagnosis. There were no significant differences by race or by gender. n=971
On average, participants in SUD showed improvements in **mental functioning (SF-12 (MCS))**, and this varied by age (displayed below in Figure 37). Younger Veterans (35 years and younger) showed greater improvement than older Veterans (36 years and older). Although Veterans showed improvement, the mental functioning scores remained below the population norm (norm-referenced score of 45 for the U.S. general population).

**FIGURE 37. SUD PROGRAM MENTAL FUNCTIONING (MEASURED BY SF-12 (MCS)) OVERALL CHANGES FROM INTAKE TO FOLLOW-UP AND BY AGE GROUP.**

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the US general population serving as the reference (Ware et al., 1998). Respondent scores below 45 can be interpreted as being below the average range for the general U.S. population. The Veterans in this study began treatment with MCS scores below the population norm. Although they improved their mental functioning scores, they remained below the population norm. Scores varied by age. Younger Veterans (35 years and younger) showed greater improvement than older Veterans (36 years and older). There were no significant differences by race or by gender. n=971
The **ECHO scale measures perceived improvement** (over the past three months) with scores ranging from 3 to 15, where higher scores indicate greater perceived improvement. This analysis looked at follow-up scores only. There were **no group differences**, including by gender, in perceived improvement at follow-up. Figure 38 below shows the follow-up ECHO scores for all Veterans and by gender (no significant differences).

**Figure 38. SUD Program Perceived Improvement (Measured by ECHO) at Follow-up by Gender.**

The perceived improvement scale within the ECHO Survey used for this evaluation comprises three items asking patients to compare their current health status with what it was in the three previous months. Scores range from 3 to 15, with higher scores indicating greater perceived improvement (Daniels et al., 2004; AHRQ, 2019). There were **no significant group differences**. *n=598*

There were **no significant changes** in the outcomes of **mental well-being (SWEMW), daily functioning (WHODAS) or protective factors for substance use (BAM)** from intake to follow-up. As mentioned previously (see GMHS), the idea of measuring well-being is relatively new. It is promising that participants experienced improvements in the primary measure of substance use. Perhaps with a longer period of time to measure, subsequent improvements to well-being may occur.

On average, SUD services had similar impacts, regardless of Veteran’s race.

**Results by Gender**

Results differed statistically by gender for **risk factors for substance use (BAM)** (displayed below in Figure 39). Male Veterans had a greater decrease in risk factors compared to female Veterans.
The “risk factors” subscale of the BAM assesses exposure to factors likely to increase risk of substance use. A decrease in scores indicated lower risk for substance use. Male Veterans had a greater decrease in risk factors than compared to female Veterans. 

Results for protective factors for substance use (BAM) did not significantly differ by gender (displayed below in Figure 40). Males and females showed approximately the same improvement in substance use.

The “use” subscale of the BAM is based on three items assessing frequency of use of prescription opioids, illegal substances, and alcohol, with scores ranging from 0 to 12. If a patient scores a 1 or greater, it calls for further examination and clinical attention (Veterans Health Administration, 2011). Overall, Veterans of both genders significantly reduced substance use from baseline to follow-up. There were no significant differences in changes by gender. n=971
Veteran Satisfaction

Overall, Veterans report high satisfaction with services they received in the SUD program. Most males (52 percent) reported “high quality” care, and most females (61 percent) reported “high quality” care. There was no statistically significant difference between genders. Patient ratings of quality are the closest proxy for Veteran satisfaction currently available in the data.

![Veteran Satisfaction Results for SUD by Gender](image)

**Figure 41. SUD Program Veteran Satisfaction by Gender.**

*Note: n=971*

Impact of SUD Program on Suicidal Ideation and Behavior—Columbia-Suicide Severity Rating Scale (C-SSRS) Methods and Results

**Methods**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Research shows that an individual exhibiting even a single behavior identified by the scale is 8 to 10 times more likely to die by suicide (Posner et al., 2011).

For scoring and evaluation purposes, it is recommended that the suicidal ideation (SI) and suicidal behavior (SB) components be analyzed separately (Nilsson et al., 2013). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). Suicidal behavior was coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer et al., 2011; Gipson et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care.

Descriptive analysis examined the changes in the proportion of Veterans reporting SI and SB in the three months from baseline to follow-up. Wilcoxon signed-rank test examined the significance of those changes in SI. To compare baseline and follow-up SB, an aggregated SB binary variable was created (1=reported any SB including preparatory acts or behavior, suicidal attempts, and suicide attempts that required medical care; 0=no SB). Chi-squared tests examined the
significance of changes in this aggregated SB variable. Ordinal logistic regression compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). When the statistical assumption (parallel line assumption) of ordinal logistic regression was not met, multinomial logistic regression also compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). Because of the small sample size of Veterans who reported SB at follow-up, binary logistic regression, comparing baseline SB and follow-up SB (controlling for demographics, MH diagnosis, and lifetime SI and SB), was conducted for all programs instead of each program.

C-SSRS Findings

Veterans receiving SUD services reported less severe levels of SI at follow-up than at baseline as displayed in Figures 42-43 below. This indicates SUD services are effective at reducing SI among participating Veterans.

**Figure 42. SUD Program Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Baseline.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=602
The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=602

Furthermore, in both statistical Models A and B (shown in Table 12 below), results indicate that Veterans reported less severe levels of SI at follow-up as compared to baseline.

- In Model A, Veterans were 1.89 times more likely to report a less severe level of SI than to stay at the same level.
- In Model B, Veterans who reported passive SI, active non-specific SI, or active SI without intent or plan at baseline were likely to report the same level of SI at follow-up than to move to no SI, associated with an insignificant odds ratio. Among Veterans who reported active SI with method, intent or plan, it is more likely to report no SI than to remain at the same level, with significant odds ratios of 3.90 and 8.94, respectively.
- This suggests that among Veterans who participated in SUD services, Veterans who entered services with lower severity SI remained at low levels of SI, and significant improvement occurred among Veterans who entered SUD services with higher severity SI (active SI with method, intent, or plan).
<table>
<thead>
<tr>
<th>Effect</th>
<th>Point Estimate</th>
<th>95% Wald Confidence Limits</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model A: Ordinal Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>1.887</td>
<td>1.422</td>
<td>2.503</td>
</tr>
<tr>
<td><strong>Model B: Multinomial Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline vs. Follow-up Passive SI</td>
<td>1.032</td>
<td>0.727</td>
<td>1.466</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active Non-specific SI</td>
<td>1.807</td>
<td>0.964</td>
<td>3.386</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI w/method, no intent or plan</td>
<td>1.935</td>
<td>0.965</td>
<td>3.879</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI w/method and intent</td>
<td>3.901</td>
<td>1.611</td>
<td>9.446</td>
</tr>
<tr>
<td>Baseline vs. Follow-up Active SI w/method, intent, and plan</td>
<td>8.938</td>
<td>2.982</td>
<td>26.797</td>
</tr>
</tbody>
</table>

*Note: Significant finding as indicated by p-value of ≤ 0.05.*
The Columbia Scale also asks Veterans about suicidal behavior (SB). At follow-up, fewer Veterans reported SB (Figure 44 below).

![Columbia Scale Percent of Veterans with Suicide Behavior](image)

**Figure 44. PC-MHI Program Percent of Veterans with Suicidal Behavior at Baseline and Follow-up.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal behavior is coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer, et al., 2011; Gipson, et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care. n=602

*Note: Only significant difference between baseline and follow-up is for “Any Suicide Behavior” category.

**Conclusions**

SUD specialized services are designed to meet the needs of Veterans with SUD diagnoses, including those with coexisting mental health or general health comorbidities. The program operates as a standard outpatient and a more intensive outpatient (IOP). Importantly, the SUD program is meeting the needs of Veterans in the primary outcome of reduction in substance use. There were significant reductions in both reported substance use and risk factors for substance use (with males experiencing greater reduction in risk factors compared to females). Veterans in IOP had a greater reduction in substance use and risk factors for substance use. All Veterans experienced significant improvements in mental distress and mental functioning, however Veterans in the IOP group had a greater reduction in mental distress than those in the standard outpatient group. Taken together, this suggests that all SUD services are effective, with an even stronger effect for IOP services.

However, it is interesting to note that baseline scores for substance use did not differ between those who received standard SUD outpatient services or IOP services. Intuitively, one might expect that those in IOP have more severe substance use levels that necessitate more intensive services, but this finding suggests that perhaps the distinction between whether a Veteran is referred to one program or the other is not based on severity, even after controlling for facility effects. It may be worth considering how and why Veterans are referred to one program vs. the
other, both in terms of what standard outpatient and intensive outpatient programs are designed to accomplish, and with respect to providing the most effective services to all Veterans. It is important to note, however, that not every facility offers both standard SUD and IOP services. Furthermore, some facilities may choose to offer all of their SUD program in an IOP format.

As with several other programs evaluated, there were no changes in outcomes of well-being. Furthermore, no changes were found in levels of protective factors against substance use. Both psychological constructs are more difficult to measure and could take a longer time to see meaningful change, especially given the challenges faced by patients in the first three months of SUD treatment. It is encouraging to note that substance use levels and mental distress symptom levels can improve, even when overall well-being has not yet demonstrated a similar improvement.

Overall, Veterans receiving SUD services reported less severe levels of suicidal ideation from baseline to follow-up. The program appears to be most beneficial for those with the most severe SI. Those who reported active SI with intent, method, or plan were more likely to report no SI at baseline than to remain the same. Veterans also reported less SB at follow-up than at baseline. This is a very positive and reassuring finding that indicates the positive impact the SUD program is having on Veterans’ SI, particularly when it is the most severe level of SI. (Refer to Chapter 5 for an overall analysis of the Columbia Scale and comparison between programs.)

Veterans had a positive perceived improvement at follow-up, and Veterans of both genders expressed high satisfaction with the services they received in the SUD program, indicating that Veterans felt the SUD services provided were of value to them.

Program Description

Specialized Posttraumatic Stress Disorder (PTSD) Services provide a continuum of care from outpatient PTSD specialists and Clinical Teams (PCTs) through specialized inpatient units, brief-treatment units, and residential rehabilitation programs. The primary goal is to help Veterans reduce symptoms of PTSD as well as any other comorbid disorders and to improve overall functioning and quality of life. In addition to screening for and monitoring of PTSD symptoms, Specialized PTSD services can include the following:

- Acute stabilization and intervention, including hospitalization, as necessary
- Treatment and rehabilitation, short-term or long-term (greater than 30 days), on an outpatient or residential basis for those patients in need of such a setting
- Other outpatient care, encompassing continuing care, monitoring, and relapse prevention for those with SUD comorbidity and follow-up assessments

For the purpose of this evaluation and this section of the report, we focus only on the Outpatient Specialized PTSD program. Further in the report, we look at the Residential PTSD program (PTSD-RRTP).
Evaluation Questions

- What were the characteristics and clinical diagnoses of Veterans enrolled in Specialized PTSD services?
- What were the clinical outcomes associated with participation in Specialized PTSD services?
- Did clinical outcomes differ for Veterans with prior PTSD-RRTP (residential treatment) enrollment versus those Veterans that had no PTSD-RRTP enrollment (prior to enrollment in Specialized PTSD services)?
- Did outcomes differ for male and female Veterans? Did outcomes differ by age or race? Did outcomes differ by mental health diagnosis?
- What were Veterans’ levels of satisfaction with Specialized PTSD services by gender?
- Does participation in Specialized PTSD lead to a reduction in suicidal ideation and behavior (C-SSRS)?

Methods

Data for the Specialized PTSD analyses were derived from the VOA baseline, the VOA follow-up, and additional demographic variables, mental health diagnoses, and program participation information extracted from medical records for each Veteran who completed the VOA. As noted in the methods section of this report (Chapter 2), individual responses of Veterans who completed the VOA were weighted to adjust for sampling and response rates and to ensure that findings could generalize to the population of Veterans who started receiving Specialized PTSD care in FY2018. Mixed-effect modeling was then used to examine the differences between the baseline results and the follow-up results on the SWEMW, K6, SF-12, BAM, and WHODAS measures, controlling facility as random effect. Mixed-effect models also controlled for baseline factors and covariates including demographic variables, mental health diagnosis, prior PTSD residential treatment (PTSD-RRTP), number of Specialized PTSD encounters (from baseline to follow-up), and baseline measures of outcomes. Because ECHO is a patient experience survey asking patients’ improvement in the past three months, the follow-up ECHO scores were not compared with baseline scores. Mixed-effect models were used to examine differences between male and female Veterans, by age, across Veterans from different racial groups, and across Veterans with different mental health diagnosis. Details of analysis results are presented in Appendix B.

Table 13 below shows outcome measures used to evaluate this program and the psychological constructs they assess. Based on the objectives of Specialized PTSD services, improvement in PTSD symptoms is the primary outcome that is anticipated for Veterans enrolled in services. All other outcomes listed below are secondary outcomes that may also be attained through participation in the program for some Veterans. Although substance use (measured by average BAM use score) is not necessarily a direct outcome for the Specialized PTSD program, this measure was examined due to the connection between PTSD and substance use (both for general and Veteran populations) found in the literature (Teeters et al., 2017; Jacobson et al., 2001; Pietrzak et al., 2011; Tull et al., 2013; Tull et al., 2011).
### Description of Specialized PTSD Program Measures

<table>
<thead>
<tr>
<th>Measures of Outcome</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD Checklist (PCL-5)</td>
<td>PTSD symptoms</td>
</tr>
<tr>
<td>The Short Warwick-Edinburgh Mental Well-Being Scale (SWEMW)</td>
<td>Mental well-being</td>
</tr>
<tr>
<td>Kessler Psychological Distress Scale (K6)</td>
<td>Mental distress</td>
</tr>
<tr>
<td>SF-12 Health Survey (PCS and MCS)</td>
<td>Physical functioning (PCS) Mental functioning (MCS)</td>
</tr>
<tr>
<td>WHO Disability Assessment Schedule (WHODAS)</td>
<td>Daily functioning</td>
</tr>
<tr>
<td>Experience of Care and Health Outcomes Survey (ECHO)</td>
<td>Perception of improvement</td>
</tr>
<tr>
<td>Brief Addiction Monitor (BAM) Survey (Substance Use Subscale)</td>
<td>Substance use</td>
</tr>
<tr>
<td>Columbia-Suicide Severity Rating Scale (C-SSRS)</td>
<td>Helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs</td>
</tr>
</tbody>
</table>

Due to difficulties in trying to identify adequate case controls for patients treated in the Specialized PTSD program, there is no cost or cost-effectiveness analysis.

### Specialized PTSD Population Description

In FY2018, there were 16,308 Veterans who were newly enrolled in the Specialized PTSD program and were eligible for the VOA. Most of these Veterans participating in Specialized PTSD services were male (83.65 percent), with females constituting 16 percent, which is comparable to their overall representation within the military. The majority were diagnosed with PTSD, depression, and anxiety, which occur either alone or in combination (i.e., comorbid). About 26 percent of Veterans in Specialized PTSD services had an SUD comorbidity. The largest group of participants were White (56.8 percent). Black Veterans represented 26 percent of the total number of participants, Hispanic represented 2 percent, and other/unknown represented 15 percent.
TABLE 14. CHARACTERISTICS OF VETERANS NEWLY ENROLLED IN SPECIALIZED PTSD PROGRAM IN FY2018

<table>
<thead>
<tr>
<th>Characteristics of Veterans Newly Enrolled in Specialized PTSD Program in FY2018</th>
<th>Total Number (n=16,308)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13642</td>
<td>83.65</td>
</tr>
<tr>
<td>Female</td>
<td>2666</td>
<td>16.35</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>9263</td>
<td>56.80</td>
</tr>
<tr>
<td>Black</td>
<td>4253</td>
<td>26.07</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>2463</td>
<td>15.10</td>
</tr>
<tr>
<td>Hispanic</td>
<td>329</td>
<td>2.01</td>
</tr>
<tr>
<td><strong>AGE GROUP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>4261</td>
<td>26.13</td>
</tr>
<tr>
<td>36-65 years</td>
<td>8728</td>
<td>53.52</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>3319</td>
<td>20.35</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>14495</td>
<td>88.88</td>
</tr>
<tr>
<td>Depression</td>
<td>9527</td>
<td>58.42</td>
</tr>
<tr>
<td>Anxiety</td>
<td>5377</td>
<td>32.97</td>
</tr>
<tr>
<td>SUD</td>
<td>4335</td>
<td>26.58</td>
</tr>
<tr>
<td>SMI**</td>
<td>1282</td>
<td>7.86</td>
</tr>
<tr>
<td>Other MH</td>
<td>581</td>
<td>3.56</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

Clinical Findings

Approximately 88 percent of Veterans in the Specialized PTSD program sample have a diagnosis of PTSD. Among those with a PTSD diagnosis, 18 percent had comorbid SUD, 29 percent had comorbid anxiety, and 51 percent had comorbid depression.

On average, Veterans in the Specialized PTSD program achieved a statistically significant decrease in the primary outcome of PTSD symptoms (PCL-5) from intake to follow-up. No group differences (e.g., gender, race, age, MH diagnosis) in the magnitude of change were found. Over one third of Veterans (36.1 percent) reported a decrease of 10 or more points and nearly half (48.9 percent) reported a decrease of 5 or more points. The overall reduction in PTSD symptoms for all participants is displayed below in Figure 45.
Scores on the PCL-5 range from 0 to 80. A total score of 33 or higher suggests the patient may benefit from PTSD treatment. Within the 90 days from baseline to follow-up, both male and female Veterans experienced significant declines in PTSD symptoms (Blevins et al., 2015). \( n=1,146 \)

Additionally, overall, Specialized PTSD participants had statistically significant improvement from intake to follow-up on the following outcomes:

- Mental distress (K6)
- Mental functioning (SF12 (MCS))

On average, Specialized PTSD services had similar impacts, regardless of a Veteran’s race. The only gender difference identified in the analyses as statistically significant (presented below in Figure 54) was found for the ECHO scale, indicating that male Veterans had greater perceived improvement than female Veterans (at follow-up). There were no significant impacts on:

- Mental well-being (SWEMW)
- Daily functioning (WHODAS)
- Physical functioning (SF-12 (PCS))

The magnitude of improvement in mental distress (K6) varied by age and diagnosis (displayed below in Figures 46-49). Younger Veterans (35 years and younger) had greater improvement in mental distress than older Veterans (36 years and older). By diagnosis, Veterans with MH comorbidities (i.e. SMI and depression diagnoses) had greater improvement in mental distress. Veterans with an SUD diagnosis (either alone or comorbid) had improvement in mental distress, but less so than Veterans with other diagnoses.
Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, but they experienced statistically significant improvements over the 90-day period that was assessed. Scores varied by age and diagnosis. There were no significant differences by race or by gender. 

n=1,146
FIGURE 47. SPECIALIZED PTSD PROGRAM MENTAL DISTRESS (MEASURED BY K6) CHANGES FROM INTAKE TO FOLLOW-UP BY SMI DIAGNOSIS.

Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, but they experienced statistically significant improvements over the 90-day period that was assessed. Scores varied by age and diagnosis. There were no significant differences by race or by gender.

n=1,146

FIGURE 48. SPECIALIZED PTSD PROGRAM MENTAL DISTRESS (MEASURED BY K6) CHANGES FROM INTAKE TO FOLLOW-UP BY DEPRESSION DIAGNOSIS.

Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, but they experienced statistically significant improvements over the 90-day period that was assessed. Scores varied by age and diagnosis. There were no significant differences by race or by gender.

n=1,146
Lower scores on K6 reflect improvements. On the K6, based on the scoring of 1 to 5 for each item and total scores ranging from 6 to 30, scores above 19 are indicative of serious mental illness, as described by Furukawa et al. (2003). At intake, on average, Veterans had scores that were below the threshold for serious mental illness, but they experienced statistically significant improvements over the 90-day period that was assessed. Scores varied by age and diagnosis. There were no significant differences by race or by gender. 

n=1,146
The magnitude of improvement in mental functioning (SF-12 (MCS)) varied by age and diagnosis (displayed below in Figures 50-51). Younger Veterans (35 years and younger) had greater improvements in mental functioning than older Veterans (36 years and older). Veterans who had an SMI diagnosis had greater improvement in mental functioning than those with no SMI diagnosis. Overall, Veterans showed clinically significant improvement indicated by a change from baseline scores of 41.8, which is considered to be below the range of average mental functioning, to follow-up scores of 46.2, which indicate average mental functioning compared to the general population (Ware et al., 1998).

**Figure 50. Specialized PTSD—Mental Functioning (Measured by SF-12) Changes from Intake to Follow-up by Age Group.**

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference (Ware et al., 1998). Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and improved their mental functioning scores to levels that are considered average for the general population. Scores varied by age and diagnosis. There were no significant differences by race or by gender. n=1,146
FIGURE 51. SPECIALIZED PTSD PROGRAM MENTAL FUNCTIONING (MEASURED BY SF-12(MCS)) CHANGES FROM INTAKE TO FOLLOW-UP BY SMI DIAGNOSIS.

The mental component scale (MCS) within the SF-12 uses norm-referenced scoring with the U.S. general population serving as the reference (Ware et al., 1998). Respondent scores below 45 can be interpreted as being below the average range for the general population. The Veterans in this study began treatment with MCS scores below the population norm and improved their mental functioning scores to levels that are considered average for the general population. Scores varied by age and diagnosis. There were no significant differences by race or by gender. n=1,146
The ECHO scale measures perceived improvement (over the past three months) with scores ranging from 3 to 15, where higher scores indicate greater perceived improvement. This analysis looked at follow-up scores only. Male Veterans reported significantly greater improvement at follow-up compared to female Veterans (Figure 54 below). There were significant group differences in perceived improvement at follow-up by SUD diagnosis. Veterans without an SUD diagnosis reported greater improvement than Veterans with an SUD diagnosis (Figure 52 below).

![Specialized PTSD—Perceived Improvement (Measured by ECHO) by SUD diagnosis](image)

**Figure 52. Specialized PTSD Program Perceived Improvement (Measured by ECHO) at Follow-up by SUD Diagnosis.**

The perceived improvement scale within the ECHO Survey used for this evaluation comprises three items asking patients to compare their current health status with what it was in the three previous months. Scores range from 3 to 15, with higher scores indicating greater perceived improvement (Daniels et al., 2004; AHRQ, 2019). There were significant differences by gender and SUD diagnosis.

Veterans in the Specialized PTSD program significantly increased substance use (BAM) from baseline to follow-up (average BAM use score), however the differences were very small and likely do not represent a clinically significant change (shown in Figure 54 below). No group differences (e.g., gender, race, age, MH diagnosis) were found. However, Veterans with prior PTSD-RRTP (PTSD residential treatment) admissions in the one year prior to entry into Specialized PTSD outpatient services increased substance use more than Veterans with no prior PTSD-RRTP admissions. This could potentially be explained by Veterans being unable to use substances while in the residential treatment program (a regression to the mean effect) or that Veterans referred for residential treatment are more likely to have more severe and comorbid conditions.

Increased substance use is not a surprising finding as research shows that substance use can emerge secondary to PTSD symptoms in Veteran populations (Teeters et al., 2017). Additionally, substance use disorder and PTSD frequently co-occur among Veterans and are associated with poorer treatment outcomes (Jacobson et al., 2001; Pietrzak et al., 2011). Among both civilian and Veteran populations, researchers have found a high level of relapse in substance use after PTSD treatment (Tull et al., 2013; Tull et al., 2011). It is also not known if this is a short-term increase in substance use that may remit following the reduction in PTSD symptoms observed.
The “use” subscale of the BAM is based on three items assessing frequency of use of prescription opioids, illegal substances, and alcohol, with scores ranging from 0 to 12. If a patient scores a 1 or greater, it calls for further examination and clinical attention (Veterans Health Administration, 2011). Veterans significantly increased substance use from baseline to follow-up. No group differences (e.g., gender, race, age, MH diagnosis) were found. Veterans with prior PTSD-RRTP increased substance use more than those with no prior PTSD-RRTP. n=1,146.

Figure 53. Specialized PTSD Program Substance Use (Measured by BAM) Overall Changes From Intake To Follow-up And By Prior RRTP Admissions.
Results by Gender

Male Veterans had greater perceived improvement (measured by ECHO) than female Veterans (Figure 54).

**FIGURE 54. SPECIALIZED PTSD PROGRAM PERCEIVED IMPROVEMENT (MEASURED BY ECHO) CHANGES FROM INTAKE TO FOLLOW-UP BY GENDER.**

*The perceived improvement scale within the ECHO Survey used for this evaluation comprises four items asking patients to compare their current health status with what it was in the three previous months. Scores range from 3 to 15 (Daniels et al., 2004). Male Veterans had greater perceived improvement than male Veterans. n=1,146*
There were no significant differences in PTSD symptoms (PCL-5) by gender, but the overall changes for the population were reliable and significant. Figure 55 below displays the average scores at intake and follow-up for PTSD symptoms (PCL-5) by gender and overall for the entire population.

**Figure 55. Specialized PTSD Program Overall PTSD Symptom (Measured by PCL-5) Changes from Intake to Follow-up by Gender.**

Scores on the PCL-5 range from 0 to 80. A total score of 33 or higher suggests the patient may benefit from PTSD treatment. Within the 90 days from baseline to follow-up, all Veterans experienced significant declines in PTSD symptoms (though not clinically significant) (Blevins et al., 2015; National Center for PTSD, 2019). n=1,146
Veteran Satisfaction

Overall, Veterans report high satisfaction with the Specialized PTSD services they received. Most males (57 percent) reported “high quality” care, and most females (63 percent) reported “high quality” care. Patient ratings of quality are the closest proxy for Veteran satisfaction currently available in the data.

![Veteran Satisfaction Results for Specialized PTSD by Gender](image)

**FIGURE 56. SPECIALIZED PTSD PROGRAM VETERAN SATISFACTION BY GENDER.**

*Note: n=1,146*

Impact of Specialized PTSD Program on Suicidal Ideation and Behavior—Columbia-Suicide Severity Rating Scale (C-SSRS) Methods and Results

**Methods**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Research shows that an individual exhibiting even a single behavior identified by the scale is 8 to 10 times more likely to die by suicide (Posner et al., 2011).

For scoring and evaluation purposes, it is recommended that the suicidal ideation (SI) and suicidal behavior (SB) components be analyzed separately (Nilsson, et al., 2013). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). Suicidal behavior was coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer et al., 2011; Gipson et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care.

Descriptive analysis examined the changes in the proportion of Veterans reporting SI and SB in the three months from baseline to follow-up. Wilcoxon signed-rank test examined the significance of those changes in SI. To compare baseline and follow-up SB, an aggregated SB binary variable was created (1=reported any SB including preparatory acts or behavior, suicidal attempts, and suicide attempts that required medical care; 0=no SB). Chi-squared tests examined the
significance of changes in this aggregated SB variable. Ordinal logistic regression compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). When the statistical assumption (parallel line assumption) of ordinal logistic regression was not met, multinomial logistic regression also compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). Because of the small sample size of Veterans who reported SB at follow-up, binary logistic regression, comparing baseline SB and follow-up SB (controlling for demographics, MH diagnosis, and lifetime SI and SB), was conducted for all programs instead of each program.

C-SSRS Findings

Veterans receiving Specialized PTSD services reported less severe levels of SI at follow-up than at baseline as displayed in Figures 57-58 below. This indicates Specialized PTSD services are effective at reducing SI among participating Veterans.

![Specialized PTSD—Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Baseline](image)

**Figure 57. Specialized PTSD Program Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Baseline.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=710
Figure 58. Specialized PTSD Program Percent of Veterans with Suicidal Ideation (Measured by C-SSRS) in Past 3 Months at Follow-up.

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). n=710

Furthermore, in both statistical Models A and B (shown in Table 15 below), the results indicate that Veterans reported less severe levels of SI at follow-up as compared to baseline.

- In Model A, Veterans were 1.71 times more likely to report a less severe level of SI than to stay at the same level.
- In Model B, Veterans who reported passive SI at baseline were more likely to report the same level of SI at follow-up, associated with an insignificant 0.94 odds ratio. Among Veterans who reported active SI, with or without intent, method, or plan, it is more likely to report no SI at follow-up, with odds ratios of 2.15, 2.02, 20.0, and 5.85, respectively. It is worth noting that 17 Veterans (1.97 percent) reported active SI with method and intent at baseline and only 1 (0.14 percent) Veteran reported the same level of SI at follow-up. This dramatic change is seen with the large odds ratio in Model B (20.00).
Table 15. Specialized PTSD Program Columbia Scale SI Odds Ratio Estimates; Model A and Model B

<table>
<thead>
<tr>
<th>Effect</th>
<th>Point Estimate</th>
<th>95% Wald Confidence Limits</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model A: Ordinal Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>1.714</td>
<td>1.348</td>
<td>2.18</td>
</tr>
<tr>
<td><strong>Model B: Multinomial Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>Passive SI</td>
<td>0.889</td>
<td>0.665</td>
</tr>
<tr>
<td>Active Non-specific SI</td>
<td>2.151</td>
<td>1.207</td>
<td>3.832</td>
</tr>
<tr>
<td>Active SI w/method, no intent or plan</td>
<td>2.022</td>
<td>1.191</td>
<td>3.431</td>
</tr>
<tr>
<td>Active SI w/method and intent</td>
<td>20.002</td>
<td>2.632</td>
<td>152.022</td>
</tr>
<tr>
<td>Active SI w/method, intent, and plan</td>
<td>5.846</td>
<td>2.438</td>
<td>14.019</td>
</tr>
</tbody>
</table>

*Note: Significant finding as indicated by p-value of ≤ 0.05.

The Columbia Scale also asks Veterans about suicidal behavior (SB). At follow-up, fewer Veterans reported SB (Figure 59 below).

![Specialized PTSD—Percent of Veterans with Suicide Behavior (Measured by C-SSRS) at Baseline and Follow-up](image)

**Figure 59. Specialized PTSD Program Percent of Veterans with Suicidal Behavior at Baseline and Follow-up.**

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal behavior is coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer et al., 2011; Gipson et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care. n=710

*Note: Only significant difference between baseline and follow-up is for “Any Suicide Behavior” category.
Conclusions
This evaluation focused on the outpatient Specialized PTSD program. Most (88 percent) Veterans in this program had a PTSD diagnosis and many had other comorbid diagnoses including SUD, anxiety and/or depression. The program was successful in significantly reducing PTSD symptoms, regardless of a Veteran’s gender, race, age, or mental health diagnoses at intake.

Veterans had significant improvement in mental distress and mental functioning, on average. Younger Veterans (35 years and younger) had greater improvement in mental distress and mental functioning than Veterans 36 and older. Those with comorbid SUD diagnosis experienced improvement, but less so than other diagnoses. This may suggest that older Veterans (36 years and older) or those with comorbid SUD diagnoses would benefit from additional or more targeted services than they may be receiving as the current standard of care.

On average, Veterans in the Specialized PTSD program experienced a statistically significant but not clinically significant increase in substance use between baseline and follow-up. At first glance, this may be a surprising and concerning finding. However, as described in the findings section above, other research supports the findings that substance use can emerge secondary to PTSD symptoms in Veteran populations and that there is a high level of relapse in substance use after PTSD treatment. Further evaluation would be needed to determine if this is a short-term increase in substance use or one that is longer lasting. PTSD programs could also consider addressing the potential increase in substance use during and after PTSD treatment, in order to provide more targeted skills and inoculate against this pattern. This is in line with the current VA/DoD Clinical Practice Guideline recommendations for concurrent PTSD and SUD care (VA, 2017).

Overall, Veterans receiving Specialized PTSD services reported less severe levels of suicidal ideation from baseline to follow-up. Among Veterans with active SI, with or without intent, method, or plan, it is more likely to report no SI at follow-up as compared to baseline. For the most severe level of SI at baseline, only 1 of the 17 Veterans reported the same level of SI at follow-up. Veterans were also less likely to report any SB at follow-up compared to baseline. These are positive findings that indicate the Specialized PTSD program is successful in reducing the severity of SI for Veterans. (Refer to Chapter 5 for an overall analysis of the Columbia Scale and comparison between programs.)

Like the other programs evaluated, Veterans of both genders express high satisfaction with the quality of care received in Specialized PTSD.

Therapeutic and Supported Employment Services (TSES) Program Description
Therapeutic and Supported Employment Services (TSES) are based on a recovery-oriented model and offer a variety of employment skills and restoration services. TSES are offered to Veterans with psychiatric diagnoses who express a desire to obtain employment and work skills. The primary goal of the program is for Veterans to obtain and retain competitive community-based employment (CE). Veterans in the program may receive a wide variety of job training skills and supportive services to help them attain their employment goals. While in the program, Veterans
are financially compensated for their work, and in turn, improve their economic and social well-being as they prepare for re-entry into community employment. TSES consists of two broad categories of services—Compensated Work Therapy (CWT) and Incentive Therapy (IT). However, CWT services are the most commonly provided services through models of Transitional Work (TW), Supported Employment (SE) and Community-Based Employment Services (CBES). The 2019 evaluation examined the impacts of the following three CWT models.

- **Transitional Work (TW):** Time-limited program that provides a work opportunity for Veterans. Allows the Veteran opportunities to develop experience, history, and references while learning and developing appropriate work habits and behaviors. The goal is for the Veteran to leave the program employed.

- **Supported Employment (SE):** Time-unlimited program for Veterans with a psychotic disorder (constituting 75 percent of the caseload) and with the most significant level of impairment and support needs. However, it is also effective for other populations. The goal is to provide direct, competitive community-based employment and intense follow-along support for as long as clinically indicated.

- **Community-Based Employment Services (CBES):** This program is less intensive than SE and not specifically targeted to Veterans with diagnosis of psychosis. It provides a range of services leading to direct placement in CE, where an employer hires a Veteran, and the Veteran receives continuing clinical support.

**Evaluation Questions**

- What were the characteristics and clinical diagnoses of Veterans enrolled in TSES (by SE, TW, and CBES program)?
- How long did Veterans remain in TSES (length of participation in months)? Did outcomes differ by length of participation?
- To what extent did Veterans obtain competitive community-based employment (full- or part-time) at the time of discharge from TSES?
- What were the predictors for competitive employment after TSES?
- What were the differences in characteristics of participants and outcomes across SE, TW, and CBES?
- Did outcomes differ for male and female Veterans? Did outcomes differ by age or race?
- Did outcomes differ by mental health diagnosis? Did outcomes differ by months of prior unemployment or by types of other income supplements received (SSI/SSDI/NSCP)?

**Methods**

In calendar year 2015, NEPEC began tracking program participants’ employment status while in the program. Data for these analyses were extracted from the NEPEC clinician-recorded employment forms completed at intake and follow-up, job start and job end forms (SE and CBES), job placement start and assignment end forms (TW), as well as demographic, diagnosis, and Elixhauser scores recorded in medical and administrative records. The sample includes Veterans for whom a TSES discharge form was completed between FY2015-FY2018 and for whom intake forms were also available. For Veterans with more than one intake and discharge from TSES during this time period, we selected the most recent intake to TSES for analysis.

To measure program effectiveness, the analyses utilized competitive status at discharge as well as percent of time maintaining competitive employment while in the program. Since the program services are delivered through different models—TW, SE, and CBES—all the analyses for TSES evaluation utilized a stratified model. To examine the effectiveness of the program, the analyses
utilized a chi-square test to examine employment status changes from intake to discharge. The Evaluation Team also applied K-nearest neighbor regression to predict competitive community-based employment at discharge.

These analyses also examined differences between male and female Veterans, by age, and across different racial groups. Details of analysis results are presented in Appendix B.

Table 16 shows the primary outcome measures used to evaluate this program. Based on the objectives of TSES, competitive employment is the primary outcome that is anticipated for Veterans enrolled in services. **Competitive employment (CE) is defined as paid employment, either part or full time. For TW, during program participation, employment is a set-aside and not competitive (job placement).** Other type of work, including student, trainee, or volunteer work, was recorded by programs, but for the purpose of this evaluation, competitive employment at discharge is considered to be the primary outcome.

*As the evaluation of TSES does not entail a comparative design, no cost-effectiveness analysis was completed for TSES.*

### TABLE 16. DESCRIPTION OF TSES PROGRAM MEASURES

<table>
<thead>
<tr>
<th>Description of TSES Program Measures</th>
<th>Measures of Outcome</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive employment (CE) and Job placement data</td>
<td>Job placement during program stay, CE status at discharge, number of jobs, and time employed</td>
<td></td>
</tr>
<tr>
<td>Predicted probability of competitive employment</td>
<td>The predicted likelihood of CE at discharge based on length of stay in TSES and predictor variables</td>
<td></td>
</tr>
</tbody>
</table>

**TSES—Transitional Work (TW) Population Description and Results**

**TW Program Population Description**

In FY2015-FY2018, most participants in the TW program were male (90 percent), White (48 percent), and between the ages of 36-65 years (nearly 80 percent) (as displayed in Table 17 below). More than half of the Veterans were homeless or receiving homeless services (52 percent). Most participants were diagnosed with either PTSD (nearly 29 percent), depression (nearly 29 percent), and/or SMI (nearly 20 percent). Nearly all Veterans were not receiving Supplemental Security Income (SSI)/Social Security Disability Insurance (SSDI) (94 percent), consistent with the age group (less than 65 years) of most program participants. More Black Veterans (40 percent) in the TW program were diagnosed with SUD than in the SE program (presented further below). There were fewer Veterans diagnosed with SMI in the TW program than the SE program, which is consistent with the goals of these programs.
### Table 17. Characteristics of TW Sample FY2015 through FY2018

<table>
<thead>
<tr>
<th>Characteristics of TW Sample FY2015 through FY2018</th>
<th>Total Number (n=25,495)*</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23120</td>
<td>90.68</td>
</tr>
<tr>
<td>Female</td>
<td>2327</td>
<td>9.13</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>12350</td>
<td>48.44</td>
</tr>
<tr>
<td>Black</td>
<td>10353</td>
<td>40.61</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>2607</td>
<td>10.23</td>
</tr>
<tr>
<td>Hispanic</td>
<td>185</td>
<td>0.73</td>
</tr>
<tr>
<td><strong>AGE GROUP</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>4134</td>
<td>16.21</td>
</tr>
<tr>
<td>36-65 years</td>
<td>20292</td>
<td>79.59</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>1021</td>
<td>4.00</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong></td>
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<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>7350</td>
<td>28.83</td>
</tr>
<tr>
<td>Depression</td>
<td>7482</td>
<td>29.35</td>
</tr>
<tr>
<td>Anxiety</td>
<td>839</td>
<td>3.29</td>
</tr>
<tr>
<td>Personality disorder or other</td>
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<tr>
<td>SMI***</td>
<td>5094</td>
<td>19.98</td>
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<tr>
<td>No MH</td>
<td>4486</td>
<td>17.60</td>
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<tr>
<td><strong>SUD DIAGNOSIS</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18155</td>
<td>71.21</td>
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<tr>
<td>No</td>
<td>7340</td>
<td>28.79</td>
</tr>
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<td><strong>HOMELESS OR RECEIVING HOMELESS SERVICES</strong></td>
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<tr>
<td>No</td>
<td>12154</td>
<td>47.67</td>
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<td>936</td>
<td>3.67</td>
</tr>
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<td>19906</td>
<td>78.08</td>
</tr>
<tr>
<td>&gt;5</td>
<td>4653</td>
<td>18.25</td>
</tr>
<tr>
<td><strong>PERIOD OF SERVICE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WWII</td>
<td>6958</td>
<td>27.29</td>
</tr>
<tr>
<td>Pre-Korean Conflict</td>
<td>17678</td>
<td>69.34</td>
</tr>
<tr>
<td>Korean Conflict</td>
<td>859</td>
<td>3.37</td>
</tr>
<tr>
<td>Between Korea/Vietnam</td>
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<td>0.00</td>
</tr>
<tr>
<td>Vietnam Era</td>
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<td>0.02</td>
</tr>
<tr>
<td>Post-Vietnam</td>
<td>10</td>
<td>0.04</td>
</tr>
<tr>
<td>Persian Gulf War</td>
<td>54</td>
<td>0.21</td>
</tr>
<tr>
<td>OEF/OIF/OND****</td>
<td>3497</td>
<td>13.72</td>
</tr>
<tr>
<td><strong>RECEIVING NON-SERVICE-CONNECTED PAY (NSCP)</strong>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4977</td>
<td>19.52</td>
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<tr>
<td>No</td>
<td>5495</td>
<td>21.55</td>
</tr>
<tr>
<td><strong>RECEIVING SSI/SSDI</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1517</td>
<td>5.95</td>
</tr>
<tr>
<td>No</td>
<td>23978</td>
<td>94.05</td>
</tr>
</tbody>
</table>

*Note: Total n includes missing demographic data (gender and age) for 48 participants.

**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

***Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.
Length of Participation (LOP)
As displayed in Table 18 below, Veterans in TW who were older than 65 years stayed in the program longer (Length of Participations (LOP)) (5.89 months) than those who were 35 years and younger (4.21 months). Veterans with no SUD diagnosis stayed in the program longer (5.7 months) than those with a SUD diagnosis (5.0 months). Veterans who were receiving SSI/SSDI stayed in the program longer (5.5 months) than those who did not receive SSI/SSDI (5.23 months).

**TABLE 18. TW Program Length of Participation (Number of Months) FY2015 through FY2018**

<table>
<thead>
<tr>
<th>TW Program Length of Participation (Number of Months) FY2015 through FY2018</th>
<th>Total Number (n)</th>
<th>Mean (M)</th>
<th>Standard Deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>25,046*</td>
<td>5.24</td>
<td>4.43</td>
</tr>
<tr>
<td><strong>GENDER</strong>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22706</td>
<td>5.25</td>
<td>4.43</td>
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<tr>
<td>Female</td>
<td>2293</td>
<td>5.24</td>
<td>4.44</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>12147</td>
<td>5.02</td>
<td>4.41</td>
</tr>
<tr>
<td>Black</td>
<td>10166</td>
<td>5.49</td>
<td>4.43</td>
</tr>
<tr>
<td>Other</td>
<td>1679</td>
<td>5.26</td>
<td>4.65</td>
</tr>
<tr>
<td>Hispanic</td>
<td>179</td>
<td>5.12</td>
<td>4.2</td>
</tr>
<tr>
<td>Unknown</td>
<td>875</td>
<td>5.35</td>
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<td><strong>AGE</strong>*</td>
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</tr>
<tr>
<td>0-35 years</td>
<td>4063</td>
<td>4.21</td>
<td>3.71</td>
</tr>
<tr>
<td>36-65 years</td>
<td>19935</td>
<td>5.42</td>
<td>4.53</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>1001</td>
<td>5.89</td>
<td>4.54</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>7232</td>
<td>4.94</td>
<td>4.26</td>
</tr>
<tr>
<td>Depression</td>
<td>7338</td>
<td>5.58</td>
<td>4.55</td>
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<tr>
<td>Anxiety</td>
<td>825</td>
<td>5.26</td>
<td>4.16</td>
</tr>
<tr>
<td>Personality disorder or other</td>
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<tr>
<td>SMI***</td>
<td>4993</td>
<td>4.66</td>
<td>4.26</td>
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<tr>
<td>No MH</td>
<td>4418</td>
<td>5.77</td>
<td>4.6</td>
</tr>
<tr>
<td><strong>SUD DIAGNOSIS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17857</td>
<td>5.05</td>
<td>4.40</td>
</tr>
<tr>
<td>No</td>
<td>7189</td>
<td>5.73</td>
<td>4.47</td>
</tr>
<tr>
<td><strong>HOMELESS OR RECEIVING HOMELESS SERVICES</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13140</td>
<td>5.09</td>
<td>4.38</td>
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<tr>
<td>No</td>
<td>11906</td>
<td>5.41</td>
<td>4.48</td>
</tr>
<tr>
<td><strong>RECEIVING NON-SERVICE-CONNECTED PAY</strong></td>
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<tr>
<td>Yes</td>
<td>1493</td>
<td>5.50</td>
<td>4.69</td>
</tr>
<tr>
<td>No</td>
<td>23553</td>
<td>5.23</td>
<td>4.41</td>
</tr>
<tr>
<td><strong>RECEIVING SSI/SSDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3660</td>
<td>5.55</td>
<td>4.72</td>
</tr>
<tr>
<td>No</td>
<td>21386</td>
<td>5.19</td>
<td>4.38</td>
</tr>
</tbody>
</table>
*Note: Unknown categories for gender and age not reported.
**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
***Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

Job Placement during Program Stay and Competitive Employment (CE) at Discharge

As displayed in Table 19 below, at discharge from TW, over one third of Veterans had competitive employment (36 percent), and 92 percent had obtained at least one job placement during their program stay. Veterans who were homeless or receiving homeless services were less likely to have a job placement, but more likely to have obtained competitive employment at discharge. Veterans diagnosed with SUD were more likely to get a job placement, but less likely to have obtained CE at discharge.

**Table 19. TW Job Placement during Stay and CE at Discharge FY2015 through FY2018**

<table>
<thead>
<tr>
<th>TW Job Placement during Stay and CE at Discharge FY2015 through FY2018</th>
<th>Total Number (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtained At Least One Job Placement During Program Stay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>23468</td>
<td>92.05</td>
</tr>
<tr>
<td>No</td>
<td>2027</td>
<td>7.95</td>
</tr>
<tr>
<td>Competitive Employment at Discharge*</td>
<td></td>
<td></td>
</tr>
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<td>Yes</td>
<td>9376</td>
<td>36.78</td>
</tr>
<tr>
<td>No</td>
<td>13657</td>
<td>53.57</td>
</tr>
</tbody>
</table>

*Note: Unknown/missing for n=2462 (9.66%)

Predictors for Competitive Employment at Discharge*

Veterans who were more likely to obtain CE by discharge from TW (displayed in Table 20 and Figure 60 below) were:

- White Veterans as compared to Black Veterans
- Not homeless or receiving homeless services
- Not diagnosed with SMI, SUD, PTSD or depression
- Had less than 5 comorbidities
- Not receiving other non-service-connected pay (NSCP) or SSI/SSDI
- Stayed in the program longer (length of participation in months)

Gender and age are not significant predictor variables in this model.
### TABLE 20. TW Predictors for Competitive Employment at Discharge FY2015 through FY2018

<table>
<thead>
<tr>
<th>TW Predictors for Competitive Employment at Discharge FY2015 through FY2018</th>
<th>Estimated Probability</th>
<th>Mean (M)</th>
<th>Standard Deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0.42</td>
<td>0.39</td>
<td>0.45</td>
</tr>
<tr>
<td>Black</td>
<td>0.39</td>
<td>0.37</td>
<td>0.42</td>
</tr>
<tr>
<td>Other</td>
<td>0.40</td>
<td>0.37</td>
<td>0.44</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.45</td>
<td>0.37</td>
<td>0.54</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>0.40</td>
<td>0.37</td>
<td>0.43</td>
</tr>
<tr>
<td>Depression</td>
<td>0.43</td>
<td>0.4</td>
<td>0.46</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.49</td>
<td>0.45</td>
<td>0.54</td>
</tr>
<tr>
<td>Personality disorder or other</td>
<td>0.46</td>
<td>0.39</td>
<td>0.53</td>
</tr>
<tr>
<td>SMI**</td>
<td>0.32</td>
<td>0.3</td>
<td>0.35</td>
</tr>
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<td>0.46</td>
<td>0.43</td>
<td>0.49</td>
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<td><strong>SUD DIAGNOSIS</strong></td>
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<tr>
<td>Yes</td>
<td>0.38</td>
<td>0.36</td>
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<td>No</td>
<td>0.47</td>
<td>0.44</td>
<td>0.50</td>
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<td>&gt;5</td>
<td>0.25</td>
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<td><strong>PERIOD OF SERVICE</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>WWII</td>
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<td>Pre-Korean Conflict</td>
<td>0.75</td>
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<td>Korean Conflict</td>
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<td>0.64</td>
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<td>Between Korea/Vietnam</td>
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<td>Vietnam Era</td>
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<td>0.35</td>
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<td>Post-Vietnam</td>
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<td>0.43</td>
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<td>Persian Gulf War</td>
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</tr>
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<td>OEF/OIF/OND***</td>
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<td>0.46</td>
</tr>
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<td><strong>RECEIVING NON-SERVICE-CONNECTED PAY</strong></td>
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<td>0.23</td>
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<tr>
<td>No</td>
<td>0.42</td>
<td>0.39</td>
<td>0.44</td>
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<td>0.26</td>
<td>0.24</td>
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</tr>
<tr>
<td>No</td>
<td>0.43</td>
<td>0.40</td>
<td>0.46</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

***Note: Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND).
FIGURE 60. TSES TW—PREDICTED PROBABILITY OF CE AT DISCHARGE BY PROGRAM LENGTH OF PARTICIPATION.

TSES—Supported Employment (SE) Population Description and Results

SE Program Population Description

In FY2015-FY2018, most participants in the SE sample were male (nearly 85 percent), White (57 percent), and between the ages of 36-65 years (nearly 71 percent) (displayed in Table 21 below). Around one fourth of the Veterans were homeless or receiving homeless services (26 percent). Around half of the participants (53 percent) had a diagnosis of SMI and/or a diagnosis of SUD (46 percent). More than half of the participants have between one and five comorbidities (63 percent). Most participants in SE are not receiving other NSCP (93 percent) or SSI/SSDI (73 percent).
### Table 21. Characteristics of SE Sample FY2015 through FY2018

<table>
<thead>
<tr>
<th></th>
<th>Total Number (n=5,960)*</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5061</td>
<td>84.92</td>
</tr>
<tr>
<td>Female</td>
<td>890</td>
<td>14.93</td>
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<tr>
<td><strong>RACE</strong></td>
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</tr>
<tr>
<td>White</td>
<td>3415</td>
<td>57.3</td>
</tr>
<tr>
<td>Black</td>
<td>1722</td>
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<tr>
<td>Other</td>
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<td>Hispanic</td>
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<tr>
<td>Depression</td>
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<td><strong>PERIOD OF SERVICE</strong></td>
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<td>0.02</td>
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<td>0.03</td>
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<td>Between Korea/Vietnam</td>
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<td>0.34</td>
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<td>Vietnam Era</td>
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<td>12.33</td>
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<td>Post-Vietnam</td>
<td>1884</td>
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<td>Persian Gulf War</td>
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<td>27.1</td>
</tr>
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<td>OEF/OIF/OND****</td>
<td>1700</td>
<td>28.52</td>
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<td>26.33</td>
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<td>No</td>
<td>4391</td>
<td>73.67</td>
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</tbody>
</table>

*Note: Total n includes missing demographic data (gender and age) for 9 participants.

**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
Length of Participation
As displayed in Table 22 below, Veterans in SE who were homeless or receiving homeless services stayed in the program for a shorter length of stay (8.5 months) than those who were not homeless or receiving homeless services (9.3 months). Veterans with no SUD diagnosis stayed in the program longer (9.3 months) than those with a SUD diagnosis (8.8 months). Veterans who were receiving SSI/SSDI stayed in the program longer (9.6 months) than those who did not receive SSI/SSDI (8.9 months).

| TABLE 22. SE PROGRAM LENGTH OF PARTICIPATION (NUMBER OF MONTHS) FY2015 THROUGH FY2018 |
|----------------------------------|--------------------------|--------------------------|
| Total Number (n) | Mean (M) | Standard Deviation (SD) |
| All | 5588 | 9.10 | 7.71 |
| GENDER* | | | |
| Male | 4757 | 9.13 | 7.73 |
| Female | 822 | 8.94 | 7.59 |
| RACE | | | |
| White | 3191 | 9.12 | 7.77 |
| Black | 1630 | 9.45 | 7.87 |
| Other | 526 | 8.22 | 6.87 |
| Hispanic | 54 | 6.69 | 5.19 |
| Unknown | 187 | 9.0 | 7.73 |
| AGE | | | |
| 0-35 years | 1299 | 8.39 | 7.24 |
| 36-65 years | 4013 | 9.27 | 7.83 |
| >65 years | 267 | 10.07 | 7.77 |
| MH DIAGNOSIS** | | | |
| PTSD | 1342 | 8.83 | 7.23 |
| Depression | 857 | 9.98 | 7.75 |
| Anxiety | 85 | 7.76 | 6.18 |
| Personality disorder or other | 24 | 9.08 | 8.51 |
| SMI*** | 2988 | 9.05 | 7.89 |
| No MH | 292 | 8.77 | 7.93 |
| SUD DIAGNOSIS | | | |
| Yes | 2597 | 8.82 | 7.61 |
| No | 2991 | 9.35 | 7.78 |
| HOMELESS OR RECEIVING HOMELESS SERVICES | | | |
| Yes | 1482 | 8.54 | 7.61 |
| No | 4106 | 9.31 | 7.73 |
| RECEIVING NON-SERVICE-CONNECTED PAY | | | |
| Yes | 378 | 10.3 | 8.70 |
| No | 5210 | 9.02 | 7.62 |
| RECEIVING SSI/SSDI | | | |
| Yes | 1497 | 9.66 | 8.16 |
| No | 4091 | 8.90 | 7.52 |

*Note: Unknown categories for gender not reported.
**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
***Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.
Employment Record during Program Stay and Competitive Employment (CE) Status at Discharge

At discharge from SE, 35 percent of Veterans had CE and 44 percent had obtained at least one job during their program stay (displayed in Table 23 below). This is a similar CE rate to what has been found in other studies (Abraham, Resnick, & Zivin, 2017).

**Table 23. SE Employment Record during Stay and CE at Discharge FY2015 through FY2018**

<table>
<thead>
<tr>
<th>SE Employment Record during Stay and CE at Discharge FY2015 through FY2018</th>
<th>Total Number (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Obtained At Least One Job During Program Stay</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2651</td>
<td>44.48</td>
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<tr>
<td>No</td>
<td>3309</td>
<td>55.52</td>
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<tr>
<td><strong>Competitive Employment at Discharge</strong></td>
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<tr>
<td>Yes</td>
<td>2100</td>
<td>35.23</td>
</tr>
<tr>
<td>No</td>
<td>3285</td>
<td>55.12</td>
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</table>

*Note: Unknown/Missing for n=575 (9.65%).

Predictors for Competitive Employment at Discharge

Veterans who more likely to obtain CE by discharge from SE (displayed in Table 24 and Figure 61 below) were:

- Younger (65 years and younger)
- Not diagnosed with SMI or SUD
- Less than 5 comorbidities
- Not receiving other NSCP or SSI/SSDI
- Stayed in the program longer
- Less time unemployed

Gender, race, and homeless status are not significant predictor variables in this model.
Table 24. SE Predictors for Competitive Employment FY2015 through FY2018

<table>
<thead>
<tr>
<th>SE Predictors for Competitive Employment FY2015 through FY2018</th>
<th>Estimated Probability Mean (M)</th>
<th>Lower 95% Confidence Limit Mean (M)</th>
<th>Upper 95% Confidence Limit Mean (M)</th>
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<tr>
<td>0-35 years</td>
<td>0.41</td>
<td>0.35</td>
<td>0.47</td>
</tr>
<tr>
<td>36-65 years</td>
<td>0.36</td>
<td>0.30</td>
<td>0.41</td>
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<td>&gt;65 years</td>
<td>0.24</td>
<td>0.17</td>
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<td><strong>MH DIAGNOSIS</strong></td>
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<td></td>
<td></td>
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<tr>
<td>PTSD</td>
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<tr>
<td>Depression</td>
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<td>0.51</td>
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<tr>
<td>Anxiety</td>
<td>0.59</td>
<td>0.47</td>
<td>0.70</td>
</tr>
<tr>
<td>Personality disorder or other</td>
<td>0.52</td>
<td>0.32</td>
<td>0.73</td>
</tr>
<tr>
<td>SMI**</td>
<td>0.28</td>
<td>0.23</td>
<td>0.33</td>
</tr>
<tr>
<td>No MH Diagnosis</td>
<td>0.44</td>
<td>0.36</td>
<td>0.52</td>
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<tr>
<td><strong>SUD DIAGNOSIS</strong></td>
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<td></td>
<td></td>
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<tr>
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<td>0.31</td>
<td>0.26</td>
<td>0.36</td>
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<tr>
<td>No</td>
<td>0.41</td>
<td>0.35</td>
<td>0.47</td>
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<td>0.50</td>
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<td>1-5</td>
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<td>0.39</td>
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<td>0.08</td>
<td>0.22</td>
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<tr>
<td><strong>PERIOD OF SERVICE</strong></td>
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<td></td>
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<tr>
<td>WWII</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Pre-Korean Conflict</td>
<td>0.33</td>
<td>0.04</td>
<td>0.85</td>
</tr>
<tr>
<td>Korean Conflict</td>
<td>0.50</td>
<td>0.04</td>
<td>0.96</td>
</tr>
<tr>
<td>Between Korea/Vietnam</td>
<td>0.29</td>
<td>0.12</td>
<td>0.53</td>
</tr>
<tr>
<td>Vietnam Era</td>
<td>0.24</td>
<td>0.18</td>
<td>0.31</td>
</tr>
<tr>
<td>Post-Vietnam</td>
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<td>0.25</td>
<td>0.35</td>
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<td>Persian Gulf War</td>
<td>0.42</td>
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<td>0.48</td>
</tr>
<tr>
<td>OEF/OIF/OND***</td>
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<td>0.49</td>
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<tr>
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</tr>
<tr>
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<td>0.18</td>
<td>0.13</td>
<td>0.24</td>
</tr>
<tr>
<td>No</td>
<td>0.37</td>
<td>0.32</td>
<td>0.43</td>
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<tr>
<td>No</td>
<td>0.42</td>
<td>0.36</td>
<td>0.48</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

***Note: Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND).
CBES Program Population Description

In FY2015-FY2018, most participants in the CBES program were male (87 percent), White (46 percent), and between the ages of 36-65 years (76 percent). Nearly half of the participants were homeless or receiving homeless services (48 percent). Many of the participants (nearly 24 percent) did not have a mental health diagnosis (at time of entry). Around half of the participants had an SUD diagnosis (49 percent). Most participants in CBES are not receiving other NSCP (96 percent) or SSI/SSDI (88 percent).
### Characteristics of CBES Sample FY2015 through FY2018

<table>
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<th></th>
<th>Total Number (n=4,563)*</th>
<th>Percent (%)</th>
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<tr>
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<td>WWII</td>
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<td>4045</td>
<td>88.65</td>
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</table>

*Note: Total n includes missing demographic data (gender and age) for 14 participants.

**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
Length of Participation

As displayed in Table 26 below, Black Veterans stayed longer (6.5 in months) in CBES compared to White Veterans (5.9 months). Veterans who were not receiving SSI/SSDI stayed in the program a longer length of time (6.2 months) compared to those who were receiving the benefit (5.9 months). Furthermore, Veterans who were receiving NSCP stayed in the program longer (7.2 months) than those who were not receiving NSCP (6.1 months).

**Note: Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND).**

| CBES Program Length of Participation (Number of Months) FY2015 through FY2018 |
|-------------------------------------------------|-------|-------------------|
| Total Number (n)*                              | Mean (M) | Standard Deviation (SD) |
| All                                            | 4135    | 6.20              | 5.35 |
| **GENDER**                                     |         |                   |      |
| Male                                           | 3619    | 6.26              | 5.36 |
| Female                                         | 503     | 5.78              | 5.24 |
| **RACE**                                       |         |                   |      |
| White                                          | 1943    | 5.95              | 5.25 |
| Black                                          | 1606    | 6.53              | 5.45 |
| Other                                          | 369     | 6.28              | 5.21 |
| Hispanic                                       | 51      | 5.57              | 5.56 |
| Unknown                                        | 166     | 5.94              | 5.55 |
| **AGE**                                        |         |                   |      |
| 0-35 years                                     | 746     | 5.44              | 4.87 |
| 36-65 years                                    | 3160    | 6.34              | 5.42 |
| >65 years                                      | 216     | 6.79              | 5.55 |
| **MH DIAGNOSIS**                               |         |                   |      |
| PTSD                                           | 1094    | 5.65              | 4.87 |
| Depression                                     | 1329    | 6.39              | 5.47 |
| Anxiety                                        | 145     | 6.66              | 5.38 |
| Personality disorder or other                  | 38      | 7.37              | 6.20 |
| SMI***                                         | 547     | 6.00              | 5.69 |
| No MH Diagnosis                                | 982     | 6.56              | 5.39 |
| **SUD DIAGNOSIS**                              |         |                   |      |
| Yes                                            | 2022    | 6.02              | 5.37 |
| No                                             | 2113    | 6.38              | 5.32 |
| **HOMELESS OR RECEIVING HOMELESS SERVICES**    |         |                   |      |
| Yes                                            | 1955    | 6.18              | 5.58 |
| No                                             | 2180    | 6.22              | 5.13 |
| **RECEIVING NON-SERVICE-CONNECTED PAY**         |         |                   |      |
| Yes                                            | 180     | 7.21              | 5.93 |
| No                                             | 3955    | 6.16              | 5.31 |
| **RECEIVING SSI/SSDI**                         |         |                   |      |
| Yes                                            | 488     | 5.95              | 4.80 |
| No                                             | 3647    | 6.24              | 5.41 |

*Note: Unknown categories for gender and age not reported.
**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
***Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.
Employment Record during Program Stay and Competitive Employment (CE) Status at Discharge

At discharge from CBES, nearly 37 percent of Veterans had obtained competitive employment. This is significantly higher than the CE rates detected for both TW and SE. Nearly half of Veterans (49 percent) had obtained at least one job during their program stay (this is similar to the results for SE).

**Table 27. CBES Employment Record during Program Stay and CE at Discharge FY2015 through FY2018**

<table>
<thead>
<tr>
<th>Obtained At Least One Job During Program Stay</th>
<th>Total Number (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2276</td>
<td>49.88*</td>
</tr>
<tr>
<td>No</td>
<td>2287</td>
<td>50.12</td>
</tr>
<tr>
<td>Competitive Employment at Discharge*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2141</td>
<td>46.92</td>
</tr>
<tr>
<td>No</td>
<td>1800</td>
<td>39.45</td>
</tr>
</tbody>
</table>

*Note: Unknown/Missing for n=622 (13.6%).

Predictors for Competitive Employment at Discharge

Veterans *more likely to obtain CE by discharge* from CBES (displayed in Table 28 and Figure 62 below) were:

- Not homeless or receiving homeless services
- Not diagnosed with SUD or any MH diagnosis
- Less than 5 comorbidities
- Not receiving other non-service-connected pensions or SSI/SSDI
- Stayed in the program longer
- Less time unemployed (months)

*Gender, race, and age are not significant predictor variables in this model.*
<table>
<thead>
<tr>
<th>CBES Predictors for Competitive Employment FY2015 through FY2018</th>
<th>Estimated Probability</th>
<th>Mean (M)</th>
<th>Standard Deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HOMELESS OR RECEIVING HOMELESS SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.45</td>
<td>0.38</td>
<td>0.52</td>
</tr>
<tr>
<td>No</td>
<td>0.55</td>
<td>0.47</td>
<td>0.62</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>0.47</td>
<td>0.39</td>
<td>0.54</td>
</tr>
<tr>
<td>Depression</td>
<td>0.51</td>
<td>0.44</td>
<td>0.58</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.50</td>
<td>0.39</td>
<td>0.60</td>
</tr>
<tr>
<td>Personality disorder or other</td>
<td>0.48</td>
<td>0.30</td>
<td>0.66</td>
</tr>
<tr>
<td>SMI**</td>
<td>0.41</td>
<td>0.34</td>
<td>0.49</td>
</tr>
<tr>
<td>No MH Diagnosis</td>
<td>0.57</td>
<td>0.5</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>SUD DIAGNOSIS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.44</td>
<td>0.37</td>
<td>0.51</td>
</tr>
<tr>
<td>No</td>
<td>0.56</td>
<td>0.48</td>
<td>0.63</td>
</tr>
<tr>
<td><strong>CATEGORIES OF COMORBIDITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.55</td>
<td>0.47</td>
<td>0.62</td>
</tr>
<tr>
<td>1-5</td>
<td>0.48</td>
<td>0.41</td>
<td>0.55</td>
</tr>
<tr>
<td>&gt;5</td>
<td>0.31</td>
<td>0.21</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>PERIOD OF SERVICE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WWII</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Pre-Korean Conflict</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Korean Conflict</td>
<td>0.25</td>
<td>0.03</td>
<td>0.73</td>
</tr>
<tr>
<td>Between Korea/Vietnam</td>
<td>0.25</td>
<td>0.08</td>
<td>0.55</td>
</tr>
<tr>
<td>Vietnam Era</td>
<td>0.40</td>
<td>0.31</td>
<td>0.49</td>
</tr>
<tr>
<td>Post-Vietnam</td>
<td>0.47</td>
<td>0.41</td>
<td>0.54</td>
</tr>
<tr>
<td>Persian Gulf War</td>
<td>0.57</td>
<td>0.5</td>
<td>0.64</td>
</tr>
<tr>
<td>OEF/OIF/OND***</td>
<td>0.52</td>
<td>0.45</td>
<td>0.60</td>
</tr>
<tr>
<td><strong>RECEIVING NON-SERVICE-CONNECTED PAY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.32</td>
<td>0.23</td>
<td>0.43</td>
</tr>
<tr>
<td>No</td>
<td>0.51</td>
<td>0.43</td>
<td>0.58</td>
</tr>
<tr>
<td><strong>RECEIVING SSI/SSDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.33</td>
<td>0.26</td>
<td>0.43</td>
</tr>
<tr>
<td>No</td>
<td>0.52</td>
<td>0.45</td>
<td>0.59</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).
**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.
***Note: Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND).
Comparisons Across TSES (TW, SE, and CBES) Programs

The TSES programs had significant differences in the characteristics and clinical diagnoses of participants.

- Veterans with SMI represented over half of SE participants (53 percent), compared to TW (nearly 20 percent), and CBES (13 percent). This is to be expected as one of the program design characteristics for SE is to help Veterans with SMI to obtain meaningful CE.
- There was a higher portion of Veterans diagnosed with SUD in TW (71 percent) compared to Veterans in SE (44 percent) and CBES (49 percent).
- There was a higher portion of Veterans who were homeless or receiving homeless services in TW (around 52 percent) compared to Veterans in SE (around 26 percent) and CBES (nearly 48 percent).
- In terms of racial categories, Black Veterans represented a higher portion of participants within the TW program (around 40 percent) and CBES (39 percent) compared to the SE program (29 percent).

The TSES programs had significant differences in employment outcomes.

- On average, TW participants had shorter program length of participation (5.5 months) compared to the SE program (9.10 months).
- Veterans in CBES were more likely to have competitive employment at discharge and Veterans in SE were the least likely to have CE at discharge.
Veteran Satisfaction
There is not a Veteran satisfaction metric collected for the TSES program.

Conclusions

Overall, across all three TSES programs, Veterans who were most likely to obtain CE did not have a SUD diagnosis, had less than 5 comorbidities, were not receiving SSI/SSDI or NSCP, and stayed in the TSES programs longer. In all predicted probability models for CE at discharge, gender was not a significant predictor in the model. These findings suggest that a SUD diagnosis or significant number of comorbid (5 or greater) diagnoses may potentially make obtaining competitive employment more difficult. Thus, more targeted services to address these areas first or concurrently may be needed if CE is the goal for all Veterans.

Several controlled studies have shown that Veterans in SE programs achieve rates of CE that are higher than those found in our analysis and also higher than those achieved by Veterans in TW programs. For example, in their randomized controlled study on the impact of SE versus TW on the employment of Veterans with PTSD, Davis and her colleagues (Davis et al., 2017) found that a higher proportion of Veterans in a supported work program attained CE (68.6 percent) in comparison to Veterans in a TW program (57 percent). As discussed in Abraham et al. (2017), differences in the direction and magnitude of program effects found in randomized control trials versus real world studies “may reflect a ‘voltage drop’ that occurs when interventions are translated from research to practice.” In randomized control trials the characteristics of program participants, providers and the context in which the programs are implemented are precisely defined and personnel follow specified protocol directives to encourage precise adherence to study procedures. Heterogeneity in the characteristics of Veterans served in the variety of VA centers in which these programs are implemented may account for the direction and size of the impacts found for this evaluation.
Program Description
The PRRC program is an outpatient multidisciplinary treatment program that provides services to Veterans suffering from severe and persistent mental illness (e.g., schizophrenia, bipolar disorder, PTSD) with significant functional impairment. Veterans who participate in PRRC receive clinical services, including psychiatric services, case management services, and individual psychotherapy that may be available to Veterans with similar diagnoses through other VA mental health services. However, PRRC provides additional services to enable these Veterans to become integrated into their communities and to cope with mental health stigma or other difficulties they may experience within their communities. Veterans involved in the program receive individual assessment and curriculum planning, skills training classes, psychoeducational classes, illness management and recovery classes, peer support services, and family educational programs. The services provided are available to Veterans for as long as needed.

Evaluation Questions
- What were the characteristics and clinical diagnoses of Veterans in PRRC services?
- What were the clinical outcomes associated with participation in PRRC services?
  - Did Veterans in PRRC services reduce feelings of mental health stigma?
  - Did Veterans in PRRC services increase community engagement?
- Did outcomes differ for male and female Veterans? Did outcomes differ by age or race?
- Did outcomes differ by mental health diagnosis?
- Did Veterans in PRRC services reduce suicidal ideation (PHQ-9, Item 9)?
- What were Veterans' levels of satisfaction with PRRC services by gender?

Methods
Data for the analyses were derived from clinical assessments and program participation records maintained for the PRRC program for 1048 Veterans enrolled in the program in FY2018. This includes staff intake forms containing demographic and diagnostic information for Veterans, and clinical assessments completed by Veterans at intake and at follow-up. The median length of time between intake and follow-up was 102 days (approximately 3.5 months), with a range of 2 to 5 months.

Table 29 below shows outcome measures used to evaluate this program and the psychological constructs they assess. Based on the objectives of PRRC, a reduction in stigma (measured by Internalized Stigma of Mental Illness [ISMI]) and improvement in community engagement (measured by the VA-adapted Temple University Community Participation Scale [VA-TUCP] (Salzer, 2014)) are the primary outcomes that are anticipated for Veterans enrolled in services. All other outcomes listed below are secondary outcomes that may also be attained through participation in the program for some Veterans.

To examine the impact of PRRC participation, the analyses compared Veterans' responses on assessments of (a) feelings of stigma, (b) community engagement, (c) mental well-being, (d) daily functioning, (e) depression, and (f) suicidal ideation that were completed at intake and follow-up (around 180 days post-intake). These analyses also examined differences between male and female Veterans. Satisfaction with PRRC was measured at follow-up only. Details of analysis results are presented in Appendix B.
As the evaluation of PRRC does not entail a comparative design, no cost-effectiveness analysis was completed for PRRC.

### Table 29. Description of PRRC Program Measures

<table>
<thead>
<tr>
<th>Measures of Outcome</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalized Stigma of Mental Illness (ISMI)</td>
<td>Stigma</td>
</tr>
<tr>
<td>VA-adapted Temple University Community Participation Scale (VA-TUCP)</td>
<td>Community engagement</td>
</tr>
<tr>
<td>Patient Health Questionnaire- Depression Module (PHQ-9)</td>
<td>Depression</td>
</tr>
<tr>
<td>Item 9 from PHQ-9</td>
<td>Suicidal ideation</td>
</tr>
<tr>
<td>The Short Warwick-Edinburgh Mental Well-Being Scale (SWEMW)</td>
<td>Mental well-being</td>
</tr>
<tr>
<td>World Health Organization Disability Assessment Schedule (WHODAS)</td>
<td>Daily functioning</td>
</tr>
</tbody>
</table>

PRRC Program Population Description

A sample (n=1048 PRRC participants) from FY2018 intake data was used for analysis. Most of these Veterans were male (78 percent), and female Veterans constituted 22 percent, which is roughly comparable to their overall representation within the military (Council on Foreign Relations, 2019). The majority of PRRC participants were diagnosed with depression, SMI, and anxiety, which occurred either alone or in combination (i.e., comorbid). About 43 percent of Veterans in PRRC had an SUD comorbidity. The largest group of Veterans who enrolled in PRRC in FY2018 were White (54 percent). Black Veterans represented 31 percent of the total number of participants, with the rest of the sample identifying as other/unknown (nearly 14 percent) and Hispanic (less than 1 percent).
TABLE 30. CHARACTERISTICS OF VETERANS IN PRRC PROGRAM SAMPLE IN FY2018

<table>
<thead>
<tr>
<th>Characteristics of Veterans in PRRC Program Sample in FY2018</th>
<th>Total Number (n=1,048)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>822</td>
<td>78.44</td>
</tr>
<tr>
<td>Female</td>
<td>226</td>
<td>21.56</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>566</td>
<td>54.01</td>
</tr>
<tr>
<td>Black</td>
<td>327</td>
<td>31.20</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>145</td>
<td>13.84</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>0.95</td>
</tr>
<tr>
<td><strong>AGE GROUP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>131</td>
<td>12.50</td>
</tr>
<tr>
<td>36-65 years</td>
<td>739</td>
<td>70.52</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>178</td>
<td>16.98</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>722</td>
<td>68.89</td>
</tr>
<tr>
<td>PTSD</td>
<td>587</td>
<td>55.01</td>
</tr>
<tr>
<td>Anxiety</td>
<td>439</td>
<td>41.88</td>
</tr>
<tr>
<td>SUD</td>
<td>448</td>
<td>42.74</td>
</tr>
<tr>
<td>SMI**</td>
<td>615</td>
<td>58.68</td>
</tr>
<tr>
<td>Other MH</td>
<td>165</td>
<td>15.74</td>
</tr>
</tbody>
</table>

*Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

**Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

Clinical Findings

The results of the analysis indicate that, among Veterans enrolled in PRRC, there were *small but statistically significant changes* in the primary outcomes of stigma (ISMI) and community engagement (VA-TUCP) from intake to follow-up. The average ISMI scores decreased from 2.5 to 2.45, a *small but statistically significant improvement* indicating reduced stigma (Figure 64 below). This indicates participants remained in the *mild internalized stigma* category at both intake and follow-up, according to ISMI scoring (Lysaker, 2003). The average increase in level of engagement increased from 2.26 to 2.38, a *small but statistically significant improvement* (Figure 65 below). Additionally, the average increase in number of areas of engagement increased from 5.62 to 6.21, a *small but statistically significant improvement* (Figure 66 below).
The Internalized Stigma of Mental Illness (ISMI) scale is a 29-item questionnaire measuring self-stigma among persons with psychiatric disorders. The most commonly reported findings of studies using the ISMI are that internalized stigma correlates with higher depression, lower self-esteem, and higher symptom severity (Boyd et al., 2014; West et al., 2011). In studies related to people with mental illness, people who report high stigma are found to have a lower degree of self-esteem (Corrigan et al., 2006), help-seeking (Barney et al., 2006), and treatment adherence (Fung et al., 2008). The scale is found to be valid and reliable (Chang et al., 2014). Higher scores indicate higher internalized stigma: a score between 1.00 and 2.00 indicates minimal or no internalized stigma; 2.01–2.50 indicates mild internalized stigma; 2.51–3.00 indicates moderate internalized stigma; and 3.01–4.00 indicates severe internalized stigma (Lysaker et al., 2003). n=1048
Figure 65. PRRC Program Level of Community Engagement (Measured by VA-TUCP) Changes from Intake to Follow-up.

VA-TUCP is a VA-adapted scale from the Temple University Community Participation (TUCP) Scale (Salzer et al., 2014). It assesses community engagement within the context of what is important to the individual, rather than using a generalized definition of community engagement. n=1048

Figure 66. PRRC Program Number of Areas of Engagement (Measured by VA-TUCP) from Intake to Follow-up.

VA-TUCP is a VA adapted scale from the Temple University Community Participation (TUCP) Scale (Salzer et al., 2014). It assesses community engagement within the context of what is important to the individual, rather than using a generalized definition of community engagement. n=1048
Overall, PRRC participants had statistically significant improvements from intake to follow-up in the following secondary outcomes:

- Depression (PHQ-9)
- Suicidal ideation (Item 9 from PHQ-9)
- SWEMW (Mental Well-being)
- Daily functioning (WHODAS)

On average, PRRC had similar impacts regardless of a Veteran’s gender. As mentioned above, differences by age and racial categories could not be analyzed due to small sample sizes.

At intake, on average, Veterans had scores on the PHQ-9 (depression) that were considered “high” (greater than or equal to 10 indicating they are more likely to be diagnosed with depression) at both intake (11.9) and follow-up (10.5), but they experienced statistically significant improvements over the approximately 180-day period that was assessed (Figure 67 below). However, a change in 1 to 2 points would not be considered clinically significant.

In this sample (n=1048), if using a change of 5 points on PHQ-9 as clinically significant, depression symptoms improved in 253 (24 percent) participants (PHQ decrease by at least 5), worsened in 118 (11 percent) participants (PHQ increase by at least 5), and there was no clinical change in symptoms in the remaining 677 (65 percent) Veterans (PHQ change by less than +/- 5). This variability in outcomes suggests that there may be different groups of Veterans who are being served by the PRRC program. For example, although PRRC is meant for Veterans with SMI and PTSD, only 58 percent have SMI and 56 percent have PTSD. Future research may be needed to uncover which groups of Veterans PRRC best serves.

**Figure 67. PRRC Program Depression (Measured by PHQ-9) Changes from Intake to Follow-up.**

The PHQ-9, the depression module of the longer Patient Health Questionnaire, is a reliable and valid self-administered tool to assess depression. It incorporates DSM-IV depression criteria with other leading major depressive symptoms into a brief self-report instrument. Results show that individuals who score high (≥ 10) are between 7 to 13.6 times more likely to be diagnosed with depression by a mental health professional. Individuals scoring low (≤ 4) have a less than a 1 in 25 chance of having depression (Kroenke et al, 2001). n=1048
**Item 9 in the PHQ-9 measures suicidal ideation (SI)** asks individuals to rate how often they had “thoughts that you would be better off dead” or “thoughts of hurting yourself.” Response to Item 9 has been found to be predictive of subsequent death by suicide or suicide attempt (Simon, 2013). Analysis of Item 9 showed that, although 40.8 percent of PRRC participants had expressed suicidal ideation at intake, at follow-up there were significant decreases in the number expressing such thoughts (displayed in Figure 67 below). Among this group, 14.8 percent had *remitted SI* (defined as the presence of SI at intake but not at follow-up) as displayed in Figure 68 below. Some PRRC participants (25.9 percent) experienced *persistent SI* (defined by the presence of SI at both intake and follow-up). A small proportion of PRRC participants (7.3 percent) experienced *onset SI* (defined as the absence of SI at intake but the presence of SI at follow-up). Altogether, at follow-up, 66.6 percent of PRRC participants did not report having suicidal ideation. Furthermore, the analysis revealed that Veterans participating in PRRC with PTSD and depression were more likely to experience *onset SI* or to have *persistent SI* than compared to *remitted SI or no SI*. Older Veterans (older than 65 years) were more likely to report *persistent SI* than younger Veterans (65 years and younger).

<table>
<thead>
<tr>
<th>Suicidal Ideation Group Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ <em>Remitted SI</em>: Presence of SI at intake but not at follow-up</td>
</tr>
<tr>
<td>➢ <em>Persistent SI</em>: Presence of SI at both intake and follow-up</td>
</tr>
<tr>
<td>➢ <em>Onset SI</em>: Absence of SI at intake but the presence of SI at follow-up</td>
</tr>
<tr>
<td>➢ <em>No SI</em>: Absence of SI at both intake and follow-up</td>
</tr>
</tbody>
</table>

**Figure 68. PRRC Program Suicidal Ideation Groups (Measured by Item 9, PHQ-9).**

The PHQ-9, the depression module of the longer Patient Health Questionnaire, is a reliable and valid self-administered tool to assess depression. It incorporates DSM-IV depression criteria with other leading major depressive symptoms into a brief self-report instrument. Item 9 asks patients about suicidal ideation and has been found to predict subsequent death by suicide and suicide attempts (Simon, 2013). \( n = 1048 \)
The PHQ-9, the depression module of the longer Patient Health Questionnaire, is a reliable and valid self-administered tool to assess depression. It incorporates DSM-IV depression criteria with other leading major depressive symptoms into a brief self-report instrument. Item 9 asks patients about suicidal ideation and has been found to predict subsequent death by suicide and suicide attempts (Simon, 2013). n=1048
The average score on SWEMW (well-being) at intake for Veterans in PRRC was 19.0, and the average score at follow-up was 19.8 (displayed in Figure 70 below). There was a small but statistically significant increase in well-being (average increase in score of 0.81). However, Veterans in PRRC had well-being scores below the population norm reference score of 23.6 at both intake and follow-up (Ng Fat, 2017).

**Figure 70. PRRC Program Mental Well-being (Measured by SWEMW) Overall Changes from Intake to Follow-up.**

The SWEMW measures well-being. A higher score is considered to indicate “better” mental well-being (Stewart-Brown, 2009). The population norm-referenced average score is 23.6 with scores below this value representing “lower” than average mental well-being (the Health Survey for England is the closest norm-based estimate currently available) (Ng Fat, 2017). n=1048
The average score on WHODAS (daily functioning) at intake for Veterans in PRRC was 17.8, and the average score at follow-up was 16.9 (displayed in Figure 71 below). There was a small but statistically significant decrease in difficulty in daily life (an improvement in daily life functioning). Although Veterans showed improvement, the daily functioning score remained above the population norm for level of difficulties at discharge (norm-referenced score of 6.3).

**FIGURE 71.** PRRC—DIFFICULTIES IN DAILY LIFE (MEASURED BY WHODAS) OVERALL CHANGES FROM INTAKE TO FOLLOW-UP.

Lower scores reflect improvement. The WHODAS assesses difficulties in completing daily activities in communication, interpersonal relationships, completing work and household roles, self-care, and civic participation. Scores range from 0 to 48. The mean score for people with mental disorder has been found to be 6.3 (SD=7.1; Andrews et al., 2009). Baseline scores for PRRC participants at intake and at discharge remained above the threshold but decreased significantly for all Veterans by 90-days post-discharge. There were no significant differences by race or by gender. n=1048

**Gender Results**

There were no significant differences across any measures by gender.
Veteran Satisfaction

Veterans report high satisfaction with services they received in PRRC. Overall, 96 percent of all participants were satisfied or highly satisfied. Most males (95.7 percent) and most females (96.9 percent) reported being satisfied or highly satisfied with services. Female Veterans reported a statistically significant higher level of satisfaction than male Veterans.

**Figure 72. PRRC Program Veteran Satisfaction by Gender.**

Note: n=1048

Conclusions

PRRC is a multi-disciplinary treatment program for Veterans with severe and persistent mental illness and significant functional impairments. One of the main goals is for Veterans to better cope with their symptoms in order to integrate more fully into their communities. Veterans in PRRC had small but statistically significant reductions in feelings of stigma and improvements in levels of community engagement. This finding is promising as both of these phenomena may contribute to longer term rehabilitation from serious mental illness.

Veterans also had statistically significant improvement in depression (although this change would not be considered clinically significant), mental well-being, and daily functioning. These impacts were similar regardless of a Veteran's gender.

This analysis uncovered that the program may not be providing services to the type of participants primarily intended. Although PRRC was originally meant for those with SMI and PTSD, only 58 percent had diagnoses of SMI, and 56 percent with diagnoses of PTSD, during the year of this evaluation. For future evaluations, time should be spent to determine which groups of Veterans PRRC best serves to help identify whom to target for participation.

There were positive findings for reductions in the key outcome of suicidal ideation, with significant decreases in the number of Veterans expressing suicidal thoughts at follow-up. However, 25 percent expressed suicidal ideation at both intake and follow-up (persistent), with older Veterans (older than 65 years) more likely to report such symptoms than those 65 years and younger. This
suggests that there is still a need to address suicidal ideation for many in the PRRC program, particularly older Veterans.

Finally, the majority of Veterans (96 percent) express high satisfaction with PRRC services (with females reporting higher levels than males). This is a positive indication of the quality of services Veterans feel they have received in PRRC.

Program Description

Intensive Community Mental Health Recovery (ICMHR) Services were initially designed for Veterans with high utilization (30 days cumulative) of inpatient utilization during the year prior to entry into the program. The goal was to provide Veterans discharged from acute inpatient mental health services (AIMHS) with support and intensive outpatient mental health services in order to reduce reliance on inpatient care. The program was originally designed specifically for Veterans with mental, behavioral, or emotional disorders that meet DSM criteria for a serious mental illness, such as schizophrenia or bipolar disorder (excluding cognitive and developmental disorders and disorders due to a general medical condition), and for Veterans who meet all the following criteria:

1. Diagnosis of Severe and Persistent Mental Illness: Including but not limited to: schizophrenia, bipolar disorder, major affective disorder, or severe PTSD.
2. Severe Functional Impairment: The Veteran is neither currently capable of successful and stable self-maintenance in a community living situation (e.g. hospitalized or homeless), nor able to participate in necessary treatments with intensive support. A Global Assessment of Functioning (GAF) of 50 or less.
3. Inadequately Served: The Veteran is inadequately served by conventional clinic-based outpatient treatment or day treatment.
4. High Hospital Use: High hospital use as evidenced during the past year by over 30 days of psychiatric hospital care, or three or more episodes of psychiatric hospitalization.
5. Clinically Appropriate for Outpatient Status: Patients who are more appropriately managed clinically as inpatients need to remain in the inpatient setting.

However, because recovery and prevention of acute mental health episodes are prominent goals of care for Veterans with serious mental illness symptoms regardless of diagnosis, hospitalization, or GAF score, it is also possible for Veterans who do not have a DSM diagnosis of SMI or with no prior admission to acute inpatient mental health services to participate in ICMHR services. ICMHR Services consist of three programs:

1. Mental Health Intensive Case Management (MHICM) provides intensive mental health and psychosocial recovery and rehabilitation services to Veterans in the community.
2. Rural Access Network for Growth Enhancement (RANGE), the rural model of MHICM, provides the same services as MHICM and involves a team consisting of two clinicians and a prescribing provider.
3. **Enhanced-Rural Access Network for Growth Enhancement (E-RANGE)** is a modified model of RANGE and MHICM that involves a team consisting of two clinicians, a homeless specialist, and a prescribing provider.

Through community-based clinical case management, most services are delivered to Veterans at their homes or within their communities rather than in the medical setting. However, psychiatric services and group therapy are typically offered in medical clinics. ICMHR Services also include pharmacotherapy, psychotherapy, skills training, and community integration. An additional focus is advocacy for Veterans as they navigate the VA health care system and other social services. The most readily quantifiable goals for ICMHR are to reduce use of emergency department and acute inpatient mental health services. E-RANGE further focuses on helping Veterans find stable housing.

**Evaluation Questions**

- What were the characteristics and clinical diagnoses of Veterans enrolled in ICMHR services?
- What were the most common “segments” or groups of Veterans enrolled in ICMHR services?
- For each diagnostic cohort, for the average ICMHR participant, during the first year or two-year period after program enrollment, did they have:
  - Lower use of Acute Inpatient Mental Health admission or bed days of care during the year following enrollment in the program?
  - Lower use of mental health-related ER services?
  - Greater or less use of all other inpatient or outpatient mental health services?
  - Greater or less use of non-mental health (medical) inpatient or outpatient services?
  - Lower mental health or medical health services costs?
- Is the ICMHR program cost-effective?
- Did cost outcomes differ for male and female Veterans? Did cost outcomes differ for mental health diagnostic cohorts?
- What were Veterans’ levels of satisfaction with ICMHR services by gender?

**ICMHR Population Description**

The Evaluation Team received medical record data for all Veterans who participated in the ICMHR program during FY2016 through June FY2017. We also received data for Veterans who were admitted into AIMHS during that time period, but who either received other types of mental health services or opted not to participate in any treatment post-discharge from AIMHS.

It has become clear in discussions with the VA Mental Health Technical Advisors that Veterans may be referred to ICMHR due to functional impairment, regardless of whether they have ever been admitted to AIMHS or diagnosed with serious mental illness. Thus, the population of Veterans served in ICMHR may be quite diverse and not strictly as outlined by the participant criteria listed above. Table 31 below displays the characteristics of Veterans referred to ICMHR and had 4 or more visits in FY2016 through June FY2017.
At time of enrollment to ICMHR, nearly 62 percent of Veterans were diagnosed with schizophrenia, nearly 24 percent with bipolar disorder, nearly 34 percent with depression, and nearly 29 percent with PTSD. About 68 percent of Veterans participating in ICMHR had no prior admission to AIMHS during the year prior to enrollment. Given this high percentage of ICMHR
participants with no previous admission to AIMHS, prior to completing the cost-effectiveness analysis, the Evaluation Team completed segmentation analyses designed to elucidate the major distinct categories of Veterans served in ICMHR and to identify the key factors that may influence referral to the ICMHR program.

**Segmentation Methods**

The segmentation analyses completed for ICMHR identified the different “clusters” or groups of Veterans served by the program and identified the key diagnoses, experiences with mental health services, and other characteristics of Veterans that influence case managers’ referral of Veterans to ICMHR. Cost-effectiveness proceeded by segment (groups) to investigate whether ICMHR was effective for all participating Veterans or only for Veterans with specific diagnoses, experience with AIMHS, or key personal characteristics.

Data for segmentation included all ICMHR participants in FY2012 through FY2017. This range of data was selected to ensure that identified clusters or groups were representative of the types of Veterans usually referred to ICMHR and not simply illustrative of referral practice during the shorter FY2016 to June FY2017 period that is the focus of the cost-effectiveness analyses. The relevant variables included in the Case Manager Intake Forms dataset used for segmentation are listed below*

- Age
- Marital status
- Homeless status
- Employment status over prior 3 years
- Prior inpatient hospitalization over prior 3 years
- Whether >2 physical comorbidities from the Elixhauser scale
- Number of mental health encounters (>91 during prior year)
- Diagnosis of possible major depressive disorder
- Diagnosis of possible substance use disorder
- Diagnosis of possible schizophrenia
- Diagnosis of possible schizoaffective disorder
- Diagnosis of possible bipolar disorder
- Diagnosis of possible PTSD

*Note: Data source is VA NEPEC

Ward hierarchical cluster analysis (Ward, 1963; Kaufman & Rousseeuw, 2009) was used to identify the six segments or subgroups of Veterans participating in ICMHR. The findings of the segmentation analysis also suggest that prior admission to AIMHS, diagnosis of bipolar disorder, homelessness, and marital status are the variables that best describe Veterans who enter the ICMHR program. As a sensitivity analysis, the Evaluation Team ran the segmentation with and without a PTSD diagnosis, and found that the segments produced were very similar, with a small proportion of Veterans changing segments.

The segments also demonstrate that prior AIMHS stay is not the key characteristic of Veterans referred to ICMHR, as originally intended by the program. From FY2012 to FY2017 only 44 percent of the Veterans referred to ICMHR had a prior AIMHS admission. Details of the segmentation results are provided in Appendix B.
VA initiated the ICMHR program in 1987. A comprehensive evaluation of ICMHR conducted in 2006 showed that approximately 87 percent of ICMHR participants had a diagnosis of psychosis and 76 percent were hospitalized for more than six months prior to their admission to ICMHR (Mohamed et al., 2009). Thus, the population served appeared to be aligned to the program’s original admission criteria. ICMHR also resulted in reduced hospital use and symptoms and in improved quality of life and client satisfaction (Neale et al., 2007). Several analyses have also shown cost saving associated with ICMHR (Slade, 2013; Clark, 1998; Johnston, 1998). However, as indicated by Table 31 and the results of the segmentation analyses, Veterans currently participating in ICMHR are less likely to be like those served by the program during the early period of ICMHR implementation. Thus, program effectiveness may also differ.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior inpatient</td>
<td>Prior inpatient</td>
<td>No prior inpatient</td>
<td>No prior inpatient</td>
<td>No prior inpatient</td>
<td>No prior inpatient</td>
</tr>
<tr>
<td>No bipolar diagnosis</td>
<td>Bipolar diagnosis</td>
<td>No bipolar diagnosis</td>
<td>Bipolar diagnosis</td>
<td>Homeless</td>
<td>Bipolar diagnosis</td>
</tr>
<tr>
<td>n=9382</td>
<td>n=3413</td>
<td>n=9906</td>
<td>n=3277</td>
<td>n=3009</td>
<td>n=3388</td>
</tr>
</tbody>
</table>

**Figure 73. Primary Characteristics Distinguishing the Six Main Segments of ICMHR Participants.**

**Cost-Effectiveness Analysis (CEA) Methods & Results**

Data sources for the ICMHR cost-effectiveness analyses are listed below in Table 32. All Veterans that had at least one ICMHR visit during the period of FY2016 through June of FY2017 were selected from these sources. After consultation with VA Mental Health Technical Advisors, the 15,498 Veterans who had been referred to ICMHR, but had three or less encounters with ICMHR services, were included as “controls” for the effectiveness analyses. Veterans with four or more ICMHR encounters constituted the “ICMHR treatment” group. Using more than three visits as a proxy for distinguishing patients participating in ICMHR may not have clinical significance, but rather this break point was adopted based on the frequency distribution of ICMHR visits for the sample, with three visits being close to the median number of visits for the sample. Examining the dataset on both treatment cases and controls in the analysis sample, 20.6 percent of matched controls and 1.0 percent of patients in the ICMHR treatment group dropped out of VA mental health services and had zero utilization of services after 30 days post-index date. The low dropout rate for patients classified as participating in ICMHR vs. those with three visits or less is worth noting as a positive outcome for the ICMHR program. Dropouts were removed from analyses to eliminate the bias that dropping out from all VA services posed to the results.
After VA mental health dropouts were removed from the data, propensity score matching (PSM) techniques were used to match each Veteran in the ICMHR treatment group to a comparable Veteran in the “control group” (Rosenbaum & Rubin, 1983, 1984). The factors used for PSM included those listed above. Table 33 below displays the characteristics of Veterans in the ICMHR treatment and control groups after matching. The analysis included five cohorts; one for all ICMHR participants and 4 for the following diagnostic subgroups:

- Schizophrenia and bipolar disorder
- Schizophrenia and no bipolar disorder
- Bipolar disorder and no schizophrenia
- Major depressive disorder and no schizophrenia or bipolar disorder

We followed procedures used in prior evaluations of VA mental health services (Watkins et al., 2011) to assign Veterans into these four distinct mental health cohorts. The four diagnostic cohorts above were excluded from the PSM but were included as covariates in the regression analysis and analyses were carried out separately for each cohort. For the ICMHR cost-effectiveness analyses, missing baseline and follow-up data related to mental health symptoms precluded use of mental health symptom changes as an outcome measure of effectiveness, requiring use of hospital admissions or bed-days-of-care (BDOC) as well as emergency room (ER) use as proxies for patient health outcomes. Other important variables for the cost-effectiveness analysis included number of inpatient and outpatient mental health and non-mental health encounters for both treatment and controls one year and two years post-enrollment in ICMHR. Cost of all services pre- and post-ICMHR enrollment were captured for each service using the VA’s Managerial Cost Accounting System (MCA) inpatient and outpatient reports, as described in Appendix B. Out of system costs and services were not included.

Regression analysis was used to estimate the mean number of admissions, BDOCs, and ER encounters related to mental health for ICMHR Veterans and control group Veterans (overall and by gender and diagnostic cohort at 6 months, 1 year, and 2 years post-enrollment in ICMHR). Incremental Cost Effectiveness Ratios (ICERs) (Haddix, 2003) were computed by dividing the difference in mean net healthcare costs by the difference in outcomes estimated by the mean number of hospital admissions, BDOC, and ER MH visits, comparing the ICMHR treatment group to the control group at 6 months, 1 year and 2 years post-ICMHR. We applied bootstrap simulation analysis to estimate the 95% confidence intervals around the ICERs. Details for these analyses are provided in Appendix B.
## Table 33. Baseline Characteristics of ICMHR Program Participants and Controls in the PSM Matched Sample

<table>
<thead>
<tr>
<th></th>
<th>Treatment Group (n=8,521)</th>
<th>Control Group (n=8,521)</th>
<th>p</th>
<th>Standard Difference of Mean</th>
<th>Bias Reduced (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>53.7</td>
<td>53.7</td>
<td>0.96</td>
<td>0.00072</td>
<td>97.8</td>
</tr>
<tr>
<td><strong>Preadmissions</strong></td>
<td>0.83</td>
<td>0.8</td>
<td>0.06</td>
<td>0.02</td>
<td>66</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7378</td>
<td>7378</td>
<td>1</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Female</td>
<td>1143</td>
<td>1143</td>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>5098</td>
<td>5065</td>
<td>0.8</td>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>2225</td>
<td>2231</td>
<td>0.06</td>
<td>88.3</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1145</td>
<td>1156</td>
<td>0</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td><strong>Hispanic</strong></td>
<td>53</td>
<td>69</td>
<td>0.12</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td>0.3</td>
<td></td>
<td></td>
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<tr>
<td>Not Married</td>
<td>6700</td>
<td>6756</td>
<td>0</td>
<td>64.7</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>1821</td>
<td>1765</td>
<td>0</td>
<td>64.7</td>
<td></td>
</tr>
<tr>
<td><strong>Schizophrenia</strong></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Present</td>
<td>3735</td>
<td>6318</td>
<td>0.7</td>
<td>99.5</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>4786</td>
<td>2203</td>
<td>0.7</td>
<td>99.5</td>
<td></td>
</tr>
<tr>
<td><strong>PTSD</strong></td>
<td></td>
<td></td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Present</td>
<td>5072</td>
<td>5054</td>
<td>0.02</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>3449</td>
<td>3467</td>
<td>0.02</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td><strong>SUD</strong></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Present</td>
<td>4613</td>
<td>4025</td>
<td>0.1</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>3908</td>
<td>4496</td>
<td>0.1</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td><strong>Major Depression</strong></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Present</td>
<td>4980</td>
<td>3736</td>
<td>0.3</td>
<td>91.5</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>3541</td>
<td>4785</td>
<td>0.3</td>
<td>91.5</td>
<td></td>
</tr>
<tr>
<td><strong>Bipolar Disorder</strong></td>
<td></td>
<td></td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Present</td>
<td>6403</td>
<td>6377</td>
<td>0</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>2118</td>
<td>2144</td>
<td>0</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td><strong>Number of MH Diagnoses</strong></td>
<td></td>
<td></td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>102</td>
<td>107</td>
<td>0.01</td>
<td>88.6</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td>23</td>
<td>0</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>86</td>
<td>99</td>
<td>0</td>
<td>86.6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1411</td>
<td>1360</td>
<td>0.02</td>
<td>75.4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2200</td>
<td>2174</td>
<td>0</td>
<td>67.3</td>
<td></td>
</tr>
<tr>
<td>5 or More</td>
<td>4700</td>
<td>4758</td>
<td>0.02</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>Segment</strong></td>
<td></td>
<td></td>
<td>0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Inpatient (Inpt) No Bipolar</td>
<td>2171</td>
<td>2169</td>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Prior Inpt Bipolar</td>
<td>1073</td>
<td>1114</td>
<td>0</td>
<td>78.8</td>
<td></td>
</tr>
<tr>
<td>No Prior Inpt Bipolar</td>
<td>2387</td>
<td>2420</td>
<td>0</td>
<td>77.8</td>
<td></td>
</tr>
<tr>
<td>No Prior Inpt Bipolar Homeless</td>
<td>785</td>
<td>686</td>
<td>0.04</td>
<td>63.9</td>
<td></td>
</tr>
</tbody>
</table>
Cost-Effectiveness Results

Results of analyses were similar for 6 months, 1 year, and 2 years post-ICMHR. Therefore, in this section we present the findings based on 2 years post-ICMHR. The results for 6 months and 1 year are included in Appendix B.

As indicated in Table 34 below, the results of the regression for AIMHS admissions 2 years post-ICMHR show that, after controlling for mental health diagnoses, there was a positive and statistically significant effect of treatment on AIMHS admissions. Thus, Veterans who participated in ICMHR services had significantly more admissions than control group Veterans. This result is reflected in the average effect column in the CEA Tables 34 through 38 below.

**TABLE 34. REGRESSION RESULTS FOR AIMHS ADMISSIONS 2 YEARS POST-ICMHR**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>D F</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald 95% Confidence Limits</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1</td>
<td>-0.1778</td>
<td>0.0315</td>
<td>-0.2395 -0.1160</td>
<td>31.86</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ICMHR Veterans</td>
<td>1</td>
<td>0.0883</td>
<td>0.0193</td>
<td>0.0505 0.1260</td>
<td>21.00</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Pre- AIMHS Days</td>
<td>1</td>
<td>0.1678</td>
<td>0.0030</td>
<td>0.1619 0.1737</td>
<td>3151.54</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Schizophrenia Disorder</td>
<td>1</td>
<td>0.3107</td>
<td>0.0205</td>
<td>0.2705 0.3508</td>
<td>229.70</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td>1</td>
<td>0.1620</td>
<td>0.0194</td>
<td>0.1240 0.1999</td>
<td>69.96</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Major Depressive Disorder</td>
<td>1</td>
<td>0.3067</td>
<td>0.0212</td>
<td>0.2651 0.3482</td>
<td>209.48</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Substance Use Disorder</td>
<td>1</td>
<td>0.3532</td>
<td>0.0235</td>
<td>0.3071 0.3992</td>
<td>226.02</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
The results of the regression for ER visits, displayed in Table 35 below, shows a negative and statistically significant estimate for treatment group, indicating that Veterans in the ICMHR treatment group had significantly fewer ER visits than Veterans in the control group 2 years post-ICMHR.

**TABLE 35. REGRESSION RESULTS FOR EMERGENCY ROOM VISITS 2 YEARS POST-ICMHR**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DF</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald 95% Confidence Limits</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1</td>
<td>0.1408</td>
<td>0.0271</td>
<td>0.0876 - 0.1940</td>
<td>26.93</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ICMHR Veterans</td>
<td>1</td>
<td>-0.0459</td>
<td>0.0175</td>
<td>-0.0803 - 0.0115</td>
<td>6.85</td>
<td>0.0089</td>
</tr>
<tr>
<td>Pre-ER Days</td>
<td>1</td>
<td>0.1475</td>
<td>0.0029</td>
<td>0.1418 - 0.1531</td>
<td>2633.75</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Schizophrenia Disorder</td>
<td>1</td>
<td>0.2796</td>
<td>0.0188</td>
<td>0.2427 - 0.3166</td>
<td>220.21</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td>1</td>
<td>0.0853</td>
<td>0.0179</td>
<td>0.0503 - 0.1203</td>
<td>22.79</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Major Depressive Disorder</td>
<td>1</td>
<td>0.2013</td>
<td>0.0189</td>
<td>0.1642 - 0.2384</td>
<td>113.32</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Substance Use Disorder</td>
<td>1</td>
<td>0.4727</td>
<td>0.0217</td>
<td>0.4301 - 0.5153</td>
<td>472.76</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

The results of the cost-effectiveness analyses for impact at 2 years post-ICMHR participation on cost of AIMHS admissions are presented in Table 36 for all Veterans, in Table 37 for male Veterans and in Table 38 for female Veterans. In these tables, a negative CE ratio indicates a negative incremental effect of ICMHR on AIMHS admissions and a positive incremental cost, indicating that ICMHR was not cost effective. Negative CE ratios are shown but have no meaningful interpretation.

**TABLE 36. CEA RESULTS MENTAL HEALTH ADMISSIONS 2 YEARS POST-ICMHR (ALL VETERANS)**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect</th>
<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>39,060</td>
<td>--</td>
<td>0.83</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ICMHR</td>
<td>61,957</td>
<td>22,897</td>
<td>1.00</td>
<td>-0.17</td>
<td>-134,688</td>
</tr>
</tbody>
</table>
Table 37. CEA Results Mental Health Admissions 2 Years Post-ICMHR (Male)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect Mental Health Admissions</th>
<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($/ΔMH Admissions Averted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>39,855</td>
<td>--</td>
<td>0.86</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ICMHR</td>
<td>62,152</td>
<td>22,297</td>
<td>1.00</td>
<td>-0.14</td>
<td>-159,264</td>
</tr>
</tbody>
</table>

Table 38. CEA Results Mental Health Admissions 2 Years Post-ICMHR (Female)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect Mental Health Admissions</th>
<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($/ΔMH Admissions Averted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>33,942</td>
<td>--</td>
<td>0.64</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ICMHR</td>
<td>60,698</td>
<td>26,756</td>
<td>1.00</td>
<td>-0.36</td>
<td>-74,322</td>
</tr>
</tbody>
</table>

The results of the cost-effectiveness analyses for impacts at 2 years post-ICMHR participation on cost of ER use are presented in Table 39 for all Veterans, in Table 40 for male Veterans and in Table 41 for female Veterans. Results indicate that participation in ICMHR is associated with decreases in ER visits overall but remains associated with high costs. ER visits averted were slightly positive (0.05) for males versus negative for females (-0.14), indicating that ER visits increased, on average, for women Veterans who were in ICMHR. This provides clear evidence that MICHM was not cost-effective for reducing ER visits for female Veterans. At face value, the relatively high cost per ER mental health visit averted for men suggests that MICHM was also not cost-effective for reducing ER visits for male Veterans.

Table 39. CEA Results Emergency Room Visits 2 Years Post-ICMHR (All Veterans)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect ER Visits</th>
<th>Incremental Average Effect ER Visits Averted</th>
<th>Incremental CE Ratio ($/ER Visits Averted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>39,855</td>
<td>--</td>
<td>1.04</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ICMHR</td>
<td>62,152</td>
<td>22,297</td>
<td>1.02</td>
<td>0.02</td>
<td>1,114,850</td>
</tr>
</tbody>
</table>
### Table 40. CEA Results Emergency Room Visits 2 Years Post-ICMHR (Male)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect ER Visits</th>
<th>Incremental Average Effect ER Visits Averted</th>
<th>Incremental CE Ratio ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>39,060</td>
<td>--</td>
<td>1.08</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ICMHR</td>
<td>61,957</td>
<td>22,897</td>
<td>1.03</td>
<td>0.05</td>
<td>457,940</td>
</tr>
</tbody>
</table>

### Table 41. CEA Results Emergency Room Visits 2 Years Post-ICMHR (Female)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect ER Visits</th>
<th>Incremental Average Effect ER Visits Averted</th>
<th>Incremental CE Ratio ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>33,942</td>
<td>--</td>
<td>0.83</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ICMHR</td>
<td>60,698</td>
<td>26,756</td>
<td>0.97</td>
<td>-0.14</td>
<td>-191,114</td>
</tr>
</tbody>
</table>

**Satisfaction by Gender**

The majority of participants (96 percent) were satisfied with the overall quality of services received from VA ICMHR staff. Using a mixed model to control for confounders, we found a statistically significant gender difference in overall satisfaction. This indicates that *female participants reported higher satisfaction (somewhat or very satisfied) with the overall quality of services received from VA ICMHR staff.*

![Veteran Satisfaction Results for ICMHR by Gender](image)

**Figure 74. ICMHR Veteran Satisfaction by Gender.**

*Note: n=7,841*
Conclusions

The results indicate that program satisfaction is high among ICMHR patients. However, in terms of the major objectives of reducing hospital admissions, lengths of stay, or ER visits, the program does not appear to be cost-effective. Sixty-eight percent of patients in the sample who were referred to ICMHR and had at least one ICMHR visit had no acute mental health admissions during the year prior to their first ICMHR visit. Using hospitalization as the primary outcome measure with relatively low utilizers reduces the potential for the program to affect that measure of outcome. This raises the question of whether these outcomes are in fact the correct measures of success for the ICMHR program given how the program has evolved. The Suicidality Index may also serve as a useful measure, as suggested in a publication (Mohamed, 2013) regarding the RANGE program, which showed that both outcomes and cost-effectiveness for that program were dependent on Veterans’ scores on the index.

Another issue is whether the program is currently being targeted to the patients who can most benefit from ICMHR services. Veterans classified as participating in ICMHR in this study (four or more visits) are not only less likely to have prior use of AIMHS but are also less likely to have a diagnosis of psychosis. A more refined set of eligibility criteria may bolster the program’s cost-effectiveness.

Finally, a major threat to validity of the cost-effectiveness results is possible selection bias due to unobservable differences between the controls and cases that may be related to the outcomes. The PSM matched on diagnoses but not on severity of mental illness. If patients who stay with ICMHR tend to have more serious illness than those in the control group, the results could be biased against the program. Also, the use of 4 or more visits as the proxy for classifying patients as being ICMHR participants may also need to be revisited with program experts to set criteria that may have more clinical significance. However, results were similar when the inclusion criteria for the ICMHR group was increased to 21 visits.

Future analysis should address all of the issues raised above, and program decision-makers should weigh the study limitations when considering any changes in policy or program management. Further study and collaboration with ICMHR program staff may allow the analysis to be refined for the Year Three evaluation and could potentially lead to different conclusions.

Program Description

VA operates approximately 8,000 mental health residential beds nationwide for Veterans with a wide range of presenting problems, illnesses, and rehabilitation care needs, including serious mental disorders such as schizophrenia and major depression, substance use disorders, comorbid conditions, homelessness, and vocational/employment/social needs. The RRTP range of services includes the following models of residential care:

- Domiciliary PTSD (Dom PTSD) or Posttraumatic Stress Disorder (PTSD) – Residential Rehabilitation Treatment Program (PTSD-RRTP)
- General Domiciliary (General Dom) or Psychosocial Residential Rehabilitation Treatment Program (PRRTP)
- Domiciliary SA (Dom SA) or Substance Abuse Residential Rehabilitation Treatment Program (SARRTP)
- Domiciliary Residential Rehabilitation Treatment Program (DRRTP)
- Domiciliary Care for Homeless Veterans (DCHV)
- Compensated Work Therapy (CWT) – Transitional Residence (TR) Program

Data related to the services provided by RRTPs and the clinical status and outcomes for Veterans who participate in them are collected by each RRTP program and may vary across locations. In FY2017, VHA started a Measurement-Based Care initiative that requires all RRTPs to collect similar sets of clinical assessments from Veterans at baseline and different points throughout treatment. These data are expected to be available for the Clay Hunt Evaluation Team starting in FY2020. Therefore, for FY2019, the evaluation focuses on PTSD-R RTP, for which consistent data was available.

**Evaluation Questions**

- What were the characteristics and clinical diagnoses of Veterans enrolled in PTSD-R RTP?
  - Did outcomes differ for male and female Veterans? Did outcomes differ by age or race? Did outcomes differ by mental health diagnosis? Did outcomes differ by military experience (i.e. period of service, incoming fire, hazard duty deployment)?
- How long did Veterans remain in PTSD-R RTP (length of stay in days)?
  - What were the characteristics of Veterans by length of stay (in days)?
  - How did length of stay (in days) impact outcomes?
- How did differences in type of delivery model and treatments impact outcomes?
- What mental health services did Veterans in PTSD-R RTP receive after discharge?
- How did the presence of comorbidities influence the effectiveness of PTSD-R RTP for improving clinical outcomes?
- What were Veterans’ levels of satisfaction with PTSD-R RTP by gender?
- How do mental health and primary health care cost change one year after discharge for Veterans who participate in PTSD-R RTP?

**Methods**

Data for the PTSD-R RTP analyses were derived from clinical assessments, demographics, mental health diagnoses, and program participation extracted from NEPEC MH program records from FY2016 through FY2017. To examine the effectiveness of the PTSD-R RTP, the analysis utilized Chi-square tests and the Wilcoxon rank-sum test to detect differences between Veterans who stayed in the program for a longer period (greater than 92 days) compared to less time (92 days or less). Multivariate analysis was used for factors related to program length of stay. To examine the effectiveness of PTSD-R RTP and Veterans’ recovery and relapse after discharge, the analysis utilized a mixed-effect model. The random effect was the facility variable, and the fixed effect variables were gender, race, age, homeless status, years of education, military experiences, MH diagnoses, baseline measures, Evidenced-Based Treatment (EBT) received, SUD treatment received, and PTSD services after discharge. The Evaluation Team also created an interaction term of program length of stay with other variables, including race, incoming fire experiences, PTSD symptoms at baseline, substance use at baseline, EBT, and SUD treatment.

- **Military experiences** included: 1) experiencing incoming fire (yes or no); 2) the era during which the Veteran served; and 3) number of hazard duty pay deployments.
EBT included: 1) Cognitive Processing Therapy (CPT) and 2) Prolonged Exposure (PE).

These analyses also examined differences between male and female Veterans, by age, and across Veterans from different racial groups. Detailed results are presented in Appendix B.

In addition to these analyses, the Evaluation Team conducted a pathway analysis to uncover prior acute inpatient or RRTP care. This was hypothesized to be important, as this may impact the magnitude of change seen for the PTSD-RRTP analyses.

Table 42 below shows outcome measures used to evaluate this program and the psychological constructs they assess. Based on the objectives of PTSD-RRTP, improvement in PTSD symptoms is the primary outcome that is anticipated for Veterans enrolled in services. Substance use is a secondary outcome that may also be affected through participation in the program for some Veterans. Although levels of substance use (measured by average BAM score) are not necessarily a direct outcome for the PTSD-RRTP program, this measure was examined due to the connection between PTSD and substance use (for both general and Veteran populations) found in the literature (Teeters et al., 2017; Jacobson et al., 2001; Pietrzak et al., 2011; Tull et al., 2013; Tull et al., 2011).

**Table 42. Description of PTSD-RRTP Program Measures**

<table>
<thead>
<tr>
<th>Measures of Outcome</th>
<th>What does this measure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD Checklist (PCL-5)</td>
<td>PTSD symptoms</td>
</tr>
<tr>
<td>Brief Addiction Monitor (BAM) Survey (Substance Use Subscale)</td>
<td>Substance use</td>
</tr>
</tbody>
</table>

**PTSD-RRTP Program Population Description**

As displayed below in Table 32, from FY2016 through FY2017, a total of 5482 Veterans were admitted to a PTSD-RRTP, 3538 were discharged and completed the discharge forms, and 1674 completed follow-up forms. At admission, most of the Veterans were male (85 percent), White (53 percent), and between the ages of 36 and 65 years (58 percent). Additionally, most of the Veterans had both PTSD and SUD comorbid diagnoses (60 percent) and were not homeless or receiving homeless services (62 percent). In terms of military experiences, most Veterans at time of admission had experienced incoming fire (73 percent) and had served during the most recent Military Operations (OEF/OIF/OND) (58 percent).
Clinical Findings

The results of the analysis indicate that, among Veterans in PTSD-RRTP, there was an overall statistically significant reduction in the primary outcome of PTSD symptoms (measured by PCL-5) (displayed in Figures 75-76 below).

- From admission to discharge, Veterans overall had a 13.79-point reduction in PCL-5 score, which likely indicates a clinically meaningful improvement, on average.
- From discharge to four-month follow-up post-discharge, Veterans overall had a 6.49-point increase in PCL-5 score. This is reliable (not due to chance) and suggests Veterans' post-treatment gains were somewhat moderated over time.
**FIGURE 75.** PTSD-RRTP Program PTSD Symptoms (Measured by PCL-5) Overall Changes from Admission, to Discharge, to Follow-up (4 Months).

Scores on the PCL-5 range from 0 to 80. A total score of 33 or higher suggests the patient may benefit from PTSD treatment (Blevins et al., 2015; National Center for PTSD, 2019). Admission to discharge n=3538; discharge to follow-up n=1674.

**FIGURE 76.** PTSD-RRTP Program PTSD Symptoms (Measured by PCL-5) Changes from Discharge to Follow-up (4 Months).

Scores on the PCL-5 range from 0 to 80. A total score of 33 or higher suggests the patient may benefit from PTSD treatment (Blevins et al., 2015; National Center for PTSD, 2019). n=1674
By diagnosis, Veterans with PTSD+SMI and PTSD+SUD comorbidity experienced the greatest improvement in PTSD symptoms at discharge (displayed in Figure 77 below).

**Figure 77. PTSD-RRTP Program PTSD Symptoms (Measured by PCL-5) Changes from Admission to Discharge by Diagnosis.**

Scores on the PCL-5 range from 0 to 80. A total score of 33 or higher suggests the patient may benefit from PTSD treatment (Blevins et al., 2015; National Center for PTSD, 2019). n=3538
For *substance use (BAM)*, the analysis utilized the substance use subscale of BAM (three items, with scores ranging from 0 to 12). Veterans with substance use comorbidity (PTSD+SUD) were selected for this outcome analysis because changes on this scale can be subtle and would not be clinically meaningful if Veterans with no SUD diagnosis were included. The findings show a *statistically significant, though small, reduction* in substance use (measured by BAM), from admission to four-month follow-up (0.32-point decrease from a baseline score of 2.34 to a follow-up score of 2.02) (displayed in Figure 78 below). Veterans with higher substance use scores at intake experienced the greatest improvement at follow-up (although this could be a regression to the mean, it is still considered a positive finding).

**Figure 78. PTSD-RRTP Program Substance Use (Measured by BAM) Scores from Admission to Follow-up.**

The “use” subscale of the BAM is based on three items assessing frequency of use of prescription opioids, illegal substances, and alcohol, with scores ranging from 0 to 12. If a patient scores a 1 or greater, it calls for further examination and clinical attention (Veterans Health Administration, 2011). n=871
Regarding care received following discharge from PTSD-RRTP (displayed in Figure 79 below), Veterans who received care from GMHS, outpatient Specialized PTSD, and other VA inpatient services experienced the greatest decrease in substance use from admission to four-month follow-up. However, Veterans who received care from non-VA facilities experienced increase in substance use from admission to four-month follow-up. This suggests that care from certain VA MH programs post-discharge may help to decrease or prevent relapse in substance use.

**Figure 79. PTSD-RRTP Program Substance Use (Measured by BAM) Changes from Admission to 4-Month Follow-up by Post-Treatment Received.**

The “use” subscale of the BAM is based on three items assessing frequency of use of prescription opioids, illegal substances, and alcohol, with scores ranging from 0 to 12. If a patient scores a 1 or greater, it calls for further examination and clinical attention (Veterans Health Administration, 2011). n=871
By homeless status (displayed in Figure 80 below), Veterans who were homeless or were receiving homeless services showed a significant decrease in substance use. Conversely, Veterans who were not homeless or receiving homeless services showed no change in substance use.

The "use" subscale of the BAM is based on three items assessing frequency of use of prescription opioids, illegal substances, and alcohol, with scores ranging from 0 to 12. If a patient scores a 1 or greater, it calls for further examination and clinical attention (Veterans Health Administration, 2011). n=871

Length of Stay
As displayed in Table 44 below, length of stay (in days) is shown by key demographic variables. On average, Veterans who were Black, had experienced incoming fire, and had more severe PTSD symptoms and/or substance use at intake tended to stay in PTSD-RRTP longer. Veterans with longer program stay (greater than 92 days) did not differ from Veterans with shorter program stay (92 days or less) by homeless status, gender, age, MH diagnosis, or baseline measures (these were not significant factors in the LOS differences).
### Table 44. PTSD-RRTP Program Length of Stay (in days) in FY2016 through FY2017

<table>
<thead>
<tr>
<th>PTSD-RRTP Program Length of Stay (in days) in FY2016 through FY2017</th>
<th>Number (N)</th>
<th>Mean (M)</th>
<th>Median</th>
<th>Standard Deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENDER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4661</td>
<td>51.25</td>
<td>49</td>
<td>23.58</td>
</tr>
<tr>
<td>Female</td>
<td>668</td>
<td>52.16</td>
<td>49</td>
<td>21.51</td>
</tr>
<tr>
<td>Unknown</td>
<td>130</td>
<td>48.63</td>
<td>47</td>
<td>20.41</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2946</td>
<td>50.26</td>
<td>49</td>
<td>23.49</td>
</tr>
<tr>
<td>Black</td>
<td>1331</td>
<td>52.60</td>
<td>49</td>
<td>22.20</td>
</tr>
<tr>
<td>Other</td>
<td>742</td>
<td>53.18</td>
<td>51</td>
<td>24.68</td>
</tr>
<tr>
<td>Hispanic</td>
<td>269</td>
<td>51.88</td>
<td>49</td>
<td>22.97</td>
</tr>
<tr>
<td>Unknown</td>
<td>171</td>
<td>49.97</td>
<td>49</td>
<td>20.85</td>
</tr>
<tr>
<td><strong>AGE</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-35 years</td>
<td>1689</td>
<td>51.49</td>
<td>49</td>
<td>25.49</td>
</tr>
<tr>
<td>36-65 years</td>
<td>3204</td>
<td>51.25</td>
<td>49</td>
<td>21.75</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>536</td>
<td>51.21</td>
<td>49</td>
<td>25.05</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Only</td>
<td>263</td>
<td>53.35</td>
<td>49</td>
<td>28.18</td>
</tr>
<tr>
<td>PTSD+SMI*</td>
<td>1044</td>
<td>51.22</td>
<td>49</td>
<td>22.81</td>
</tr>
<tr>
<td>PTSD+SUD</td>
<td>3299</td>
<td>51.38</td>
<td>49</td>
<td>23.94</td>
</tr>
<tr>
<td>PTSD+Other</td>
<td>853</td>
<td>50.43</td>
<td>49</td>
<td>19.16</td>
</tr>
<tr>
<td><strong>HOMELESS OR RECEIVING HOMELESS SERVICES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2040</td>
<td>51.91</td>
<td>49</td>
<td>23.89</td>
</tr>
<tr>
<td>No</td>
<td>3419</td>
<td>50.93</td>
<td>49</td>
<td>22.89</td>
</tr>
<tr>
<td><strong>INCOMING FIRE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4007</td>
<td>51.73</td>
<td>49</td>
<td>24.31</td>
</tr>
<tr>
<td>No</td>
<td>1234</td>
<td>49.71</td>
<td>49</td>
<td>19.88</td>
</tr>
<tr>
<td><strong>OEF/OIF/OND</strong>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3211</td>
<td>51.36</td>
<td>49</td>
<td>23.91</td>
</tr>
<tr>
<td>No</td>
<td>2248</td>
<td>51.2</td>
<td>49</td>
<td>22.33</td>
</tr>
</tbody>
</table>

*Note: SMI defined as Schizophrenia, bipolar depression, and any other psychosis.

**Note: Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), Operation New Dawn (OND).

### Interaction Findings

It was hypothesized that the significant outcome findings cited above may be an artifact of how long Veterans stayed in the PTSD-RRTP program. Therefore, the Evaluation Team created the interaction term of program length of stay (LOS) to determine how program length of stay interacting with other variables impacts the program outcome.

Analyses of interactions between LOS and provision of EBT, displayed in Figures 81 below, find the following:

- As indicated by the positive slopes of the lines in the interaction chart, for Veterans who received CPT-Individual and PE, longer program stay was associated with less improvement.
- The negative slope for Veterans receiving other types of EBT care (CPT Group, Partial EBT, EBT Prior to program), or no EBT at all, showed a greater decrease in PTSD symptoms with longer LOS.
Although the interaction effect between program LOS and provision of EBT reflected plausible benefits of longer program stay and certain EBT treatment combinations (e.g., longer program stay with prior completed EBT, CPT group), further studies would be needed to substantiate whether there is a reliable interaction effect between types of EBT and program LOS.

**Figure 81. PTSD-RRTP Program Interaction between EBT and LOS.**

Length of Stay (in days) on the x-axis is the log value. Interaction between EBT and LOS, with the Y-axis showing the extent of PTSD symptom reduction. The greater the negative value indicates greater improvement/reduction in symptoms.

Analyses of interactions between LOS and military experience (displayed in Figures 82 below), finds:

- As indicated by the greater negative slopes for all Veterans (with or without incoming fire experiences), longer program stay was beneficial for Veterans.
- Overall, although longer program stay in PTSD-RRTP is beneficial for all Veterans, those with no history of experiencing incoming fire benefit from longer program stay than those who experienced incoming fire. However, in examining group differences, the analysis shows that those with incoming fire experiences were, in fact, staying in the program longer than those who did not experience incoming fire.
**FIGURE 82. PTSD-RRTP PROGRAM INTERACTION BETWEEN MILITARY EXPERIENCE AND LOS.**

Interaction between military experience and LOS, with the Y axis showing the extent of PTSD symptom reduction. The greater the negative value indicates greater improvement/reduction in symptoms.
Analyses of interactions between LOS and PTSD symptoms and relapse (from discharge to four-month follow-up), displayed in Figures 83 below, finds:

- For Veterans with less severe PTSD at intake (less than 53), longer program stay was associated with less PTSD relapse after discharge; for Veterans with more severe PTSD at intake (scores between 53 and 73), longer program stay was associated with more PTSD relapse after discharge.

![PTSD-RRTP—Interaction between PTSD Symptoms (Measured by PCL-5) and Length of Stay Discharge to Follow-up](image)

**Figure 83. PTSD-RRTP Program Interaction between LOS and PTSD Symptoms (from Discharge to 4-Month Follow-up).**

Interaction between PTSD symptoms at intake and LOS, with the Y axis showing the extent of PTSD symptom reduction. The greater the negative value indicates greater improvement/reduction in symptoms.

Pathways

The Evaluation Team examined the pathways of care pre- and post-PTSD-RRTP, as prior care could affect the magnitude of change that the Veteran may experience in PTSD-RRTP.

<table>
<thead>
<tr>
<th>Definition of Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ordered set of distinct mental health programs that we construct for a given Veteran by listing the programs in which a Veteran participated based on the first date they visited that program, within the time interval of interest. We align these programs sequentially to see which mental health programs were accessed in the year (365 days) prior to admission to PTSD-RRTP and after discharge from PTSD-RRTP.</td>
</tr>
</tbody>
</table>

As displayed in Table 45 below, the majority of PTSD-RRTP participants had been in a residential care program in the year prior to admission to PTSD-RRTP (nearly 58 percent). Further, many had been in either AIMHS or another RRTP program prior to admission to PTSD-RRTP. After PTSD-RRTP, most Veterans (nearly 35 percent) went to another RRTP program.
### Table 45. Pre- and Post-PTSD-RRTP Program Pathways of Care (Top 10)

<table>
<thead>
<tr>
<th>Pathways</th>
<th>Pre-PTSD-RRTP</th>
<th>Percent (%)</th>
<th>Post-PTSD-RRTP</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRTP</td>
<td>1039</td>
<td>57.9</td>
<td>RRTP</td>
<td>305</td>
</tr>
<tr>
<td>AIMHS ➔ RRTP</td>
<td>247</td>
<td>13.8</td>
<td>AIMHS</td>
<td>86</td>
</tr>
<tr>
<td>Sub-acute* ➔ RRTP</td>
<td>107</td>
<td>6.0</td>
<td>RRTP ➔ Sub-acute*</td>
<td>50</td>
</tr>
<tr>
<td>RRTP ➔ AIMHS</td>
<td>81</td>
<td>4.5</td>
<td>RRTP ➔ AIMHS</td>
<td>47</td>
</tr>
<tr>
<td>Sub-acute* ➔ AIMHS ➔ RRTP</td>
<td>50</td>
<td>2.8</td>
<td>AIMHS ➔ RRTP</td>
<td>37</td>
</tr>
<tr>
<td>RRTP ➔ Sub-acute*</td>
<td>42</td>
<td>2.3</td>
<td>RRTP ➔ PTSD-RRTP</td>
<td>23</td>
</tr>
<tr>
<td>AIMHS ➔ Sub-acute* ➔ RRTP</td>
<td>22</td>
<td>1.2</td>
<td>Sub-acute* ➔ AIMHS</td>
<td>22</td>
</tr>
<tr>
<td>AIMHS ➔ RRTP ➔ Sub-acute*</td>
<td>21</td>
<td>1.2</td>
<td>PTSD-RRTP</td>
<td>21</td>
</tr>
<tr>
<td>RRTP ➔ PTSD-RRTP</td>
<td>19</td>
<td>1.1</td>
<td>Sub-acute* ➔ RRTP</td>
<td>19</td>
</tr>
<tr>
<td>Other Pathways**</td>
<td>100</td>
<td>5.9</td>
<td>Other Pathways**</td>
<td>114</td>
</tr>
</tbody>
</table>

*Note: Sub-acute=sub-acute inpatient care.

**Note: Other possible combinations of pathways occurred for less than 6% of this population (pre) and less than 13% of this population (post).

### Gender Results

There were no significant differences across any measures by gender.

### Veteran Satisfaction

Overall, around 60 percent of Veterans (both male and female) were “completely” or “pretty much satisfied” with their experience in PTSD-RRTP (displayed in Figure 84 below). The analysis controlled for race, age, homeless status, education, military experience, EBT, and MH comorbidities and showed no significant differences by gender.

#### Veteran Satisfaction Results with for PTSD-RRTP by Gender

![Veteran Satisfaction Results with for PTSD-RRTP by Gender](image)

**Figure 84. PTSD-RRTP Program Veteran Satisfaction by Gender.**

*Note: n=3538*
Cost Analysis Methods

It is expected that a stay in PTSD-RRTP will reduce the likelihood of admission to acute inpatient mental health services and reduce use and cost of other outpatient mental health services. Because a comparison group was not available to estimate the cost-effectiveness of PTSD-RRTP, the Evaluation Team compared physical and mental health care utilization and cost one year pre-admission with one year post-discharge utilization and cost of care. Cost and utilization during the PTSD-RRTP stay was also measured and reported. Data for these analyses were drawn from the sources listed in Table 46 below.

**TABLE 46. DESCRIPTION OF PTSD-RRTP PROGRAM CEA DATA SOURCES AND VARIABLES**

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterans Information Systems and Technology Architecture (VISTA) <em>(extracted from CDWWork)</em></td>
<td>Demographics, general medical and mental health diagnoses, Elixhauser scores, hospitalizations, referrals, readmissions, encounters with VA programs and services/VHA service utilization, adverse events, types and pattern of services received, and timing of services/dates</td>
</tr>
<tr>
<td>VA Managerial Cost Accounting System (MCA) <em>(extracted from MCA Clinic Stop and Treating Specialty Cost Reports)</em></td>
<td>Unit costs by outpatient clinic stop code and inpatient treating specialty</td>
</tr>
</tbody>
</table>

The following programs and categories of care were included in the analysis:

- AIMHS admissions and bed days
- All PTSD-RRTP programs admissions and total LOS
- All Other RRTP programs admissions and total LOS
- All Mental Health outpatient encounters
- All Non-Mental Health admissions and total LOS
- All Non-Mental Health outpatient encounters

For each of the above, unit costs were extracted from MCA for all inpatient and outpatient codes. Unit costs were then multiplied by utilization to calculate total cost incurred by each Veteran during their stay in PTSD-RRTP as well as one year pre-admission and one year post-discharge. Costs for any non-VA care that was not reimbursed by VA was not included. All costs are expressed in 2018 dollars.

As indicated in Table 47, for Veterans who participated in PTSD-RRTP, use of both inpatient and outpatient mental health services, of outpatient primary care services, and of other RRTP programs decreased significantly in the year following discharge from the program, as compared to utilization in the year prior to the index PTSD-RRTP admission. Admissions and length of stay in PTSD-RRTP and Compensated Work Therapy—Transitional Residence (CWT-TR), as well as lengths of stay in non-mental health inpatient services all increased in the year post-discharge from PTSD-RRTP but none of these increases were statistically significant.

Decreases in service utilization were statistically similar overall for both male and female Veterans except for both admissions and length of stay in CWT-TR, where female Veterans had more admissions and longer lengths of stay in the one year post-discharge than the one year prior to the index stay in PTSD-RRTP (displayed in Table 47 below).
**Table 47. Change in Utilization One Year Pre-Admission and One Year Post-Discharge from PTSD-RRTP Program (All)**

<table>
<thead>
<tr>
<th>Period</th>
<th>During PTSD-RRTP Index Stay</th>
<th>One Year_PRE</th>
<th>One Year_POST</th>
<th>Difference (POST-PRE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Admissions AIMHS</td>
<td>57</td>
<td>1,966</td>
<td>1,154</td>
<td>(812)</td>
</tr>
<tr>
<td>Total LOS AIMHS</td>
<td>310</td>
<td>16,904</td>
<td>9,004</td>
<td>(7,900)</td>
</tr>
<tr>
<td>Total Admissions PTSD-RRTP</td>
<td>4,640</td>
<td>99</td>
<td>303</td>
<td>204</td>
</tr>
<tr>
<td>Total LOS PTSD-RRTP</td>
<td>235,371</td>
<td>4,678</td>
<td>12,292</td>
<td>7,614</td>
</tr>
<tr>
<td>Total Admissions Other RRTP</td>
<td>9</td>
<td>1,252</td>
<td>657</td>
<td>(595)</td>
</tr>
<tr>
<td>Total LOS Other RRTP</td>
<td>741</td>
<td>63,304</td>
<td>44,492</td>
<td>(18,812)</td>
</tr>
<tr>
<td>Total Admissions CWTTR</td>
<td>-</td>
<td>12</td>
<td>35</td>
<td>23</td>
</tr>
<tr>
<td>Total LOS CWTTR</td>
<td>-</td>
<td>2,483</td>
<td>5,126</td>
<td>2,643</td>
</tr>
<tr>
<td>Total Encounters OUTPTMH</td>
<td>343,768</td>
<td>618,700</td>
<td>272,511</td>
<td>(346,189)</td>
</tr>
<tr>
<td>Total Admissions Non-MH INPT</td>
<td>134</td>
<td>908</td>
<td>881</td>
<td>(27)</td>
</tr>
<tr>
<td>Total LOS Non-MH INPT</td>
<td>329</td>
<td>3,458</td>
<td>3,780</td>
<td>322</td>
</tr>
<tr>
<td>Total Encounters Non-MH OUTPT</td>
<td>147,776</td>
<td>431,816</td>
<td>313,197</td>
<td>(118,619)</td>
</tr>
</tbody>
</table>

*Note: Grey highlighted cells are statistically significant.*

**LOS=length of stay (in days)**
As can be seen in Table 49, between one year pre-admission and one year post-discharge, there were also large and significant decreases in costs overall and for most mental health and non-mental health programs. The only decrease found not to be significant was for non-Mental Health Inpatient services.

The cost for PTSD-RRTP admissions more than doubled between the pre- and post-years for this group of Veterans. Use of PTSD-RRTP also more than doubled during the post-year when compared to the year prior to the index year. However, cost of PTSD-RRTP in the year after the index stay still represents a small proportion (2.47 percent) of the total cost for index PTSD-RRTP admissions.

Additionally, changes in costs were similar between genders overall. The only gender difference in cost between genders found to be significant was for CWT-TR. Female Veterans had an increase in cost for CWT-TR between the pre- and post-years, which was more than twice as much per participant compared to male Veterans.
<table>
<thead>
<tr>
<th>Table 49. Change in MH and Non-MH Costs One Year Pre-admission and One Year Post-discharge from PTSD-RRT Program (All Veterans)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
</tr>
<tr>
<td>During PTSD-RRT Index Stay</td>
</tr>
<tr>
<td>One Year_PRE</td>
</tr>
<tr>
<td>One Year_POST</td>
</tr>
<tr>
<td>Difference (POST - PRE)</td>
</tr>
<tr>
<td>Per Patient Cost Difference</td>
</tr>
</tbody>
</table>

*Note: Grey highlighted cells are statistically significant.*

<table>
<thead>
<tr>
<th>Table 50. Change in MH and Non-MH Costs One Year Pre-admission and One Year Post-discharge from PTSD-RRT Program (Male)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
</tr>
<tr>
<td>Male (n=3,941)</td>
</tr>
<tr>
<td>One Year_PRE</td>
</tr>
<tr>
<td>One Year_POST</td>
</tr>
<tr>
<td>Difference (POST - PRE)</td>
</tr>
<tr>
<td>Per Patient Cost Difference</td>
</tr>
</tbody>
</table>

*Note: Grey highlighted cells are statistically significant.*

<table>
<thead>
<tr>
<th>Table 51. Change in MH and Non-MH Costs One Year Pre-admission and One Year Post-discharge from PTSD-RRT Program (Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
</tr>
<tr>
<td>Female (n=98)</td>
</tr>
<tr>
<td>One Year_PRE</td>
</tr>
<tr>
<td>One Year_POST</td>
</tr>
<tr>
<td>Difference (POST - PRE)</td>
</tr>
<tr>
<td>Per Patient Cost Difference</td>
</tr>
</tbody>
</table>

*Note: Grey highlighted cells are statistically significant.*

To look at whether total costs may have been affected by length of stay in the program, we divided PTSD-RRTTP participants into two groups: a) Veterans with index stays of less than or equal to 45 days and b) Veterans with index stays of greater than 45 days. The sample used for the cost analysis had a median length of stay of 49.0 days and mean of 50.7 days. The 45-day cutoff was selected as it is closer to the most frequent practice in VA, which is the range of 42 to 45 days. As indicated in Table 52, overall costs for both groups decreased. The only differences between the two groups that were found to be significant were for mental health and non-mental health outpatient and for total costs, where the decreases in cost(s) were relatively greater for the >45-day LOS.
**TABLE 52. CHANGE IN TOTAL COST BY LENGTH OF STAY (LOS)**

<table>
<thead>
<tr>
<th>LOS</th>
<th>Period</th>
<th>AIMHS Total Cost</th>
<th>PTSD-RRTP Total Cost</th>
<th>Other RRTP Total Cost</th>
<th>CWTTR Total Cost</th>
<th>OUTPTMH Total Cost</th>
<th>Non-MH INPT Total Cost</th>
<th>Non-MH OUTPT Total Cost</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>≤ 45 Days</strong></td>
<td>During PTSD-RRTP Index Stay</td>
<td>$93,767</td>
<td>$23,609,411</td>
<td>$72,255</td>
<td>-</td>
<td>$10,351,060</td>
<td>$249,929</td>
<td>$5,942,382</td>
<td>$40,318,802</td>
</tr>
<tr>
<td>n = 1,771</td>
<td>One Year_PRE</td>
<td>$7,559,114</td>
<td>$1,223,090</td>
<td>$8,962,350</td>
<td>$135,431</td>
<td>$30,552,485</td>
<td>$3,547,522</td>
<td>$28,043,921</td>
<td>$80,023,912</td>
</tr>
<tr>
<td></td>
<td>One Year_POST</td>
<td>$4,664,008</td>
<td>$3,469,226</td>
<td>$5,191,138</td>
<td>$42,088</td>
<td>$20,386,752</td>
<td>$2,896,799</td>
<td>$23,720,738</td>
<td>$60,370,750</td>
</tr>
<tr>
<td>Per Patient Cost Difference</td>
<td>(1,635)</td>
<td>$1,268</td>
<td>$(2,129)</td>
<td>(53)</td>
<td>$(5,740)</td>
<td>$(367)</td>
<td>$(2,441)</td>
<td>(11,097)</td>
<td></td>
</tr>
<tr>
<td><strong>&gt; 45 Days</strong></td>
<td>During PTSD-RRTP Index Stay</td>
<td>$244,102</td>
<td>$99,760,584</td>
<td>$223,026</td>
<td>-</td>
<td>$39,272,163</td>
<td>$628,945</td>
<td>$20,029,423</td>
<td>$160,158,241</td>
</tr>
<tr>
<td>n = 2,869</td>
<td>One Year_PRE</td>
<td>$12,133,004</td>
<td>$1,345,438</td>
<td>$16,285,670</td>
<td>$184,558</td>
<td>$70,484,131</td>
<td>$4,541,836</td>
<td>$52,269,713</td>
<td>$157,244,350</td>
</tr>
<tr>
<td></td>
<td>One Year_POST</td>
<td>$5,411,173</td>
<td>$2,163,561</td>
<td>$9,807,384</td>
<td>$659,593</td>
<td>$32,209,428</td>
<td>$5,428,131</td>
<td>$37,339,398</td>
<td>$93,018,668</td>
</tr>
<tr>
<td></td>
<td>Difference (POST - PRE)</td>
<td>$(6,721,831)</td>
<td>$818,123</td>
<td>$(6,478,287)</td>
<td>$475,035</td>
<td>$(38,274,703)</td>
<td>$886,295</td>
<td>$(14,930,315)</td>
<td>$(64,225,682)</td>
</tr>
<tr>
<td>Per Patient Cost Difference</td>
<td>(2,343)</td>
<td>$285</td>
<td>$(2,258)</td>
<td>166</td>
<td>(13,341)</td>
<td>$309</td>
<td>$(5,204)</td>
<td>$(22,386)</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Grey highlighted cells are statistically significant.*
### Table 53. Change in Utilization by Length of Stay (LOS)

<table>
<thead>
<tr>
<th>Period</th>
<th>LOS &lt; 45 Days</th>
<th>LOS &gt; 45 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>During PTSD-RRTP Index Stay</td>
<td>One Year_PRE</td>
</tr>
<tr>
<td>Total Admissions AIMHS</td>
<td>18</td>
<td>802</td>
</tr>
<tr>
<td>Total LOS AIMHS</td>
<td>87</td>
<td>6,788</td>
</tr>
<tr>
<td>Total Admissions PTSD-RRTP</td>
<td>1,771</td>
<td>50</td>
</tr>
<tr>
<td>Total LOS PTSD-RRTP</td>
<td>48,183</td>
<td>2,206</td>
</tr>
<tr>
<td>Total Admissions Other RRT</td>
<td>3</td>
<td>491</td>
</tr>
<tr>
<td>Total LOS Other RRT</td>
<td>204</td>
<td>21,813</td>
</tr>
<tr>
<td>Total Admissions CWTTR</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Total LOS CWTTR</td>
<td>-</td>
<td>1,119</td>
</tr>
<tr>
<td>Total Encounters OUTPTMH</td>
<td>75,932</td>
<td>184,064</td>
</tr>
<tr>
<td>Total Admissions Non-MH INPT</td>
<td>40</td>
<td>407</td>
</tr>
<tr>
<td>Total LOS Non-MH INPT</td>
<td>86</td>
<td>1,519</td>
</tr>
<tr>
<td>Total Encounters Non-MH OUTPT</td>
<td>35,680</td>
<td>150,361</td>
</tr>
</tbody>
</table>

*Note: Grey highlighted cells are statistically significant.

**Note: LOS=length of stay (in days)
Conclusions

PTSD-RRTP is a nationwide residential treatment program focusing on the improvement of PTSD symptoms for Veterans. Most of the Veterans in this program were White, male, middle-aged (between the ages of 36 and 65 years), not homeless or receiving homeless services, and had comorbid PTSD+SUD diagnoses. Most also had experienced incoming fire and served in the most recent Military Operations (OEF/OIF/OND). The outcomes of PTSD-RRTP participation were quite positive for Veterans. There were significant reductions in PTSD symptoms, and even more so for the Veterans with the most severe levels at intake. The average reduction in PTSD symptoms during treatment was also clinically meaningful. Veterans who completed EBP treatment (either prior to PTSD-RRTP or during program stay) experienced significantly greater improvements of PTSD symptoms at discharge. This lends strong support that EBT is positively affecting Veterans’ PTSD symptoms and is a crucial component for care received in PTSD-RRTP.

Another positive finding is the significant reduction in substance use from admission to four-month follow-up. This suggests not only that the outcomes extend beyond the length of the program stay, but also that the improvements were greatest for those with the most severe SUD at admission. In particular, those Veterans with SMI and/or SUD or who were homeless or receiving homeless services, experienced the greatest decrease in substance use from admission to follow-up. When examining the pathways of care that Veterans received post-PTSD-RRTP, the greatest reductions in substance use at follow-up are for those Veterans who receive care in GMHS, Specialized PTSD, or other VA inpatient services. Veterans who receive care from Vet Centers or non-VA facilities experienced the greatest increase in substance use post-discharge from PTSD-RRTP. This suggests that care from VA medical center MH programs post-discharge may help decrease and/or prevent relapse in substance use.

The results indicate that costs and utilization decline overall between the periods one year pre-admission and one year post-discharge from PTSD-RRTP. There were no significant gender differences for these findings except for CWT-TR (both admissions and LOS), where increase in use for this service was relatively greater for females. Overall, there were significantly greater decreases in cost for >45-day LOS group than for the <45-day group. The only significant differences found between the two LOS groups (<45-day and >45-day LOS) were mental health and non-mental health outpatient costs and encounters for which the >45-day group had significantly larger decreases. For PTSD-RRTP, increases for both admissions and LOS were significantly less for the >45-day group.

It will be of interest to continue to track whether these declines continue over future years. It may take several years post-index date to document the full net savings that could be attributed to PTSD-RRTP due to changes in utilization of services post-discharge.
Program Description

Acute Inpatient Mental Health Services (AIMHS) refers to inpatient care that is provided to Veterans who require hospitalization due to severe and/or acute mental health symptoms, including suicidality. Inpatient units provide evidence-based treatments in the context of recovery-oriented principles in a safe, controlled environment. The main goal of this level of care is to stabilize the Veteran as safely and efficiently as possible and to continue treatment at the least restrictive and most appropriate level of mental health care. The AIMHS level of care is intended to address acute symptoms, improve quality of life through stabilization of symptoms, and transition the Veteran into the community with ongoing follow-up care and services.

Evaluation Questions

- What were the characteristics and clinical diagnoses of Veterans admitted to AIMHS?
- How long did Veterans remain in AIMHS (length of stay (LOS))? 
- What were the most common “pathways of care” pre-AIMHS and post-AIMHS admission? 
- In last year’s analysis, it appeared that one-year-post-discharge total cost of care increased for Veterans admitted to AIMHS. Much of this change was attributable to increase in use of outpatient mental health and primary health care post-discharge. Does the cost for Veterans admitted to AIMHS stabilize or decrease two years post-discharge?

AIMHS Participant Description

Data for the analyses were derived from the medical records of Veterans discharged from AIMHS between June 1, 2015, and June 30, 2017. This time period was selected because the cost analysis explores cost during one and two years post-discharge, and June 30, 2017, represented the last date for which two-year-post-discharge cost data were available at the time these analyses were completed.

As displayed in Table 54 below, of the 37,824 Veterans who were discharged from AIMHS between June 1, 2015, and June 30, 2017, most were male, White, between the ages of 35 and 65, not married, not homeless or receiving homeless services, not employed, had more than five mental health diagnoses at time of admission to AIMHS, and had no AIMHS admission in the year prior to the index admission. Only 10.6 percent of Veterans were female, which is slightly lower than the 16 percent for females currently enlisted in the military (Council on Foreign Relations, 2019).

In the year prior to their admission to AIMHS, 99 percent of Veterans received outpatient mental health services at VA facilities; male Veterans had an average of 39 outpatient encounters, while female Veterans had an average of 44 outpatient encounters. At the time of admission to AIMHS, women were more likely than men to have a diagnosis of PTSD, bipolar disorder, and/or major depressive disorder.
TABLE 54. SAMPLE CHARACTERISTICS OF VETERANS AT TIME OF ADMISSION TO AIMHS PROGRAM

<table>
<thead>
<tr>
<th>Sample Characteristics of Veterans at Time of Admission to AIMHS Program</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong> n= 37,824</td>
<td>33,822</td>
<td>4,002</td>
</tr>
<tr>
<td><strong>MARITAL STATUS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently Married</td>
<td>9,382</td>
<td>936</td>
</tr>
<tr>
<td>Not Married</td>
<td>24,440</td>
<td>3,066</td>
</tr>
<tr>
<td><strong>EMPLOYMENT STATUS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Employed</td>
<td>22,423</td>
<td>2,753</td>
</tr>
<tr>
<td>Employed</td>
<td>11,399</td>
<td>1,249</td>
</tr>
<tr>
<td><strong>RACE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>21,158</td>
<td>2,282</td>
</tr>
<tr>
<td>Black</td>
<td>9,143</td>
<td>1,156</td>
</tr>
<tr>
<td>Hispanic</td>
<td>326</td>
<td>42</td>
</tr>
<tr>
<td>Other</td>
<td>4,195</td>
<td>522</td>
</tr>
<tr>
<td><strong>HOMELESS OR RECEIVING HOMELESS SERVICES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11,526</td>
<td>1,100</td>
</tr>
<tr>
<td>No</td>
<td>22,296</td>
<td>2,902</td>
</tr>
<tr>
<td><strong>NUMBER OF MH DIAGNOSES</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>2,141</td>
<td>173</td>
</tr>
<tr>
<td>One</td>
<td>313</td>
<td>5</td>
</tr>
<tr>
<td>Two</td>
<td>1391</td>
<td>49</td>
</tr>
<tr>
<td>Three</td>
<td>4,408</td>
<td>505</td>
</tr>
<tr>
<td>Four</td>
<td>8,205</td>
<td>885</td>
</tr>
<tr>
<td>Five or more</td>
<td>17,364</td>
<td>2,385</td>
</tr>
<tr>
<td><strong>MH DIAGNOSIS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>5716</td>
<td>607</td>
</tr>
<tr>
<td>PTSD</td>
<td>14,583</td>
<td>2,348</td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td>6,748</td>
<td>1,216</td>
</tr>
<tr>
<td>Major Depressive Disorder</td>
<td>17,472</td>
<td>2,329</td>
</tr>
<tr>
<td><strong>NUMBER OF OUTPATIENT MH ENCOUNTERS PRIOR TO ADMISSION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>254</td>
<td>24</td>
</tr>
<tr>
<td>One or more</td>
<td>33,568</td>
<td>3,978</td>
</tr>
</tbody>
</table>

*Note: Total MH diagnosis is the sum of schizophrenia, bipolar, PTSD, mental health substance use, psychosis, anxiety, dementia, SUD, personality and depression disorders.

**Note: Veterans may be diagnosed with more than one diagnosis (comorbidity).

Methods for Pathways Analysis

As displayed in Table 55 below, the majority (99 percent) of Veterans admitted to AIMHS had at least one outpatient mental health encounter in the year prior to their admission to AIMHS. Veterans’ history of participation in mental health programs, such as their length of participation in such programs, the sequence in which they enter different programs, and whether individual services are used concurrently, can be significant predictors of clinical outcomes and costs. For example, concurrent treatment for both depression and substance use for Veterans has been shown to support greater reductions in substance use and depression than separate delivery of each service at different time points (Worley et al., 2010). Comprehensive services for the treatment of serious mental health diagnoses, of comorbidities, and for Veterans with prior inpatient mental health admissions are also associated with lower long-term costs for inpatient mental health services (Slade et al., 2013).
The Evaluation Team performed sequence analysis in R using the TraMineR (Trajectory Miner for R) package to discover the various sequences or pathways of mental health services that Veterans followed before admission to AIMHS and one year after discharge. Individual longitudinal characteristics of sequences, like length of time in each mental health program and number of encounters in each program, were recorded. The most frequent sequences of mental health programs were extracted and plotted using frequency plots.

In order to construct the pathways, the Evaluation Team first defined each “pathway” and determined which distinct mental health programs would be considered for inclusion. Collaboration occurred with VA Mental Health Technical Advisors to help determine which of the programs assessed as part of this evaluation are intended to impact admission and readmission to AIHMS. Pathways were computed for the 365-day interval prior to admission to AIMHS and for the 365-day interval after discharge from AIMHS. Pathways include the following outpatient programs: GMHS, ICMHR, PC-MHI, Specialized PTSD, and SUD. Pathways did not include TSES or PRRC because these programs are not intended to impact the “re-admission” outcome measures.

### Definition of Pathway

An ordered set of distinct mental health programs that we construct for a given Veteran by listing the programs in which a Veteran participated based on the first date they visited that program, within the time interval of interest. We align these programs sequentially to see which mental health programs were accessed in the year (365 days) prior to admission to AIHMS and after discharge from AIHMS.

### Pathways Results

In the year prior to AIMHS admission, the majority (32 percent) of Veterans received services only from GMHS while 25 percent received no services through any of the mental health services currently being evaluated. After discharge from AIMHS, 43 percent of Veterans continued to receive the same pattern of mental health services that they received prior to admission to AIMHS. Most Veterans (59 percent) either returned to or entered GMHS immediately after discharge from AIMHS. Forty-one percent of hospitalized Veterans either concurrently or subsequently enrolled in specialized mental health programs such as SUD and Specialized PTSD services.
### Table 55. Pre- and Post-AIMHS Program Pathways of Care (Top 10)

<table>
<thead>
<tr>
<th>Pathways</th>
<th>Pre-AIMHS n</th>
<th>Percent (%)</th>
<th>Pathways</th>
<th>Post-AIMHS n</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMHS</td>
<td>37596</td>
<td>32.40</td>
<td>GMHS</td>
<td>40426</td>
<td>34.80</td>
</tr>
<tr>
<td>MH Services Not Included in this Evaluation</td>
<td>29362</td>
<td>25.30</td>
<td>MH Services Not Included in this Evaluation</td>
<td>10321</td>
<td>8.91</td>
</tr>
<tr>
<td>GMHS ➔ SUD</td>
<td>7530</td>
<td>6.49</td>
<td>GMHS ➔ SUD</td>
<td>9459</td>
<td>8.16</td>
</tr>
<tr>
<td>SUD ➔ GMHS</td>
<td>4589</td>
<td>3.96</td>
<td>SUD ➔ GMHS</td>
<td>7060</td>
<td>6.10</td>
</tr>
<tr>
<td>GMHS ➔ PC-MHI</td>
<td>3301</td>
<td>2.85</td>
<td>GMHS ➔ PTSD</td>
<td>3445</td>
<td>2.97</td>
</tr>
<tr>
<td>PCMHI ➔ GMHS</td>
<td>2657</td>
<td>2.29</td>
<td>GMHS ➔ PC-MHI</td>
<td>3269</td>
<td>2.82</td>
</tr>
<tr>
<td>GMHS ➔ PTSD</td>
<td>2654</td>
<td>2.29</td>
<td>GMHS ➔ SUD ➔ RRTP</td>
<td>2534</td>
<td>2.18</td>
</tr>
<tr>
<td>SUD</td>
<td>1925</td>
<td>1.66</td>
<td>GMHS ➔ RRTP ➔ SUD</td>
<td>2415</td>
<td>2.08</td>
</tr>
<tr>
<td>GMHS ➔ SUD ➔ RRTP</td>
<td>1785</td>
<td>1.54</td>
<td>GMHS ➔ ICMHR</td>
<td>2214</td>
<td>1.91</td>
</tr>
<tr>
<td>GMHS ➔ RRTP ➔ SUD</td>
<td>1502</td>
<td>1.29</td>
<td>SUD ➔ GMHS ➔ RRTP</td>
<td>2198</td>
<td>1.80</td>
</tr>
<tr>
<td>Other Pathways*</td>
<td>22969</td>
<td>19.78</td>
<td>Other Pathways*</td>
<td>32529</td>
<td>27.98</td>
</tr>
</tbody>
</table>

*Note: This table displays the Top 10 Pathways. Other possible combinations include pathways with programs both within and outside the scope of this evaluation. There are 434 other pre-AIMHS pathways and 539 other post-AIMHS pathways.

During the analysis, the Evaluation Team also found that some MH program visits occurred during AIMHS stays. That is, some Veterans attend other VA MH programs while in AIMHS. This is to be expected, as concurrent treatment is common, especially with comorbid diagnoses. To describe these situations, the Evaluation Team separately computed the set (not pathways) of programs visited during the AIMHS stay. Most frequently, Veterans utilized GMHS (92 percent) and SUD programs (20 percent) while in AIMHS.

#### Cost Analysis Methods

In the *2018 Annual Report: VA Mental Health Program and Suicide Prevention Services Independent Evaluation*, analyses of costs associated with AIMHS revealed that, for the one-year period post-discharge from AIMHS, there were significant increases in utilization of inpatient and outpatient mental health services. The same was true for non-mental health services. This increase in utilization also caused costs to increase significantly between one year pre-admission and one year post-discharge. With only one year of data post-discharge, we were unable to determine whether these increases in utilization and cost improved over time. For this report, the Evaluation Team analyzed data related to utilization and costs of mental health and primary care services for Veterans who participated in AIMHS to investigate the following question:

- After showing significant increases one year post-discharge, did utilization and cost for mental health and non-mental health services decrease during the second-year post-discharge from AIMHS?

For these analyses, data for all Veterans who were discharged from AIMHS during the period FY2016 through June of FY2017 were extracted from the sources listed below. Prior to analyses, all Veterans who had an admission during the 180-day period prior to FY2016 were removed from these data. For each Veteran in the sample, primary care and mental health care utilization were identified for the period one year pre-admission, as well as one year and two years post-discharge for the following programs and categories of care.

- AIMHS admissions and bed days
- All RRTP programs (combined) admissions and bed days
- All Other Mental Health Inpatient admissions and bed days
• All Mental Health Outpatient Services encounters
• All Non-Mental Health admissions and bed days
• All Non-Mental Health outpatient encounters

For each of the above, unit costs were extracted from MCA and costs were multiplied by utilization to calculate total cost one year pre-admission as well as one year and two years post-AIMHS discharge for each program or category of care. In the following analyses, all costs were adjusted to 2018 dollars.

Data sources for the AIMHS cost analysis are displayed in Table 56 below.

**TABLE 56. DESCRIPTION OF AIMHS PROGRAM COST ANALYSIS DATA SOURCES AND VARIABLES**

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterans Information Systems and Technology Architecture (VISTA) (extracted from CDWork)</td>
<td>Demographics, general medical and mental health diagnoses, Elixhauser scores, hospitalizations, referrals, readmissions, encounters with VA programs and services/VHA service utilization, adverse events, types and pattern of services received, and timing of services/dates</td>
</tr>
<tr>
<td>VA Managerial Cost Accounting System (MCA) (extracted from MCA Clinic Stop and Treating Specialty Cost Reports)</td>
<td>Unit costs by outpatient clinic stop code and inpatient treating specialty</td>
</tr>
</tbody>
</table>

Cost Analysis Findings
As presented in Tables 57-62 below, the analyses confirmed findings previously reported: Utilization and costs for all mental health and primary care services increased significantly from pre-admission to one year post-discharge for Veterans admitted to AIMHS. However, the analyses also show that, by two years post-discharge from AIMHS, both utilization and costs are significantly lower than pre-admission levels. Decline in service utilization and cost two years post-discharge among Veterans admitted to AIMHS occurred for both male and female Veterans. As Veterans who had an AIMHS decisions six months prior to their index date were excluded from the sample, there is no comparison made between the one year pre and post periods.

**TABLE 57. CHANGE IN UTILIZATION ONE YEAR PRE-ADMISSION AND ONE AND TWO YEARS POST-DISCHARGE FROM AIMHS PROGRAM (ALL VETERANS)**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Total Admissions AIMHS</th>
<th>Total LOS AIMHS</th>
<th>ALOS AIMHS</th>
<th>Total Admissions RRTP</th>
<th>Total LOS RRTP</th>
<th>ALOS RRTP</th>
<th>Total Admissions CWT TR</th>
<th>Total LOS CWT TR</th>
<th>ALOS CWT TR</th>
<th>Total Outpt MH Encounters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year Pre Index Date</td>
<td>4,970</td>
<td>52,126</td>
<td>10.5</td>
<td>1,734</td>
<td>64,704</td>
<td>37.3</td>
<td>142</td>
<td>18,940</td>
<td>133.4</td>
<td>1,512,105</td>
</tr>
<tr>
<td>1st Year Post Index Date</td>
<td>21,842</td>
<td>219,400</td>
<td>10.0</td>
<td>4,703</td>
<td>178,311</td>
<td>37.9</td>
<td>191</td>
<td>18,904</td>
<td>99.0</td>
<td>2,413,723</td>
</tr>
<tr>
<td>2nd Year Post Index Date</td>
<td>15,388</td>
<td>159,760</td>
<td>10.4</td>
<td>1,928</td>
<td>73,517</td>
<td>38.1</td>
<td>136</td>
<td>26,378</td>
<td>194.0</td>
<td>1,467,589</td>
</tr>
<tr>
<td>Difference (Yr 2 - Yr 1)</td>
<td>(6,454)</td>
<td>(59,640)</td>
<td>(2.775)</td>
<td>(104,794)</td>
<td>(455)</td>
<td>(55)</td>
<td>(7,474)</td>
<td>(926,134)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*CWT-TR = Compensated Work Therapy—Transitional Residence.*
### Table 58. Change in Mental Health and Primary Care Services Utilization One Year Pre-Admission and One and Two Years Post-Discharge from AIMHS Program (Comparison of Male and Female Veterans)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Gender</th>
<th>Total Admissions AIMHS</th>
<th>Total LOS AIMHS</th>
<th>ALOS AIMHS</th>
<th>Total Admissions RRTP</th>
<th>Total LOS RRTP</th>
<th>ALOS RRTP</th>
<th>Total Admissions CWT TR</th>
<th>Total LOS CWT TR</th>
<th>ALOS CWT TR</th>
<th>Total Outpt MH Encounters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year Pre Index Date</td>
<td>Male</td>
<td>4,524</td>
<td>47,525</td>
<td>10.5</td>
<td>1,613</td>
<td>58,342</td>
<td>36.2</td>
<td>127</td>
<td>16,975</td>
<td>133.7</td>
<td>1,337,919</td>
</tr>
<tr>
<td>1st Year Post Index Date</td>
<td>Male</td>
<td>19,909</td>
<td>200,894</td>
<td>10.1</td>
<td>4,324</td>
<td>162,598</td>
<td>37.6</td>
<td>180</td>
<td>19,158</td>
<td>100.9</td>
<td>2,140,735</td>
</tr>
<tr>
<td>2nd Year Post Index Date</td>
<td>Male</td>
<td>14,903</td>
<td>146,027</td>
<td>9.8</td>
<td>1,747</td>
<td>66,323</td>
<td>38.0</td>
<td>125</td>
<td>23,953</td>
<td>191.6</td>
<td>1,314,235</td>
</tr>
<tr>
<td>Difference (Yr 2 - Yr 1)</td>
<td>(5,006)</td>
<td>(54,867)</td>
<td>(2,577)</td>
<td>(96,275)</td>
<td>(55.6)</td>
<td>5,765</td>
<td>(83.4,560)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Year Pre Index Date</td>
<td>Female</td>
<td>446</td>
<td>4,601</td>
<td>10.3</td>
<td>121</td>
<td>6,382</td>
<td>52.6</td>
<td>15</td>
<td>1,965</td>
<td>131.0</td>
<td>174,190</td>
</tr>
<tr>
<td>1st Year Post Index Date</td>
<td>Female</td>
<td>1,933</td>
<td>18,506</td>
<td>9.6</td>
<td>379</td>
<td>15,713</td>
<td>41.1</td>
<td>11</td>
<td>74</td>
<td>68.7</td>
<td>264,889</td>
</tr>
<tr>
<td>2nd Year Post Index Date</td>
<td>Female</td>
<td>1,295</td>
<td>13,733</td>
<td>10.6</td>
<td>181</td>
<td>7,194</td>
<td>39.7</td>
<td>11</td>
<td>2,425</td>
<td>220.5</td>
<td>173,354</td>
</tr>
<tr>
<td>Difference (Yr 2 - Yr 1)</td>
<td>(638)</td>
<td>(6,737)</td>
<td>(188)</td>
<td>(6,519)</td>
<td>0.0</td>
<td>1,679</td>
<td>(91,834)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
- CWT-TR = Compensated Work Therapy
- RRTP = Transitional Residential Program

### Table 59. Change in Mental Health and Primary Care Services Costs One Year Pre-Admission and One and Two Years Post-Discharge from AIMHS Program (All Veterans)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Total Cost AIMHS</th>
<th>Total Cost RRTP</th>
<th>Total Cost CWT TR</th>
<th>Total Cost Non MH Encounters</th>
<th>Total Cost All Mental Health</th>
<th>Total Cost Non MH Inpt</th>
<th>Total Cost Non MH Outpt</th>
<th>Total Cost All Non Mental Health</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year Pre Index Date</td>
<td>$57,121,262</td>
<td>$37,094,586</td>
<td>$25,669,993</td>
<td>$311,106,206</td>
<td>$160,779,651</td>
<td>$2,425,543</td>
<td>$426,559,124</td>
<td>$587,369,194</td>
<td>$1,142,254,025</td>
</tr>
<tr>
<td>2nd Year Post Index Date</td>
<td>$157,806,455</td>
<td>$124,362,177</td>
<td>$42,302,177</td>
<td>$311,106,206</td>
<td>$160,779,651</td>
<td>$2,425,543</td>
<td>$426,559,124</td>
<td>$587,369,194</td>
<td>$1,142,254,025</td>
</tr>
<tr>
<td>Difference (Yr 2 Post - Yr 1 Post)</td>
<td>(68,685,224)</td>
<td>(87,268,590)</td>
<td>(12,050,000)</td>
<td>(280,006,000)</td>
<td>(240,574,443)</td>
<td>(2,000,000)</td>
<td>(2,000,000)</td>
<td>(2,000,000)</td>
<td>(200,000)</td>
</tr>
</tbody>
</table>

**NOTE:**
- CWT-TR = Compensated Work Therapy

### Table 60. Change in Mental Health and Primary Care Services Costs One Year Pre-Admission and One and Two Years Post-Discharge from AIMHS Program (Comparison of Male and Female Veterans)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Gender</th>
<th>Total Cost AIMHS</th>
<th>Total Cost RRTP</th>
<th>Total Cost CWT TR</th>
<th>Total Cost Non MH Encounters</th>
<th>Total Cost All Mental Health</th>
<th>Total Cost Non MH Inpt</th>
<th>Total Cost Non MH Outpt</th>
<th>Total Cost All Non Mental Health</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year Pre Index Date</td>
<td>Male</td>
<td>$32,539,972</td>
<td>$13,699,438</td>
<td>$2,249,150</td>
<td>$310,544,227</td>
<td>$395,823,781</td>
<td>$379,355,211</td>
<td>$366,150,573</td>
<td>$1,400,393,311</td>
<td>$321,100,399</td>
</tr>
<tr>
<td>1st Year Post Index Date</td>
<td>Male</td>
<td>$220,251,585</td>
<td>$92,300,792</td>
<td>$4,039,230</td>
<td>$423,699,282</td>
<td>$744,330,591</td>
<td>$630,275,371</td>
<td>$616,450,930</td>
<td>$1,420,286,311</td>
<td>$1,420,286,311</td>
</tr>
<tr>
<td>2nd Year Post Index Date</td>
<td>Male</td>
<td>$180,671,368</td>
<td>$73,991,023</td>
<td>$25,305,281</td>
<td>$231,542,442</td>
<td>$496,277,130</td>
<td>$376,660,211</td>
<td>$373,638,062</td>
<td>$1,014,510,272</td>
<td>$1,014,510,272</td>
</tr>
<tr>
<td>Difference (Yr 2 Post - Yr 1 Post)</td>
<td>(9,859,605)</td>
<td>(2,399,825)</td>
<td>(8,388,000)</td>
<td>(9,597,230)</td>
<td>(3,655,644)</td>
<td>(3,144,824)</td>
<td>(3,337,151)</td>
<td>(3,337,151)</td>
<td>(3,337,151)</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
- CWT-TR = Compensated Work Therapy

### Table 61. Change in Non-Mental Health Utilization One Year Pre-Admission and One and Two Years Post-Discharge from AIMHS Program (All Veterans)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Total Admissions _Non MH Inpt</th>
<th>Total LOS _Non MH Inpt</th>
<th>ALOS _Non MH Inpt</th>
<th>Total Outpt Non MH Encounters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year Pre Index Date</td>
<td>13,240</td>
<td>84,012</td>
<td>6.3</td>
<td>2,348,855</td>
</tr>
<tr>
<td>1st Year Post Index Date</td>
<td>14,982</td>
<td>121,909</td>
<td>8.1</td>
<td>3,026,799</td>
</tr>
<tr>
<td>2nd Year Post Index Date</td>
<td>12,253</td>
<td>109,212</td>
<td>8.9</td>
<td>2,289,822</td>
</tr>
<tr>
<td>Difference (Yr 2 - Yr 1)</td>
<td>(2,729)</td>
<td>(12,697)</td>
<td>(73,977)</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions
The results indicate that cost and utilization rise during the period one year post-index date of AIMHS admission. However, both factors decline significantly during the second year following admission. There were no significant differences overall in these findings between male and female Veterans, with the exceptions of the following:

- RRTP admissions, where the decline between years one and two was greater for males;
- Non-mental health total LOS, where female LOS was lower in the second year; and
- Compensated Work Therapy—Transitional Residence (CWT-TR) cost, where the increase in the second year for males was greater.

Findings related to increased health care utilization and cost in the year following discharge from an acute mental health inpatient stay can be understood within the context of research that has shown that increased use of outpatient mental health services following hospitalization is associated with decreased likelihood of readmission (Vigod et al., 2013). The VA standard of care for transitioning Veterans from inpatient to outpatient care requires discharge planning and follow-up outpatient care within 30 days after discharge. Because of post-discharge planning and follow-up, it is likely that admission to AIMHS opens entry into mental health and other health care services of which Veterans were previously unaware or with which they had not been recently connected. The decrease in both utilization and care two years post-discharge may be an indication that Veterans’ needs have stabilized. However, more research is needed to understand the continuity of care that Veterans receive after an admission to acute inpatient mental health care services.

It may be of interest to continue to track whether these declines continue over future years. It may take several years post-index date to document any net savings that could be attributed to AIMHS and resulting services post-discharge.
Chapter 4: Evaluation of VA Clinical Practice Guidelines for Opioid Therapy for Chronic Pain

Chronic pain is more common and severe among U.S. Veterans than in the general population. Analysis of data from the 2010–2014 National Health Interview Survey (NHIS) estimated that 65 percent of Veterans reported pain in the previous three months (compared to 56 percent in the general population). Veterans also reported more severe pain (9 percent) compared to the general population (6 percent). Chronic non-cancer pain has been linked to increased risk of suicide (Hooley et al., 2014; Ilgen et al., 2013), and risks are elevated with greater use of opioids. Among Veterans with chronic pain receiving opioids from FY2004-2005, Veterans receiving the highest doses of opioid prescriptions (100+ mg/day) were more than twice as likely to die by suicide than those Veterans receiving less than 20 milligrams per day (Ilgen et al., 2016).

In 2010, the Department of Veterans Affairs and the Department of Defense jointly published the Clinical Practice Guideline for Management of Opioid Therapy for Chronic Pain (2010 OT CPG) to provide healthcare providers working within the VA health care system with an evidence-based framework by which to evaluate, treat, and manage the needs of Veterans with chronic pain. In 2017, the OT CPG was updated. Quarterly monitoring of the implementation of the OT CPG has been a critical element in the VHA Opioid Safety Initiative (Sandbrink, 2019). However, as required by the Clay Hunt Act (Clay Hunt SAV Act, Public Law 114-2, 2015), the Evaluation Team combined medical record and prescription data for all Veterans who used VHA services in FY2017 and FY2018 to provide an independent examination, to the extent feasible, of how well these guidelines are being implemented with fidelity.

Approach to Development of Measures of Guideline Adherence

The VA OT CPG contains 18 recommendations to help VA prescribers determine when to initiate and continue opioid treatment. The guidelines focus on four key areas: (1) initiation and continuation of opioids; (2) risk mitigation (including assessment for suicide risk); (3) type, dose, follow-up and tapering of opioids; and (4) opioid therapy for acute pain. They also encourage prescribers to consider all treatment options, including non-opioid and nonpharmacological therapies, either alone or in combination with opioids. Within the VA OT CPG, specific measures have been aligned to each of the 18 recommendations. At the beginning of this research, the Clay Hunt Evaluation Team did not have access to information regarding how VA calculates each OT CPG measure. Therefore, we compared the VA OT CPG measures with those that have been defined in the U.S. Centers for Disease Control and Prevention (CDC) Guidelines for Prescribing Opioids for Chronic Pain, identified 16 measures where overlaps exist between the VA and CDC Guidelines, and applied the guidance that has been provided by CDC for operationalizing those measures for the Clay Hunt Evaluation (CDC, 2018). To confirm the appropriateness of the CDC metric calculation approaches for assessing the VA guidelines, the Evaluation Team shared the list of recommended calculation processes for each metric with the Clay Hunt VA Advisors and representatives from VA’s Program Evaluation Resource Center (PERC), an evaluation center within VA Office of Mental Health and Suicide Prevention (OMHSP). Representatives from PERC also provided the evaluation team, for their review, the guidelines and methods for calculating metrics for the VA OT CPG that they had developed for their own reporting. Changes were made to measures recommended by the Clay Hunt Evaluation Team only to align differences between the CDC and VA guidelines in recommended dosages and time periods. Also, in discussions with VA representatives, it became apparent that some of the metrics could not be calculated due to
there not being a standard way of identifying some of the conditions (e.g., chronic pain) or procedures (e.g., tapering).

Data Sources and Analyses
Data related to frequency and quantity of prescriptions for all drugs including opioids, benzodiazepines, muscle relaxants, and SUD dependence medications were extracted from the VA Pharmacy Benefits Management Services database (extracted from CDWWork). Information about Veterans’ demographics, general medical and mental health diagnoses, hospitalizations, utilization of VA mental health services and programs, and history of serious adverse physical and mental health events in the six months prior and one year after the start of opioid therapy were also extracted from VISTA (extracted from CDWWork).

As noted above, as part of its Opioid Safety Initiative (OSI), VA has developed an OSI Dashboard providing information about opioid use and overall opioid and benzodiazepines co-prescribing (Sandbrink, 2019). For this Dashboard, as well as quarterly monitoring of adherence to the guidelines, PERC has developed SQL code for extracting data from CDWWork relevant for these analyses and has developed SAS code for calculating 11 of the 18 measures. The Evaluation Team was provided with the SQL code, which was reviewed for accuracy, adapted when necessary, and used by the Evaluation Team to generate the results presented below.

Assessment of Adherence to VA OT CPG
In the section below, we present the results of the analyses for each recommendation of the VA OT CPG. For some recommendations, it was not possible to calculate metrics designed to assess compliance with recommendations, because in medical practice and, therefore, within the VA medical records, there is no consistent manner of assessing the medical condition or procedure specified in the recommendation. For example, there is no diagnostic code to capture “chronic pain”; instead, diagnostic codes usually refer to the medical condition that leads to the experience of chronic pain for individual Veterans.

There are currently no national benchmarks for the metrics associated with the VA Opioid Prescription Guidelines or for CDC’s Guideline for Prescribing Opioids for Chronic Pain. However, in 2017, America’s Health Insurance Plans (AHIP) and its members launched the Safe, Transparent Opioid Prescribing (STOP) Measure—an evidence-based methodology that health insurance providers can use to assess how provider practices compare to the federal recommendations for prescribing opioids (AHIP, 2019a). The STOP Measure focuses on six of the twelve recommendations included in the CDC Guideline that can be measured using health insurance claims data. For the STOP Measures Initiative, AHIP analyzed the Truven MarketScan Commercial Claims and Encounters data from 2009 through 2013 (before the 2016 dissemination of the CDC Guideline) to compute an industry-wide baseline on the seven metrics prior to their adoption (AHIP, 2019b). In 2019, AHIP updated their original report to include three additional years of data (2014-2016). To put our findings related to opioid prescribing practices within VA into context, in the findings below, where feasible, we compare our findings to those reported by AHIP in their 2019 update.
**Recommendation 1:** We recommend against initiation of long-term opioid therapy for chronic pain. We recommend alternatives to opioid therapy such as self-management strategies and other non-pharmacological treatments. When pharmacologic therapies are used, we recommend non-opioids over opioids.

**Denominator:** All Veterans with new opioid prescriptions in the fiscal year

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Veterans with new* VA opioid prescriptions</td>
<td>463308</td>
<td>411609</td>
</tr>
<tr>
<td>*New is defined as a period of 6 months prior to the start of the FY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among new cases of opioid prescriptions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% long-acting</td>
<td>0.60</td>
<td>0.63</td>
</tr>
<tr>
<td>% short-acting</td>
<td>70.9</td>
<td>71.3</td>
</tr>
<tr>
<td>Tramadol</td>
<td>28.5</td>
<td>28.1</td>
</tr>
<tr>
<td>mean dosage</td>
<td>22.3 MME</td>
<td>22.3 MME</td>
</tr>
<tr>
<td>Among new cases of opioid prescriptions, length of initial opioid prescription</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% &lt;= 3 days</td>
<td>52.8</td>
<td>44.3</td>
</tr>
<tr>
<td>% 4-7 days</td>
<td>14.5</td>
<td>19.8</td>
</tr>
<tr>
<td>% &gt; 7 days</td>
<td>32.7</td>
<td>35.9</td>
</tr>
<tr>
<td>What treatments were provided after initial prescription of opioids?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. % continued same type of opioid as initial opioid prescription</td>
<td>29.1</td>
<td>27.3</td>
</tr>
<tr>
<td>b. % switched from long-acting to short-acting</td>
<td>0.31</td>
<td>0.24</td>
</tr>
<tr>
<td>c. % switched from short-acting to long-acting</td>
<td>0.11</td>
<td>0.09</td>
</tr>
<tr>
<td>d. % switched from opioid to tramadol and no other opioid</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>e. % switched to non-opioids</td>
<td>2.9</td>
<td>2.6</td>
</tr>
<tr>
<td>f. % switched to nothing</td>
<td>65.5</td>
<td>67.7</td>
</tr>
<tr>
<td>% new Veterans with opioid prescription that also receive Rehabilitation Medicine – Any</td>
<td>57.5</td>
<td>54.5</td>
</tr>
</tbody>
</table>

- In FY2017, 89 percent of the 463,308 new cases of opioid prescriptions were for male Veterans and 10 percent were for female Veterans. In FY2018, the 411,609 new VA opioid prescriptions were similarly more likely to be for male Veterans (89 percent) than for female Veterans (10 percent).

- The majority of initial opioid prescriptions by VA prescribers were for immediate-release opioids, including tramadol—about 99 percent in both FY2017 and FY2018. This percentage is in line with the 98 percent industry-wide average for prescription of immediate-release opioids as computed for AHIP’s STOP Measure (2018; 2019).

- From FY2017 to FY2018, there was an increase in the number of initial opioid prescriptions that were for longer than seven days. The CDC recommends that initial opioid prescriptions for three days or less will often be enough; more than seven days will rarely be needed. In FY2018, 44 percent of initial opioid prescriptions by VA prescribers were for three days and nearly 36 percent were for seven days or longer. In contrast, AHIP has reported that, in 2016, the year for which they have the most recent data, nationally only about 16 percent of opioid prescriptions were for longer than seven days (AHIP, 2019). This suggests that there is room for improvement within VA in their efforts to reduce the duration of opioid prescriptions.
• In FY2018, about 68 percent of Veterans did not continue opioid therapy after the initial prescription.
• The percentage of Veterans with opioid prescriptions that also received any form of rehabilitation medicine decreased between FY2017 and FY2018 from about 58 percent to 54 percent.

Recommendation 2: If prescribing opioid therapy for Veterans with chronic pain, we recommend a short duration. Note: Consideration of opioid therapy beyond 90 days requires re-evaluation and discussion with patient of risks and benefits.

Denominator: All Veterans who received a second* opioid prescription in the FY

*Second prescription is defined as “all second VA prescriptions within the fiscal year for Veterans with no prescriptions in the 6 months prior to the fiscal year.”

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total of all Veterans with second opioid prescription</td>
<td>159902</td>
<td>133088</td>
</tr>
<tr>
<td>Type of opioids prescribed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• % long-acting</td>
<td>4.0</td>
<td>4.1</td>
</tr>
<tr>
<td>• % short-acting</td>
<td>73.6</td>
<td>73.0</td>
</tr>
<tr>
<td>• % Tramadol</td>
<td>22.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Duration of prescriptions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long Acting</td>
<td>Short Acting</td>
</tr>
<tr>
<td>% &lt; 30 days,</td>
<td>30.5</td>
<td>53.5</td>
</tr>
<tr>
<td>% 30-60 days,</td>
<td>19.8</td>
<td>21.2</td>
</tr>
<tr>
<td>% 60-90 days,</td>
<td>15.4</td>
<td>11.3</td>
</tr>
<tr>
<td>% &gt;90 days</td>
<td>34.3</td>
<td>13.9</td>
</tr>
<tr>
<td>Follow-up appointments after prescription:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% at 30 days,</td>
<td>93.6</td>
<td></td>
</tr>
<tr>
<td>% at 60 days,</td>
<td>97.3</td>
<td></td>
</tr>
<tr>
<td>% at 90 days or each month in which they also receive an opioid prescription</td>
<td>97.3</td>
<td></td>
</tr>
</tbody>
</table>

• In both FY2017 and FY2018, about 96 percent of second opioid prescriptions were for short-acting opioids and tramadol, with the majority (60 percent) of short-acting opioids prescriptions being for 30 days or less. All tramadol prescriptions were also for 30 days or less.
• Large percentages of VA prescribers adhere to guidelines requiring follow-up appointments within 30, 60, and 90 days after an opioid prescription. In both FY2017 and FY2018, about 94 percent of Veterans received a follow-up visit 30 days after receiving an opioid prescription and 97 percent received follow-up visits 60 and 90 days after the first opioid prescription in the fiscal year occurred. The percentage of 30-day visits for Veterans is almost twice the size of that reported by AHIP for the general population (49 percent).
• The relatively small percentage (4 percent) of long-acting opioids prescribed after the start of opioid therapy were for either less than 30 days or for long-term therapy.
• In both FY2017 and FY2018, over 92 percent of opioid prescriptions of more than 90 days were for male Veterans.
As some Veterans may have been prescribed opioids towards the end of FY2018, data to calculate this metric for all Veterans who started on long-term treatment in FY2018 were not available, because at the time of development of this report, the FY2018 data cycle was still underway.

Results show that few Veterans with opioid use diagnoses are started on long-term opioid therapy. In addition, only a small percentage of Veterans on long-term therapy are diagnosed with opioid use disorder.

From FY2017 to FY2018, the percentage of Veterans on long-term opioid treatment with a Signed Informed Consent Form decreased from 37 percent to 34 percent, demonstrating the need for continued improvement on this clinical process.

**Recommendation 4:** We recommend against long-term opioid therapy for pain in Veterans with untreated substance use disorder. For Veterans currently on long-term opioid therapy with evidence of untreated substance use disorder (SUD), we recommend close monitoring, including engagement in substance use disorder treatment, and discontinuation of opioid therapy for pain with appropriate tapering.

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>% with opioid use disorder diagnosis one year prior to having opioids prescribed</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>% with opioid use disorder diagnosis during long term opioid treatment</td>
<td>3.9</td>
<td>UNK*</td>
</tr>
<tr>
<td>% of Veterans with Signed Informed Consent Form</td>
<td>37.1</td>
<td>33.8</td>
</tr>
</tbody>
</table>

*Note: SUD includes alcohol and other substances but does not include tobacco.*

In both FY2017 and FY2018, about 16 percent of Veterans who were prescribed opioids had been diagnosed with a substance use disorder. About 4 percent of these Veterans had participated in a SUD treatment program.

The data suggest that VA prescribers are generally conducting monthly follow-up visits with this group of Veterans. Between FY2017 and FY2018, the percentage of Veterans with SUD diagnoses who received monthly follow-up visits increased from 73 percent to 78 percent.
Recommendation 5: We recommend against the concurrent use of benzodiazepines and opioids.

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among all Veterans who received opioid prescriptions, % that had a benzodiazepine prescription concurrent with an opioid prescription?</td>
<td>10.50</td>
<td>8.72</td>
</tr>
<tr>
<td>Denominator: All Veterans with opioid prescriptions in the fiscal year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among Veterans on long-term therapy, % that received a benzodiazepine prescription?</td>
<td>16.78</td>
<td>13.43</td>
</tr>
<tr>
<td>Denominator: Veterans receiving opioids for &gt;90 days</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Results of the AHIP STOP Measure analyses showed that over 40 percent of patients in the general population with opioid prescriptions were also prescribed benzodiazepines during their opioid treatment. In contrast, in FY2018, only about 9 percent of all Veterans who received an initial opioid prescription and about 13 percent of Veterans on long-term opioid therapy also received a benzodiazepine prescription. This indicates strong alignment of current VA practice with Recommendation 5; however, more remains to be done to further reduce the percentage of Veterans on long-term opioid therapy with concurrent prescriptions for benzodiazepines.

Recommendation 6: (a) We recommend against long-term opioid therapy for Veterans less than 30 years of age secondary to higher risk of opioid use disorder and overdose. (b) For Veterans less than 30 years of age currently on long-term opioid therapy, we recommend close monitoring and consideration for tapering when risks exceed benefits.

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>% prescribed opioids &lt; 30 years of age</td>
<td>2.0</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Denominator: Veterans receiving opioids for > 90 days

- Results show that, in both FY2017 and FY2018, only about 2 percent of Veterans on long-term opioid therapy were under the age of 30, indicating strong alignment of current practice with Recommendation 6.
**Recommendation 7**: We recommend implementing risk mitigation strategies upon initiation of long-term opioid therapy, starting with an informed consent conversation covering the risks and benefits of opioid therapy as well as alternative therapies. The strategies and their frequency should be commensurate with risk factors and include:

- Ongoing, random urine drug testing (including appropriate confirmatory testing)
- Checking state prescription drug monitoring programs
- Monitoring for overdose potential and suicidality
- Providing overdose education
- Prescribing of naloxone rescue and accompanying education

Denominator: Veterans with new opioid prescription in the FY who then receive opioids for > 90 days

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine drug testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% with evidence of urine testing in records</td>
<td>68.2</td>
<td>68.3</td>
</tr>
<tr>
<td>Mean # or Frequency of urine tests in FY</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>% with evidence of checking state prescription drug monitoring programs</td>
<td>57.04</td>
<td>71.3</td>
</tr>
<tr>
<td>% with evidence of monitoring for overdose potential and suicidality</td>
<td>N/A*</td>
<td>N/A*</td>
</tr>
<tr>
<td>% with evidence that overdose education has been provided</td>
<td>N/A*</td>
<td>N/A*</td>
</tr>
<tr>
<td>% with naloxone rescue prescription</td>
<td>6.4</td>
<td>14.1</td>
</tr>
</tbody>
</table>

*Note: Data not available within the electronic health records.*

- In FY2017 and FY2018, the majority (68 percent) of Veterans on long-term opioid therapy underwent urine testing approximately twice per year.
- Prescribers within VA far exceed the industry averages reported by AHIP for urine drug testing. In AHIP analyses, they found that only about 1 percent of received a urine drug test before being prescribed an opioid, and 6–15 percent received annual urine drug tests while on long-term opioid therapy.
- There is no source that can serve as a comparison or benchmark for evidence of checking state prescription drug monitoring programs. However, from FY2017 to FY2018, there was a dramatic increase in the percentage of Veterans for whom VA physicians checked the state prescription monitoring program prior to issuing an opioid prescription. This increase may be primarily due to new guidelines that require prescribers to routinely record within Veterans’ medical records whether they have or have not checked the state drug monitoring programs prior to prescribing opioids.
- The percentage of Veterans on long-term therapy who received naloxone rescue prescription also increased from FY2017 to FY2018, indicating greater compliance with Recommendation 7. Although AHIP does not compute the percent of patients with opioid prescriptions who also receive naloxone, in their analysis of national health insurance data from 2010 to 2014, Morgan and colleagues (Morgan et al., 2018) found that only 11 percent of patients with an opioid use disorder were prescribed naloxone. Thus, the 14 percent reported estimated for the VA represents greater adherence to Recommendation 7, but more work remains to be done in this area.
Recommendation 8: We recommend assessing suicide risk when considering initiating or continuing long-term opioid therapy and intervening when necessary.

Denominator: Veterans receiving opioids for > 90 days

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA medical records do not contain consistent information that allows for determination of whether suicide risk has been assessed prior to initiation of opioids.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommendation 9: We recommend evaluating benefits of continued* opioid therapy and risk for opioid-related adverse events at least every three months.

Denominator: Veterans receiving opioids for > 90 days

*Continued opioid therapy is defined as treatment with opioids exceeding 90 days

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>% with any significant adverse events (SAE) post start of opioid therapy</td>
<td>8.33</td>
<td>7.72</td>
</tr>
<tr>
<td>% with opioid overdose post start of opioid therapy</td>
<td>0.67</td>
<td>0.71</td>
</tr>
<tr>
<td>% with sedative overdose post start of opioid therapy</td>
<td>0.19</td>
<td>0.12</td>
</tr>
<tr>
<td>% with any overdose post start of opioid therapy</td>
<td>0.91</td>
<td>0.85</td>
</tr>
<tr>
<td>% with possible or confirmed suicide-related event post start of opioid therapy</td>
<td>1.96</td>
<td>1.83</td>
</tr>
</tbody>
</table>

- VA health records do not provide consistent data on whether benefits and risks for opioid-related adverse events were evaluated by individual providers for individual Veterans. The occurrence of such adverse events is reported as a proxy of attention to risk and benefits.
- From FY2017 to FY2018, the percentage of Veterans with opioid prescriptions who reported a significant adverse event remained stable at about 8 percent.
- In both FY2017 and FY2018, about 2 percent of Veterans on long-term opioid therapy had a possible or confirmed suicide-related event. This represents 364 Veterans in FY2017 and 263 Veterans in FY2018 who are at higher risk for suicide. Thus, increased efforts should be made within the VA to ensure adherence to Recommendation 9 to increase Veteran safety.
Recommendation 10: If prescribing opioids, we recommend prescribing the lowest dose of opioids as indicated by patient-specific risks and benefits.

Denominator: All Veterans with opioid prescriptions in the fiscal year

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>% All Veterans in long-term therapy</td>
<td>5.7</td>
<td>8.7</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed SUD</td>
<td>45.3</td>
<td>13.3</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed suicide related event in 6 months prior to initiation of opioid therapy</td>
<td>49.7</td>
<td>14.1</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed anxiety</td>
<td>43.4</td>
<td>12.8</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed depression</td>
<td>42.8</td>
<td>12.9</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed PTSD</td>
<td>45.9</td>
<td>13.3</td>
</tr>
<tr>
<td>% Veterans with acute inpatient mental health admission in 6 months prior to initiation of opioid treatment</td>
<td>53.1</td>
<td>14.7</td>
</tr>
</tbody>
</table>

• In both FY2017 and FY2018, Veterans in long-term opioid therapy were most likely to receive prescriptions of greater than 90 MME. In both years, slightly more than 85 percent of these Veterans received greater than 90 MME.

• From FY2017 to FY2018, there were decreases in the proportion of Veterans receiving greater than 90 MME who were also diagnosed with possible or confirmed diagnosis of SUD, anxiety, depression, or PTSD or who had experienced suicide-related events or acute inpatient mental health admission prior to initiation of opioids. In FY2018, as compared to FY2017, there were increases in the likelihood that Veterans within these groups received prescriptions that were less than 50MME.

• The FY2018 increases in the proportion of Veterans receiving opioid prescriptions for less than 50 MME indicates greater adherence to the guidelines. However, for all groups, the proportions receiving less than 50 MME range from only 44 to 55 percent, indicating that work remains to be done to ensure that Veterans are prescribed the lowest dosages of opioids appropriate for their conditions.

Recommendation 11: As opioid dosage and risk increase, we recommend more frequent monitoring for adverse events including opioid use disorder and overdose

Denominator: Veterans receiving opioids for > 90 days

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of follow-up visits among Veterans receiving &lt;50 MME/day</td>
<td>3.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Mean number of follow-up visits among Veterans receiving &gt;=50 MME/day but &lt;90 MME/day</td>
<td>4.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Mean number of follow-up visits among Veterans receiving &gt;90 MME/day.</td>
<td>6.0</td>
<td>6.2</td>
</tr>
</tbody>
</table>
• Consistent with the guidelines, VA prescribers conduct more follow-up monitoring for adverse events as the daily opioid dosage increases. Veterans receiving less than 50 MME/day on average receive four follow-up visits, those receiving greater than or equal to 50 MME/day, but less than 90 MME/day receive about five follow-up visits, and those receiving greater than 90 MME/day received six follow-up visits.

**Recommendation 12:** We recommend against opioid doses over 90 mg morphine equivalent daily dose for treating chronic pain.

Available data are not able to identify chronic pain as a unitary diagnosis. The percentage of prescriptions for doses greater than 90 MME/day are reported above for all initial prescriptions and long term-therapy.

**Recommendation 13:** We recommend against prescribing long-acting opioids for acute pain, as an as-needed medication, or on initiation of long-term opioid therapy.

Available data are not able to identify acute pain as a unitary diagnosis.

**Recommendation 14:** We recommend tapering to reduced dose or discontinuation of long-term opioid therapy when risks of long-term opioid therapy outweigh benefits.

Available data are not able to identify tapering or what constitutes “risks of long-term opioid therapy outweigh benefits.”

**Recommendation 15:** We recommend individualizing opioid tapering based on risk assessment and patient needs and characteristics.

Available data are not able to identify tapering.
Recommendation 16: We recommend interdisciplinary care that addresses pain, substance use disorders, and/or mental health problems for Veterans presenting with high-risk and/or aberrant behavior.

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>% All Veterans in long-term therapy receiving interdisciplinary care</td>
<td>77.3</td>
<td>75.8</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed SUD receiving interdisciplinary care</td>
<td>92.8</td>
<td>91.1</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed suicide related event in 6 months prior to initiation of opioid therapy receiving interdisciplinary care</td>
<td>99.2</td>
<td>98.9</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed anxiety receiving interdisciplinary care</td>
<td>95.3</td>
<td>94.2</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed depression receiving interdisciplinary care</td>
<td>95.7</td>
<td>94.8</td>
</tr>
<tr>
<td>% Veterans with possible or confirmed PTSD receiving interdisciplinary care</td>
<td>94.5</td>
<td>93.8</td>
</tr>
<tr>
<td>% Veterans with acute inpatient mental health admission in 6 months prior to initiation of opioid treatment receiving interdisciplinary care</td>
<td>99.4</td>
<td>100</td>
</tr>
</tbody>
</table>

- From FY2017 to FY2018, the percentage of Veterans in long-term therapy who received interdisciplinary care decreased by one percentage point, from 77 percent to 76 percent. Although these percentages indicate high compliance with the guidelines, more research is needed to understand why interdisciplinary care is not provided to all Veterans prescribed opioids. It may simply be that not all Veterans have mental health conditions or that the physical limitations of some Veterans on long-term opioid therapy make it impossible for them to participate in rehabilitative therapy. Other Veterans may choose not to participate in additional components of care.

- Over 90 percent of Veterans with diagnoses of SUD, anxiety, depression, or PTSD or with confirmed suicide-related events receive interdisciplinary care. However, from FY2017 and FY2018, the percentages for each of these indicators have decreased slightly. We recommend that VA continue to monitor levels of provision of interdisciplinary care for these groups of Veterans to avoid continued trends in this direction.

- In FY2018, 100 percent of Veterans with an acute inpatient mental health admission in the six months prior to initiation of opioid treatment also received interdisciplinary care. This indicates a high level of compliance with this guideline.

Recommendation 17: We recommend offering medication assisted treatment for opioid use disorder to Veterans with chronic pain and opioid use disorder.

Denominator: All Veterans who started long-term opioid therapy in the FY

“Chronic pain” is not a unitary diagnosis and cannot be defined consistently with available data in VA electronic health records.
**Recommendation 18:**
a) We recommend alternatives to opioids for mild-to-moderate acute pain.
b) We suggest use of multimodal pain care including non-opioid medications as indicated when opioids are used for acute pain.

"Acute pain" is not a unitary diagnosis and cannot be defined consistently with available data in VA electronic health records.

**Conclusion**

For the Clay Hunt Evaluation, we were able to measure adherence to 11 of the 18 recommendations in the VA OT CPG. For these 11 recommendations, 43 separate metrics were developed, and the results of our analyses suggests that there is strong compliance with the VA OT CPG recommendations. Overall, trends indicate a shift toward safer prescribing practices, greater monitoring of Veterans on long-term therapy who are at highest risk for substance use disorder and/or suicide, and increased assessment of Veterans’ mental health diagnoses, of Veterans’ prior history of suicide attempts, and of state prescription drug monitoring programs, prior to initiation of opioid therapy. Where comparisons with industry averages were possible, VA showed higher likelihood of compliance with the CDC Guidance for Prescribing Opioids for Chronic Pain. Some key findings include the following:

- In FY2018, about 99 percent of initial opioid prescriptions by VA prescribers were for immediate-release opioids.
- About 68 percent of Veterans who received an initial opioid prescription did not receive a subsequent prescription.
- Ninety-six percent of all second opioid prescriptions were also for short-acting opioids.
- Only 28 percent of Veterans who received an initial opioid prescription in FY2018 were then placed on long-term opioid therapy lasting 90 days or longer.
- Only two percent of Veterans placed on long-term opioid therapy were under the age of 30.
- VA prescribers appear to carefully monitor Veterans placed on long-term opioid therapy.
  - Follow-up appointments at 30 days, 60 days, and 90 days or each month after an opioid is prescribed occurred for 94 to 97 percent of Veterans.
  - Monthly follow-up visits also occurred for 73 percent of Veterans with a SUD that were not participating in SUD treatment.
  - Evidence of checking the state prescription drug monitoring program was available for 71 percent of Veterans on long-term opioid treatment.
- Interdisciplinary care is provided to about 76 percent of Veterans who are on long-term opioid therapy. Furthermore, interdisciplinary care is most likely to be provided to Veterans with a diagnosis of SUD, anxiety, depression, or PTSD or with a suicide-related event or acute inpatient mental health admission prior to initiation of opioid treatment.

Despite the high level of compliance with the VA OTG, there are recommended areas of improvement, as explained below.

- In FY2018, only 34 percent of Veterans on long-term opioid therapy had a Signed Informed Consent Form, representing a decline from FY2017 figures.
- About 45 to 56 percent of opioid prescriptions provided in FY2018 were for dosages greater than 50 MME. Greater effort is needed to ensure that Veterans receive the lowest dosages of opioids appropriate for their individual conditions.
Chapter 5: Impact of VA Mental Health Services on Suicidal Ideation and Behavior

Addressing the elevated rates of death by suicide among Veterans continues to be of the highest priority. Since 2005, rates of suicide among Veterans in the U.S. have exceeded rates of suicide in the general population. According to VA’s National Suicide Data Report (released in September 2019), in 2017—the most recent year for which data are available—6,139 U.S. Veterans died by suicide, and the suicide rate for Veterans was 1.5 times greater than that for non-Veteran adults, after adjusting for population differences in age and sex. As displayed in Figure 86 below, since 2005, suicide rates among Veterans have been higher among those that receive VHA services than among those that receive non-VHA services. This may be due to use of VHA services by those most in need. Among Veterans with recent VHA utilization who died by suicide in 2017, 58.7 percent had a diagnosed mental health or substance use disorder in 2016 or 2017. Suicide rates were highest among Veterans who utilized VHA services and were diagnosed with bipolar disorder or opioid use disorder.

**Figure 85. Age and Sex Adjusted Suicide Rates: Veterans and Non-Veterans, 2005-2017 (VA, 2019).**

For the 2019 VA National Veteran Suicide Prevention Annual Report, adjustments were made to ensure that suicide rates are specific to Veterans and do not include current Service members and former, never federally activated National Guard or Reserve members. In the above figure a Veteran is defined as someone who had been activated for federal military service and was not currently serving at the time of death (VA, 2019d).
Figure 86. Age and Sex Adjusted Suicide Rates: VHA and Non-VHA Users, 2005-2017 (VA, 2019).

For the 2019 VA National Veteran Suicide Prevention Annual Report, adjustments were made to ensure that suicide rates are specific to Veterans and do not include current Service members and former, never federally activated National Guard or Reserve members. In the above figure, a Veteran is defined as someone who had been activated for federal military service and was not currently serving at the time of death (VA, 2019d).

Impact of VA Mental Health Services on Suicidal Ideation and Behavior—Columbia-Suicide Severity Rating Scale (C-SSRS) Methods and Results for Programs Overall

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Research shows that an individual exhibiting even a single behavior identified by the scale is 8 to 10 times more likely to die by suicide (Posner et al., 2011).

For scoring and evaluation purposes, it is recommended that the suicidal ideation (SI) and suicidal behavior (SB) components be analyzed separately (Nilsson et al., 2013). Suicidal ideation was analyzed as a 6-point ordinal scale (0=no suicidal ideation to 5=suicidal intent with plan). Suicidal behavior was coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer et al., 2011; Gipson et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care.

Descriptive analysis examined the changes in the proportion of Veterans reporting SI and SB in the three months from baseline to follow-up. Wilcoxon signed-rank test examined the significance of those changes in SI. To compare baseline and follow-up SB, an aggregated SB binary variable was created (1=reported any SB including preparatory acts or behavior, suicidal attempts, and suicide attempts that required medical care; 0=no SB). Chi-squared tests examined the
significance of changes in this aggregated SB variable. Ordinal logistic regression compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). When the statistical assumption (parallel line assumption) of ordinal logistic regression was not met, multinomial logistic regression also compared baseline SI and follow-up SI (controlling for demographics, MH diagnosis, and lifetime SI and SB). Because of the small sample size of Veterans who reported SB at follow-up, binary logistic regression, comparing baseline SB and follow-up SB (controlling for demographics, MH diagnosis, and lifetime SI and SB), was conducted for all programs instead of each program.

Overall, across GMHS, PC-MHI, SUD, and Specialized PTSD programs, Veterans experienced improvement (movement to lower severity levels) in both suicidal ideation (SI) and suicidal behavior (SB).

Overall, Veterans were 1.85 times more likely to report less severe SI at follow-up than to remain at the same level of SI they reported at baseline (Table 63 below). This shows improvement and indicates that programs were successful in reducing SI. Comparisons of the changes from baseline to follow-up across programs, using SUD as the reference group for illustrative purposes are presented below. The reference group across program comparisons was chosen to illustrate the significant cross-program differences. For example, the most significant difference among programs were found between AIMHS and SUD (for SI). In this comparison, Veterans in AIMHS were the most likely to report less severe SI at follow-up (OR=3.2) than to stay at the same level of SI.

**Table 63. Columbia Scale SI Odds Ratio Estimates; Model A and Model B (All Programs)**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Point Estimate</th>
<th>95% Wald Confidence Limits</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td><strong>Model A: Ordinal Logistic Regression</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Baseline vs. Follow-up</td>
<td>1.852</td>
<td>1.394</td>
<td>2.459</td>
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<tr>
<td><strong>Model B: Multinomial Logistic Regression</strong></td>
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<td></td>
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<tr>
<td>Interaction Effect of Program VS. Time</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>GMHS VS. SUD</td>
<td>0.845</td>
<td>0.627</td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>AIMHS VS. SUD</td>
<td>3.204</td>
<td>2.239</td>
</tr>
<tr>
<td>Baseline vs. Follow-up</td>
<td>PC-MHI VS. SUD</td>
<td>0.858</td>
<td>0.619</td>
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<tr>
<td>Baseline vs. Follow-up</td>
<td>SPEC PTSD VS. SUD</td>
<td>0.914</td>
<td>0.629</td>
</tr>
</tbody>
</table>

*Note: “All” programs included GMHS, PC-MHI, SUD, and Specialized PTSD Programs.

**Note: Significant finding as indicated by p-value of ≤ 0.05.

Overall, Veterans reported less suicidal behavior (SB) over the past three months at follow-up as compared to baseline. Veterans were 4.88 times more likely to report a lower severity of SB at follow-up than stay at the same level of SB. This indicates overall movement from more severe levels to lower levels (Figure 87 and Table 64 below).
FIGURE 87. PERCENT OF VETERANS WITH SUICIDAL BEHAVIOR (MEASURED BY C-SSRS) AT BASELINE AND FOLLOW-UP (ALL PROGRAMS).

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a valid and highly utilized instrument which helps identify whether someone is at risk for suicide, assess the severity and immediacy of that risk, and gauge the level of support that the person needs (The Columbia Lighthouse Project, 2019). Suicidal behavior is coded as a nominal, binary scale since there is no established hierarchy for suicidal behaviors (Gassmann-Mayer, et al., 2011; Gipson, et al., 2015), with yes or no coding for: preparatory acts or behavior, suicide attempts, and suicide attempts that required medical care. n=9991
*Note: Only significant difference between baseline and follow-up is for “Any Suicide Behavior” category.

The cross-program comparison shown below in Table 64 shows the differences in SB changes from baseline to follow-up for each program, using GMHS as a reference. The reference group for comparisons across programs was chosen to illustrate the significant cross-program differences. For example, the most significant difference among programs was found between AIMHS and GMHS (for SB). **Veterans in AIMHS were even more likely to reduce SB at follow-up compared to GMHS (OR=3.38).**

TABLE 64. COLUMBIA SCALE SB ODDS RATIO ESTIMATES; MODEL A AND MODEL B (ALL PROGRAMS)

<table>
<thead>
<tr>
<th>Effect</th>
<th>Model A: Ordinal Logistic Regression</th>
<th>Model B: Multinomial Logistic Regression</th>
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<tbody>
<tr>
<td></td>
<td>Point Estimate</td>
<td>95% Wald Confidence Limits</td>
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*Note: “All” programs included GMHS, PC-MHI, SUD, and Specialized PTSD Programs.
**Note: Significant finding as indicated by p-value of ≤ 0.05.
Overall, GMHS, PC-MHI, SUD, and Specialized PTSD programs were successful at reducing both SI and SB. Veterans across all four programs, on average, were 1.85 times more likely to report less severe SI at follow-up than to remain at the same level of SI. Furthermore, Veterans were 4.88 times more likely to report a less severe SB at follow-up than to stay at the same level of SB. This indicates overall movement from more severe levels to lower levels of severity in both SI and SB. AIMHS was particularly effective, as also demonstrated in other recent VA studies, which showed AIMHS participants were less likely to report suicide attempts (Katz et al., 2019). Veterans discharged from AIMHS were more likely to report reduced suicide behavior at follow-up, including suicide attempts, compared to GMHS participants.

The findings on the Columbia Scale are especially encouraging due to the strong reliability of the C-SSRS instrument, including in Veteran and military populations, and its ability to assess both suicidal ideation and behavior (The Columbia Lighthouse Project, 2016; Matarazzo et al., 2018). Both SI and SB, independent of each other, are shown to be predictive of suicide attempts, so these findings are reassuring as both are trending in a positive direction for Veterans (Nordstrom et al., 1995; Beck et al., 1999; Brown et al., 2000; Kuo et al., 2001).

Impact of VA Mental Health Services on Suicide Attempts and Suicide Among Veterans at Most Risk for Suicide

Due to delays in receiving the suicide data from VA, we were unable to further examine the impact of programs on suicide attempts and death by suicide as planned. However, this year we improved our focus on suicide related data by exploring the Columbia Scale (C-SSRS) by program and across programs. We have begun work using the National Death Index data, and we are continuing to work on more complex analyses that we anticipate reporting next year.

Chapter 6: 2019 Best Practice Recommendations

Introduction

Section 2.E of the Clay Hunt SAV Act requires the independent contractor conducting the program evaluation to “propose best practices for caring for individuals who suffer from mental health disorders or are at risk of suicide, including such practices conducted or suggested by other departments or agencies of the Federal Government, including the Substance Abuse and Mental Health Services Administration (SAMHSA) of the Department of Health and Human Services.” Recommendations were collected from experts within the VA, other federal agencies to include SAMHSA, and non-VA experts as well as through consumer input from representatives of Veteran Service Organizations (VSOs). Recommendations were reviewed by an expert panel to identify the candidate best practices most applicable to VA. This section provides an overview of the methods used to identify best practices.

Operational Definition Development

To identify best practices, an operational definition of best practices in mental health and suicide prevention was developed to assure that a standard description would be consistently applied throughout the evaluation. In the FY2017 report, an investigation of the current definition of the term “best practices” as used in the mental, psychological, and behavioral health disciplines and suicide prevention fields was conducted. This definition was then used as a guiding criterion by which to identify potential best practices for recommendation to VA. The definition was revised slightly this year to add evidence-based practices (in addition to evidence-based treatments).
The statement below is the working definition that was used throughout the evaluation to identify potential best practices in mental health and suicide prevention:

<table>
<thead>
<tr>
<th>Best Practices Definition</th>
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<tbody>
<tr>
<td>Best practices are defined as the delivery of evidence-based treatments or other evidence-based practices, as well as organizational, administrative, and implementation-related principles that have been shown to improve participant engagement in, or outcomes for, the treatment or prevention of mental health conditions or self-directed violence.</td>
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Interview Questions and Protocol: Development and Administration

The interview protocol included semi-structured questions, provided to the expert interviewees in advance, and was conducted via telephone. During the interview, interviewees were instructed not to focus on reiterating best practices that have already been identified within U.S. Department of Defense (DoD) and VA clinical practice guidelines, or which have already been included on an evidence-based practice registry. Instead, they were asked to provide recommendations of evolving best practices that have not yet been broadly implemented in VHA, or that are external to VHA, and which demonstrate evidence of improved outcomes. The primary goal was identification of best practices that are empirically supported, but which have not yet been fully implemented. For those interviewees outside of VA personnel, they often did not have as much familiarity with VA/DoD guidelines or practices, so any recommendations were filtered through the Panel for applicability to VA.

In total, 15 experts from around the country were interviewed, including clinicians, evaluators, researchers, implementation experts, and consumer/Veteran representatives from VSOs. Experts worked in both VA and non-VA federal agencies, as well as public settings, including academic institutions or other health centers. The Expert Panel (described below) played a significant role in recommending who should be included in these interviews. In addition to responding to the semi-structured interview, interviewees also submitted evidence (e.g., published literature, white papers, federal reports) in support of their recommended Best Practices.

Expert Panel Members

An expert panel of SMEs was established to review each of the candidate best practices and any respective associated evidence. Panel members were selected with input from the Clay Hunt VA Advisors to include experts in the field from both VA and SAMHSA. The expert panel comprised four people in total, which included three subject matter experts (SMEs) from VA and one from SAMHSA.

Key Priority Focus Areas

The Panel indicated a specific focus for this year to identify Best Practices in three key priority focus areas, but recommendations across all topic areas were considered.
Priority Focus Areas for 2019

a) **Substance Use Disorders (SUD).** This may include traditional SUD treatment, best practices related to prevention/treatment of opioid addiction, and the interface between SUD and suicide risk / suicide prevention, including the intersection of opioids and suicide risk.

b) **Key Veteran transition points.** This may include increased risk for suicide during the transition from active duty to Veteran status, care transitions from acute/ED or inpatient treatment to outpatient treatment, or transitions and care coordination between VA and community providers.

c) **Provider burnout and engagement,** especially as these factors relate to risk for suicide or other negative and positive Veteran outcomes.

These priority areas were chosen and informed by evidence from published literature, interactions with clinicians and administrators in the field, and internal VA data and in conjunction with the Panel’s expertise and opinions.

**Substance Use Disorders (SUD)** is a specialized treatment focus area within the VA mental health system. People with problems related to alcohol and drugs are at five to ten times higher risk for suicide as compared to the general population (Voss, 2012). In the Veteran population, it has been found that a diagnosis of any substance use disorder is associated with a significantly increased risk of suicide for both men and women, and even stronger for women (Bohnert, 2017). There are also promising and proven practices in this area, including pharmacology approaches (medication assisted treatment [MAT]) (SAMHSA Tip 63, 2018; Krupitsky, 2011; Kakko, 2003; Molero, 2018), group interventions (Voss, 2012), and psychosocial support (Osli, 2013), among others, that have not been fully implemented.

**Key Veteran transition points,** including the transition to civilian status, entry into the workforce, or the transition from inpatient to outpatient mental health care, are a high-risk time for suicide. VA reports that Veterans are most vulnerable in the first three months following separation from military service, although suicide risk remains elevated for years after the transition (VA, 2019a). This is also an area of critical importance to VSOs, who are on the frontlines with Veterans’ needs, particularly related to Veteran benefits, funding of programs, and improving services for mental health (Jahnke, 2014). There are some existing efforts, such as the Home-Based Mental Health (HOME) program (Matarazzo, 2017), that target high-risk transitions, but this is a growing area for consideration.

**Provider burnout and engagement** as a priority area is informed by VA survey data as well as the Panel’s experience and feedback from the field. Recent VA OMHSP Provider Survey findings were reviewed by the Panel and showed that, although most providers report occasional stress (47 percent), a total of 36 percent report *some* (23 percent), *frequent* (9 percent), or *complete* (4 percent) burnout (VA OMHSP, 2017). Recently, the American Psychiatric Association (APA) released a report on *Psychiatric Well-being and Burnout,* describing the prevalence, contributing factors, and recommendations for the field (APA, 2018) related to burnout. APA reports that across the field, an estimated 2 in 5 psychiatrists are “burned-out.” Another VA study found that within VA PTSD clinics, of the 137 surveyed psychiatrists, 50 percent reported high exhaustion and high levels of cynicism (Garcia, 2016).

**Expert Panel Review: Best Practice Selection Process**

The best practice interviews yielded a total of twenty-two candidate best practice recommendations that met the criteria of being a potential best practice (as outlined in the Protocol section above). These best practices included clinical, organizational, and implementational
recommendations. Associated documentation (e.g., articles, publications, presentations, scientific literature) provided by the interviewee as evidence to support that recommendation was also collected and organized with its respective best practice.

The Expert Panel scored these recommendations based on the 1) level of evidence, 2) applicability and feasibility to VA, 3) level of innovation and 4) priority level of the recommendation. The Panel reviewed this evidence, along with VA’s summary of interim progress on the previous recommendations and the findings from the previous independent evaluation report (ERPI/Booz Allen/Altarum, 2018).

At the end of the review period, the expert panel came to consensus on the best practices that were the highest priority for recommendation to VA for this year’s report. The experts reviewed the draft and final language for each Best Practice Recommendation for accuracy and consensus.

Recommended Best Practices

Table 65 below shows the five candidate best practices that the expert panel determined should be proposed to VA for review and consideration for full, system-wide implementation in its mental health programs and suicide prevention services in the 2019 report. Details about each selected best practice will be described further in the section following this table (below):

**TABLE 65. 2019 RECOMMENDED BEST PRACTICES**

<table>
<thead>
<tr>
<th>Priority area: Substance use disorders (SUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. VA should consider continuing to build treatment capacity for medication-assisted treatment for opioid use disorder.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority area: Key Veteran transition points</th>
</tr>
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<tbody>
<tr>
<td>2. VA should consider expanding implementation of “caring contacts” following an episode of care related to suicidality, as well as rapid telephonic follow-up of suicidal patients after discharge from the emergency department.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority area: Provider burnout and engagement</th>
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<tbody>
<tr>
<td>3. VA should consider conducting a comprehensive review of current policies and practices for responding to Veteran suicidality that is identified within VHA.</td>
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</table>

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<tr>
<th>Additional Suicide prevention recommendations</th>
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<tbody>
<tr>
<td>4. VA should consider enhancing training in safety planning and lethal means safety practices to ensure quality and systematic implementation.</td>
</tr>
<tr>
<td>5. VA should consider ensuring that Veterans have access to Cognitive-Behavioral Therapy (CBT) focused on suicide prevention.</td>
</tr>
</tbody>
</table>

1. VA should consider continuing to build treatment capacity for medication-assisted treatment for opioid use disorder.

VA is a leader in the treatment of substance use disorders and, in particular, pharmacotherapy of opioid use disorder (OUD). Pharmacotherapy has been demonstrated in multiple studies to be critical in the treatment of OUD. Despite the progress made, there continue to be opportunities for improvement. According to VA’s quality measurement program, SAIL, the use of pharmacotherapy for the treatment of Veterans with an opioid use disorder varies from 12 to 63 percent across individual sites (national average 39 percent). The VA Stepped Care for Opioid Use Disorder Train-the-Trainer (SCOUTT) initiative is a step in the right direction but is not being implemented VA-wide or targeted to sites struggling to treat OUD. There are also excellent dashboards that can be used locally, but these are not used consistently and are not designed to be in the workflow of most providers. A focus on how managers at a local site can use the dashboards may be a better strategy and should include how those dashboard data might
populate within the provider workflow in the new Cerner health record. Other opportunities for building treatment capacity may exist within the existing mental health programs. Much of the attention related to OUD treatments has been to expand capacity within primary care; however, given the multiple comorbidities and the higher prevalence within patients with other mental illnesses, VA should also consider the feasibility and value of programs that increase treatment by psychiatrists. VA should examine what proportion of untreated patients in OUD are already engaged in mental health care and possibly target those for treatment.

2. **VA should consider expanding implementation of “caring contacts” following an episode of care related to suicidality, as well as rapid telephonic follow up of suicidal patients after discharge from the emergency department (ED).**

There is a growing body of evidence supporting positive impact of “caring contacts” following certain episodes of care related to suicidality (Reger et al., 2017). Caring contacts are promising for preventing suicide attempts and ideation and may also facilitate engagement in follow-up care. It is a relatively low-intensity, easily accessible, low-cost type of intervention that is feasible to implement across a large healthcare system such as VA. Considerations for implementation would include determining what events would trigger the intervention (e.g., ED visit, inpatient hospitalization, discharge from residential setting, those who have not yet engaged in care) and which staff would be responsible (e.g., peer specialists, SPCs). In addition, the modality (e.g., mail, email, text messages), content (e.g., friendly outreach, appointment reminder), frequency, and number of messages would need to be determined. VA may want to undertake ongoing program evaluation to assess outcomes, refine the parameters, and measure the cost-effectiveness of this type of intervention.

Closely related to the caring contacts intervention is rapid telephonic follow-up of suicidal patients following discharge from the emergency department. The Safe Vet intervention has shown that the combination of collaborative safety planning in the emergency department with follow-up calls reduced suicidal behavior and increased linkage to mental health services. VA is to be commended for utilizing this science to create the Safety Planning in Emergency Departments (SPED) program, which requires both these elements of safety planning and outreach efforts. To enhance this effort, we recommend: 1) that VA adopting a requirement that an outreach contact be initiated within 48 hours of ED discharge, since the days immediately following discharge from acute care services have been shown to be the time of highest risk; and 2) that a pilot effort with one or more community emergency departments be considered given that Veterans at risk for suicide are more likely to be seen in community EDs than in EDs located in VA hospitals.

3. **VA should consider conducting a comprehensive review of current policies and practices for responding to Veteran suicidality that is identified within VHA.**

VA has a unique opportunity to provide comprehensive and coordinated care to Veterans who are at elevated risk for suicide; VA also has multiple policies and programs in place to address aspects of care related to suicidality that is identified with Veterans receiving treatment in VHA, along with specialized staff such as Suicide Prevention Coordinators. These various policies and programs have been instituted at different care points to address different needs across the system. VA should conduct a thorough programmatic review of current VHA policies and practices with particular attention to factors such as patient experience, clinical workflow, and provider burden. The review should consider elimination of policies that lack evidence. For example, VA may want to examine whether policies that are currently separate could be consolidated to create a more streamlined and comprehensive approach to suicide prevention. The goal is that this effort would serve to enhance patient outcomes and reduce provider burden. This review would optimally include an assessment of the extent to which there is a culture of blame when a loss by suicide occurs and include recommendations to reduce blame while continuing to work to identify
system improvement. Such a review would also be in alignment with VA’s implementation of the Foundations for Evidence-Based Policymaking Act of 2018 (PL 115-435).

4. **VA should consider enhancing training in safety planning and lethal means safety practices to ensure quality and systematic implementation.**

VA has utilized safety planning with at-risk Veterans for many years; however, additional work can be done to increase the consistency and comprehensiveness of the safety planning process across VA clinical settings. VA should review the length of time that is required and allotted for safety planning by a variety of providers in a variety of clinical contexts. This review could include further elaboration of when and where safety plans are recommended clinically, along with steps (e.g., provider training) to enhance the quality and consistency of the planning process. This review should include a focus on the ongoing evaluation of the quality of safety planning implementation. Routine access to lethal means assessment and counseling should be an integral part of this process and of any safety planning trainings developed for providers. Lethal means are objects (e.g., medications, firearms, sharp objects) that can be used to engage in Suicidal Self-Directed Violence (S-SDV), including suicide attempts (VA, 2018).

5. **VA should consider ensuring that Veterans have access to Cognitive-Behavioral Therapy (CBT) focused on suicide prevention.**

VA offers Veterans access to evidence-based psychotherapy for a number of conditions that are related to suicidality, such as depression and posttraumatic stress disorder. However, none are specifically focused on suicide prevention. Multiple meta-analyses and systematic reviews have demonstrated the effectiveness of brief manualized CBT protocols using several slightly different models on suicide outcomes. For example, a recent study of a 12-session CBT for suicide protocol found that Army soldiers who received CBT were 60 percent less likely than those who received usual care to make a suicide attempt during 24 months of follow-up (Rudd et al, 2015). With multiple protocols available, VA should review the evidence and consider which would be optimal for implementation in the VA healthcare system. Implementation should ensure that providers attain sufficient proficiency and maintain adequate protocol fidelity.

**Best Practices Conclusion**

VA Secretary Robert Wilkie has publicly identified suicide prevention as VA’s single highest clinical priority. As suicide rates remain high, particularly for at-risk Veterans, VA must continue to innovate and strategize ways to cost-effectively improve mental health services, outreach, and prevention. VA should continue to be guided by evidence-based best practices, including those originating outside VA. Tackling this issue will require strengthened public-private partnerships, improved clinical training, consumer-driven care, and a continuous, non-blaming quality improvement approach. This report supports this goal by recommending enhanced best practices in mental health and suicide prevention in support of VA’s mission to serve American Veterans. The best practice recommendations presented in this report are intended to inform VA’s efforts to address Veteran suicide and improve VA mental health programs and services.
VA Statement of Progress Toward Implementation of 2018 Best Practice Recommendations

The following section includes the VA’s statement of progress toward implementation of the recommended Best Practices from last year’s report (2018 Annual Report).

<table>
<thead>
<tr>
<th>Best Practice Recommendation 1</th>
<th>VA SHOULD CONSIDER NATIONAL IMPLEMENTATION OF MEASUREMENT-BASED CARE FOR DEPRESSION, PTSD, AND SUBSTANCE USE DISORDERS</th>
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<tbody>
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<td></td>
<td>Within the domain of mental health, measurement-based care involves using standardized tools such as questionnaires to gauge progress through a given course of treatment for the purpose of informing both the provider and patient about needed adjustments to treatment. Although VA has itself recognized the importance of measurement-based care in mental health treatment, obstacles have prevented these tools from being implemented consistently in the VA system, and routine implementation of measurement-based care is not standard throughout VA mental health care. Standardized measures should at least be implemented within the treatment of PTSD, depression, and substance use disorders, since potential measures have already been identified jointly by VA and the Department of Defense for this purpose. Such an effort would provide the foundation for a data-informed approach to clinical practice. Ideally, measurements should be performed frequently enough to tailor treatment to the client’s individual needs and trajectory of recovery. VA should also consider how innovative, patient-facing technology for gathering data (e.g., tablets, devices, kiosks, or other technological tools) could be integrated into this best practice to facilitate ongoing assessment in a Veteran’s home or treatment setting that could be integrated into the medical record and inform clinical practice.</td>
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<thead>
<tr>
<th>Concur/Concur in Principle/Non-concur</th>
<th>Concur</th>
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Initial Summary provided by VA

Phase I of measurement-based care (MBC) began in late 2016 and continued until the end of 2017 with 176 clinics from 58 facilities from 18 Veterans Integrated Service Networks (VISN) and led to implementation in 84 percent of participating sites. Phase II began at the start of 2018 with a focus on implementation of Joint Commission requirements for use of measurement-based care in residential rehabilitation and treatment, substance use disorder, and intensive community mental health recovery programs, as well as therapeutic and supportive employment services and psychosocial recovery and rehabilitation centers. Behavioral Health Laboratory (BHL) software is being modified to support implementation by allowing Veteran to enter patient reported outcome data on tablets devices.
Description of VA efforts taken, and progress made in calendar year 2019

The MBC initiative is supporting implementation across multiple programs through the provision of training materials, community of practice calls, and guidance on implementation planning. From the third quarter of FY2016 to the third quarter of FY2019, there has been a 128 percent increase in the number of four core patient-reported outcome measures (e.g., PHQ-9, PCL-5, BAM-R/IOP, GAD7) administered per quarter across VA mental health programs. During the same period there has been a 200 percent increase in the number of unique Veterans with at least two administrations of a core measure in a quarter. Planned improvements to BHL software have allowed for the use of iPads for implementation of MBC; 63 facilities have been approved for their use and 15 facilities are actively using iPad technology. Pilot testing for a mobile solution to Mental Health Assistant (MHA) is in the early stages. Multiple measures have been added to both BHL and MHA to support adoption of MBC in a greater number of clinical programs.

Best Practice Recommendation 2

<table>
<thead>
<tr>
<th>Best Practice Recommendation 2</th>
<th>VA SHOULD CONSIDER ROUTINE PROVISION OF ACCESS TO ONLINE OR COMPUTER-BASED TREATMENTS FOR MILD TO MODERATE DEPRESSION AND/OR INSOMNIA AS AN ADJUNCT TO TREATMENT ACROSS SETTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Online or computerized evidence-based treatments for mild to moderate depression or insomnia are used as routine components of a step-wise care approach to mental health treatment in other countries and could be implemented effectively systemwide in VA settings as well. In a step-wise approach to treatment, the intensity of care provided is increased as needed and decreased when possible. This best practice can work in both urban and rural areas and is a way to increase access to evidence-based treatments. These options can overcome several barriers to receiving needed interventions, as Veterans could access the computerized/online tools on their own time and without concerns about stigma or logistical issues of presenting for care at a clinic or medical center. This practice does not refer to the use of online self-help tools independent of care providers, but as an integrated component of treatment and as a patient engagement opportunity. This practice could be implemented first in primary care, general mental health services, or residential treatment programs and would need to be linked to care with an identified clinician conducting regular follow-up to ensure timely crisis intervention or offering alternatives if the computer-based intervention is not initially successful.</td>
</tr>
</tbody>
</table>

Concur/Concur in Principle/Non-Concur: Concur in principle

Initial Summary provided previously by VA: A number of electronic treatment resources are available through the National Center for Posttraumatic Stress Disorder (NCPTSD) including the PTSD Coach Online that teaches coping and problem solving, and VetChange, a program for Veterans with PTSD and problem drinking. The web site www.VeteransTraining.va.gov offers resources including courses for anger management, problem solving
training, and management of insomnia (based on Cognitive Behavioral Therapy for insomnia). A series of mobile apps available from NCPTSD are listed at www.ptsd.va.gov/appvid/mobile. Since 2011, they have been downloaded almost 2 million times. In 2017, NCPTSD’s Practice-Based Implementation (PBI) Network launched the Tech into Care initiative to facilitate integration of mobile and web technologies into care for Veterans with PTSD and related issues. Over 1,000 VA staff are enrolled in the Tech into Care Community of Practice. Electronic resources available from other VA sources include Vets Prevail, a program based on Cognitive Behavioral Therapy and peer support that is designed to address symptoms, to support early interventions that can prevent the onset of full-blown disorders, and to route individuals to treatment when appropriate. It includes Community Chat, a feature that allows veterans to connect with peer responders to ask questions and seek support.

<table>
<thead>
<tr>
<th>Description of VA efforts taken, and progress made in calendar year 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCPTSD is developing and testing an extension of VetChange that will add major new functionality to enable integration with in-person care by clinical providers treating Veterans. The new version will be instrumented for research and will be tested with providers and patients in VA clinics. NCPTSD’s mobile app Insomnia Coach is currently undergoing preliminary safety testing prior to its public release. The app can serve as a patient engagement strategy for Veterans, encouraging them to continue on to Cognitive Behavioral Therapy for Insomnia (CBT-i). The Rocky Mountain Mental Illness Research, Education and Clinical Center (MIRECC) is engaged in two studies aimed at exploring the efficacy of computer-based CBT-i for Veterans with insomnia. Work is specifically focused on Operation Enduring Freedom/Operation Iraqi Freedom and rural Veterans.</td>
</tr>
</tbody>
</table>

**Best Practice Recommendation 3**

**VA SHOULD CONSIDER NATIONAL IMPLEMENTATION OF THE COLLABORATIVE CARE MODEL FOR THE TREATMENT OF DEPRESSION IN PRIMARY CARE**

VA has made several efforts to improve the integration of mental health care into primary care settings, and this is important as a substantial minority of VA’s primary care population screens positive for depression. If depression were identified and effectively treated in primary care settings, it could improve Veteran quality of life and potentially reduce suicide risk. Collaborative Care is a specific model used to address common behavioral health problems, including suicide risk, among patients typically presenting in general medical settings, and could be included in outpatient follow-up for patients discharged after presenting in an acute care setting like an emergency department. Collaborative Care for depression should be expanded to be available in all VA primary care settings for pharmacological treatments (e.g., medication prescription and adherence), along
Collaborative Care provides an efficient use of specialty mental health clinicians because the principal role of a psychiatrist or specialty mental health provider in the Collaborative Care framework is not to see patients one at a time, but to be a case consultation resource to other providers, such as those on primary care teams, and care managers. Collaborative Care mental health specialty providers can provide input on a larger magnitude of patients than the specialty providers would be able to treat on an individual basis, as they render advisory services and recommendations to their colleagues who are then responsible for delivering one-on-one care.

<table>
<thead>
<tr>
<th>Concur/ Concur in Principle/ Non-Concur</th>
<th>Concur in principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Summary provided previously by VA</td>
<td>The VHA began implementing the collaborative care model in medical centers and its largest community-based outpatient clinics in 2007 as a component of its PC-MHI program. The overall PC-MHI program included other collocated-collaborative care, as well as care management based on the principles of the collaborative care model. As of 2017, 76 percent of sites reported implementation of care management. To enhance the program, training for collocated collaborative care providers and care managers was required in 2018. Behavioral Health Laboratory software is available to support implementation of the care management based on the collaborative care model and VHA is in discussion with Cerner about incorporating relevant functions in the new electronic medical record.</td>
</tr>
<tr>
<td>Description of VA efforts taken, and progress made in calendar year 2019</td>
<td>The VA Center for Integrated Healthcare partnered with the VHA OMHSP to complete competency training for all PCMHI providers throughout 2018 and monitoring of provider activity has been ongoing in 2019. The 2019 evaluation has demonstrated statistically significant improvements in fidelity to the PCMHI model of care. In the most recent survey of facilities, however, presence of Collaborative Care Model has declined to 73.6 percent of sites reporting implementation of this model. Additionally, 94.1 percent of sites report implementation of Co-located Collaborative Care. OMHSP is currently in active discussions with Cerner to assure that the functions necessary to support the Collaborative Care Model are in place.</td>
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</table>

**Best Practice Recommendation 4**

**VA SHOULD CONSIDER GENERALIZING THE MODEL OF THE EXISTING PTSD MENTORING AND CONSULTATION PROGRAMS TO BROADER DOMAINS OF MENTAL HEALTH AND SUICIDE PREVENTION WITHIN VA**

VA established a PTSD Mentoring Program in 2008 through the Office of Mental Health Services (OMHS) and NCPTSD to support the delivery of evidence-based PTSD treatments in specialty clinics by sharing strong administrative practices. The Program is a national network of PTSD clinical team directors that disseminates and implements best management practices. In addition, two or more...
expert senior clinicians serve as PTSD Mentors within each VISN. With support from VA Central Office leaders, Mentors work with PTSD program directors and PTSD specialists in their VISN (Mentees) to help meet the increased demand for treatment by restructuring existing programs and by implementing effective administrative and clinical practices. This allows for the dissemination and implementation of best practices and explicitly fosters a “bottom-up” approach to communication in which information from the field can be shared through the program to Central Office leadership.

NCPTSD’s Consultation Program offers consultation, education, information, and other resources to both VA and community practitioners who treat Veterans with PTSD. Consultation is consistent with evidence-based practices for PTSD and consensus statements such as the VA/DoD Clinical Practice Guideline for PTSD. Together, these programs promote best practices in care for patients with PTSD. Currently, the programs are used primarily to improve PTSD treatment, although VA has more recently instituted a Suicide Risk Management Consultation Program for VA providers. VA could make these Mentoring and Consultation Programs more widely available and address a broader spectrum of mental health and suicide prevention treatments and practices. This would benefit VA and community providers caring for Veterans as an effective vehicle by which to disseminate best practices across VA’s integrated health care system as well as for Veterans served outside of VA. However, expansion beyond VA staff would be dependent on a legal analysis of what is authorized.

<table>
<thead>
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<th>Concur/ Concur in Principle/ Non-Concur</th>
<th>Concur in principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Summary provided previously by VA</td>
<td>The highly successful PTSD mentoring and consultation programs, have served as a model for the development and implementation of a number of other programs, supporting the delivery of high-quality care for a number of specific conditions. The VA Suicide Risk Management Consultation Program operated by the Rocky Mountain MIRECC and the national TeleBipolar Disorder Program operated by the National TeleMental Health Center have been providing services for a number of years. More recently TelePsychosis and TeleSubstanceUse Disorder programs have been implemented.</td>
</tr>
<tr>
<td>Description of VA efforts taken, and progress made in calendar year 2019</td>
<td>VA has expanded services provided by the Rocky Mountain MIRECC National VA Suicide Risk Management Consultation Program. Specifically, consultation is available to community providers working with Veterans. Dissemination efforts are focused on both VHA and community providers (<a href="https://www.mirecc.va.gov/visn19/consult/index.asp">https://www.mirecc.va.gov/visn19/consult/index.asp</a>). In addition, additional consultation resources are now available to providers affected by Veteran suicide loss (Uniting for Suicide Postvention [USPV]).</td>
</tr>
</tbody>
</table>
Best Practice Recommendation 5

| Best Practice Recommendation 5 | VA SHOULD CONSIDER IMPLEMENTATION OF THE FULL RANGE OF PRINCIPLES INCLUDED IN THE ZERO SUICIDE FRAMEWORK, WHICH IS COMPRISED OF SEVEN CORE ELEMENTS |

Because no single approach will fully reduce suicide among individuals who are in care, comprehensive, multi-component, system-wide approaches to suicide prevention are essential to addressing the problem of suicide. Initially spearheaded by the Henry Ford Health System, and subsequently implemented across more than 200 Federal and community-based health care systems, Zero Suicide is a systematic clinical program focused on error reduction, based on the premise that a systematic approach to quality improvement is necessary. Zero Suicide is a set of seven components that have each individually been shown to support a reduction in suicide deaths and behaviors; early results show great promise when these individual components are bundled together. Further, emerging evidence suggests significant reductions may be achieved in suicide in health care systems that have implemented most or all of these core components.

- **Lead** – Create a leadership-driven, safety-oriented culture committed to dramatically reducing suicide among people under care. Include survivors of suicide attempts and suicide loss in leadership and planning roles.
  - Within VA, this includes a reinvigoration of a safety-focused culture that results from an active leadership role in suicide prevention at the national, VISN and facility levels. Leaders must reinforce a non-punitive approach for staff and a commitment to creating an organization that learns productively from missteps.

- **Train** – Develop a competent, confident, and caring workforce.
  - Training must be available to ensure that all staff know what to do if they encounter a Veteran at risk, that appropriate staff know how to discuss lethal means safety with Veterans, and that clinical staff have up-to-date competencies in evidence-based treatments for suicide prevention.

- **Identify** – Systematically identify and assess suicide risk among people receiving care.
  - Within VA, this includes a focus on lethal means safety, with an emphasis on firearm safety and routine inquiries about possession of firearms.

- **Engage** – Ensure every individual has a pathway to care that is both timely and adequate to meet his or her needs.
Include collaborative safety planning and restriction of lethal means.
  - Within VA, this relates to identifying and implementing appropriate means for suicide risk assessment, safety planning, ready access to evidence-based care, and electronic flags for high-risk patients in the health record.

- **Treat** – Use effective, evidence-based treatments that directly target suicidal thoughts and behaviors.
  - A selection of evidence-based treatments should be available to address suicidal thoughts and behaviors rather than exclusive focus on treatment of underlying conditions like depression or substance use disorders, with staff training for additional treatments provided as the evidence base for relevant treatment evolves.

- **Transition** – Provide continuous contact and support throughout the continuum of care, as patients transition in and out of various health care settings, and especially after acute care.
  - Within VA, this includes ensuring proactive follow-up after discharge from acute care settings or emergency departments for diagnoses related to suicide risk or behavioral health conditions.

- **Improve** – Apply a data-driven quality improvement approach to inform system changes that will lead to improved patient outcomes and better care for those at risk.
  - A focus on measurement of results and assessments of the quality of care involves both process and outcome measures where available, given that delays and challenges in measurement of rates of suicide do not allow the ultimate measurement of death by suicide to serve as an indicator of outcome in real time.

It is noted that VA is already involved in efforts to implement several of these elements (e.g., highlighting the critical role of suicide prevention coordinators at each facility, focusing on lethal means safety, improving post-discharge follow up). However, full implementation of all seven elements is recommended as a coordinated bundle of practices for this best practice; individual practices are unlikely to be as effective as the collection of elements across multiple domains.

<table>
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<tr>
<th>Concur/ Concur in Principle/ Non-Concur</th>
<th>Concur</th>
</tr>
</thead>
</table>

198
<table>
<thead>
<tr>
<th>Initial Summary provided previously by VA</th>
<th>The Zero Suicide framework includes seven areas that are considered separately in this summary.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lead:</strong> Veteran suicide prevention is the top clinical priority for VA and VHA leadership. This has been reflected in VA's commitment to implement the National Strategy for Prevention Veterans Suicide through work with a broad range of government, community-based, and private sector partners as well as work within VA.</td>
<td></td>
</tr>
<tr>
<td><strong>Train:</strong> VA requires SAVE (Signs of suicide, Asking about suicide, Validating feelings, Encouraging help and Expediting treatment) training for all VHA staff, clinical and non-clinical, and encourages training for Veterans Benefits Administration (VBA) and National Cemetery Administration staff. It also provided SAVE training to community partners through a broad array of outreach programs. In collaboration with the VA Educational Support System, the Suicide Prevention Program (SPP) provides monthly training for field staff on current issues related to suicide. Other specific programs have included training in safe messaging and ways for VA staff to communicate with the public about suicide-related issues while minimizing risks of contagion.</td>
<td></td>
</tr>
<tr>
<td><strong>Identify:</strong> VA has launched a strategy to use high quality, evidence-based tools in a standardized process for screening for the risk of suicide. The process is based on a brief primary screen with high sensitivity, a secondary screen with greater specificity, and a comprehensive suicide risk evaluation to be administered when appropriate. When individuals are identified as being at high risk, a patient record flag is added to the electronic medical record to ensure that providers and staff are aware of the risks and provide appropriate care. VA complements these clinical strategies for identifying patient at risk with additional approaches based on predictive modeling; these include the Recovery Engagement and Coordination for Health–Veterans Enhanced Treatment (REACH-VET) for suicide and the Stratification Tool for Opioid Risk Mitigation (STORM) for opioid overdoses. Information about patients identified as being at risk are made available to providers through the Suicide Prevention Population Risk Identification and Tracking (SPPRITE) dashboard that identifies who is at risk and provides guidance about enhancing care.</td>
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<tr>
<td><strong>Engage:</strong> VA has pioneered broad use of safety planning as an initial step in management for patients identified as being at high risk for suicide. It is required for patients at high risk identified through patient record flags. In addition, it is increasingly being used for patients without suicidal ideation or known risks when highly stressful events can be anticipated; the goal is to promote use of behavioral strategies for coping as a matter of primary prevention.</td>
<td></td>
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<tr>
<td><strong>Treat:</strong> VA is pilot testing implementation of two strategies that complement treatment focused on mental health conditions with</td>
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</table>
interventions that directly target the risk of suicide. Cognitive Therapy for Suicide Prevention (CT-SP) will be tested in VISNs 1, 10, and 19. Collaborative Assessment and Management of Suicidality (CAMS) is currently being piloted in VISN 9 and the Columbus, Ohio, VA Medical Center.

Transition: SPCs have specific responsibilities for providing assistance in managing all care transitions for patients flagged as being at high risk of suicide to ensure that none of them fall the crack between programs or services. In addition, there are programs and policies for optimizing safety during transitions between specific settings. VA is implementing SPED, an evidence-based program for patients at risk who are discharged from Emergency Departments that provides safety planning and ongoing follow-up for patients until they engage in outpatient care. In addition, there are longstanding policies for managing patients discharged from inpatient mental health units that require three clinical contacts within 30 days after discharge, four for patients flagged as being at high risk. There are also policies for managing patients who call the Veterans Crisis Line who are identified as being at elevated risk, but not high enough to require an emergency rescue intervention. They are referred to the Suicide Prevention Coordinators (SPC) at the most appropriate facility, and the SPCs are required to reach out to them within 24 hours.

Improve: VA is currently developing key process measures for tracking the activities of SPP and dashboards for making this information broadly available.

<table>
<thead>
<tr>
<th>Description of VA efforts taken, and progress made in calendar year 2019</th>
<th>Lead: VA has continued to lead the implementation of the National Strategy for Preventing Veterans Suicide through work with a broad range of government, community-based, and private sector partners and ongoing work with partners within VA.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An example to illustrate VA’s commitment to a non-punitive environment for Veterans and staff include the “Guidance for Action Following a Suicide on a VA Campus”, a checklist designed to guide facilities in their response to suicides that occur on any VA property, including owned, leased, or otherwise contracted spaces, and is intended to augment any local VA policies currently in place. These postvention actions address care and support for Veteran families, friends, and for VA staff affected by the suicide death.</td>
</tr>
<tr>
<td></td>
<td>Train: To date, over 17,000 VHA employees have taken a training on Lethal Means Safety Counseling. Online training courses to support implementation of important suicide prevention programs such as REACH-VET and Risk ID are available in the Talent Management System.</td>
</tr>
<tr>
<td></td>
<td>VA released the Mental Health and Suicide Prevention Resource Toolkit for Never Federally Activated Former Guard and Reserve Members to educate this population, as well as their families and</td>
</tr>
</tbody>
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200
health care providers, about the variety of mental health and suicide prevention resources available to them through VA and in the community.

In March 2019, we addressed lethal means safety with the development of the Suicide Prevention is Everyone’s Business: A Toolkit for Safe Firearm Storage in Your Community, a framework for fostering community collaboration to promote safe firearm storage, developing a community action plan, and piloted over the next year in 7 regions.

In summer of 2019, the “Summer Safety Stand-Down,” a presentation for all VA staff, provided an introduction to lethal means safety across the system.

OMHSP developed a safety planning and lethal means messaging educational program, with direct Veteran input, for primary care doctors and nurses, with a goal to roll out across VA and within communities.

SPP, along with VA experts, created a brochure for staff and Veterans on lethal means and the older Veteran population.

SPP created a training for non-mental-health-trained staff in hospice care/palliative care related to suicide prevention skills. This is being piloted in multiple VA sites, with a goal of engaging community partners with this training.

**Identify:** The SPPRITE dashboard is an easy-to-use lookup tool for front line providers that identifies who is at risk and provides guidance for enhancing care. The dashboard combines predictive analytics from REACH-VET for suicide and STORM for opioid overdoses.

VHA has implemented a nationwide three-step standardized and evidence-based screening and evaluation process to identify individuals at risk for suicide. Risk ID has been implemented with support from the national technical assistance team. Since October 2018, over 3 million Veterans have been screened for suicide risk.

**Engage:** VHA is implementing SPED to identify Veterans in EDs at increased risk for suicide to facilitate treatment engagement. Capacity is being built to offer technical assistance and training to those in the field.

Safety planning increasingly being used for patients without suicidal ideation or known risks when highly stressful events can be anticipated and ongoing monitoring of implementation of safety plans for individuals at high risk for suicide is available through the Suicide Prevention Quarterly Dashboard.
Veterans identified through REACH-VET are outreached and offered enhanced care strategies, including safety planning, caring letters, training for improved coping skills, and management through stressful situations.

The Whole Health/Mental Health Initiative aims to provide all Veterans with access to whole health education to promote engagement in protective factors. Additionally, VBA is establishing a Suicide Prevention POC in all VBA sites, to include suicide prevention training, materials, and a toolkit.

**Treat:** VA, along with DoD, has completed the Clinical Practice Guidelines for Suicide Prevention, with implementation across VHA in progress.

Telehealth delivery of Cognitive Behavioral Therapy for Suicide Prevention (CBT-SP) is being piloted in VISNs 10 and 19.

VHA has finalized treatment protocols for use of lithium and ketamine for use with acutely suicidal Veterans.

**Transition:** VHA is expanding SPED, an evidence-based program for Veterans who are assessed to be at risk for suicide and safe to be discharged home, by developing follow up outreach protocols to enhance motivation and support for outpatient mental health care.

**Improve:** SPP has developed a quarterly dashboard of key performance indicators reporting progress toward goals related to Veterans at high risk for suicide, including:

- Documentation of a safety plan within 7 days of flag initiation, or on or before discharge;
- Receipt of at least 4 mental health encounters within 30 days of flag initiation.

SPP has developed an annual report to accompany the annual suicide data releases, which inform on Veteran suicide nationally by state.

SPP is closer to completion of a Data Hub that will pull together information from VA and external sources and variables related to Veteran suicide risk and protective factors for improved tracking and surveillance.
References


Centers for Disease Control and Prevention. Quality Improvement and Care Coordination: Implementing the CDC Guideline for Prescribing Opioids for Chronic Pain. 2018. National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention, Atlanta, GA.


Appendix A: Details for Methods

Missing Data Imputation

The table below lists the characteristics of Veterans who were eligible for VOA sampling, Veterans who responded to VOA baseline measures, and Veterans who responded to both baseline and follow-up VOA measures. To examine the representativeness of VOA sample, we conducted Chi-Square tests to compare VOA baseline and VOA follow-up sample characteristics with VOA eligible sample characteristics. The results presented in Table indicate that due to non-responses in baseline and follow-up survey, Veterans in both the VOA baseline and VOA follow-up samples have significantly different characteristics than Veterans in the overall VOA eligible sample.

<p>| Comparison of Characteristics of FY2019 VOA Respondents vs. VOA Population |
|-------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th></th>
<th>VOA Eligible</th>
<th>VOA Baseline</th>
<th>VOA Follow-up</th>
<th>Baseline vs. Population</th>
<th>Follow-up vs. Population</th>
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</tbody>
</table>
To determine the best approach to address item non-response, we conducted simulation studies designed to compare six (6) commonly used imputation techniques and test for the accuracy of imputed values when compared to real values. Instead of using all the measures, we used complete answers for Kessler-6 scale (K6) at baseline to construct the dataset for our missing data simulation and imputation results demonstration study. We proposed K6 for the simulation because among all measures used across all programs (SF-12, Kessler, BAM-short, WHODAS, and SWEMW), Kessler has relatively high complete responses. Also, there is a published clinical cut-off for the K6 composite score. These advantages will help us construct the simulation and imputation study dataset and compute different indices to compare the accuracy of various imputation approaches.

K6 is a measure of general psychological distress that has been widely used as a screener for mood disorders and anxiety. The K6 asks respondents how frequently they experience symptoms of psychological distress (e.g., feeling so sad that nothing can cheer you up) during the past 30 days (Kessler et al., 2002) using a Likert scale with item responses ranging from 1-5.

To confirm the choice of an imputation method, we simulated missing data on a second scale within the VOA. The SF-12 scale baseline survey was selected as a second scale (in addition to K6) because SF-12 is used across several programs. SF-12 contains 12 items that have binary responses (four items) or uses Likert-type scales having three (two items), five (two items), or six (four items) levels. The SF-12 survey generates two composite scores, PCS12 (physical health) and MCS12 (mental health), each of which is a linear combination of SF-12 items (with positive and negative weights). We evaluated each imputation method by comparing their Pearson correlation of the true PCS12 and MCS12 scores with the PCS12 and MCS12 scores formed from corresponding imputed data.

To enable methodological comparison of different imputation techniques, five (5) missing data simulations were produced. Missing values were simulated in these complete cases by assigning each response a number between 0 and 1 randomly selected from the uniform distribution (0,1). The assigned values were used to assign missing values to selected observations. First, we created scenarios where random missing data are 5 percent, 10 percent, and 20 percent. To achieve this, observations assigned a value of less than
0.05, 0.1, and 0.2 would have missing values (missing item responses). Subjects with no deleted values will be removed from the analysis since there is no missing value to impute. This simulation creates a Missing Completely at Random (MCAR) scenario. Second, we created a Missing at Random (MAR) scenario, where males and Veterans over age of 65 have higher probability to have missing responses. Males over 65 were assigned a 20 percent probability of non-response; all other patients were assigned a 10 percent probability for non-responses. Last, we created the Missing Not at Random (MNAR) scenario where all questions except for item 1 were assigned a probability of missing of 20 percent if answers to item 1 is 1 or 2. If the response for item 1 is 3, 4, or 5 then the probability of missing would be 10 percent. The missing rate for item 1 was set to 5 percent.

After creating the simulated dataset, we applied the six (6) imputation techniques described below to impute the missing data.

**Random Selection:** The imputed value is a randomly selected value from 1 to 5.

**Preceding Response:** We will replicate the preceding question's response to impute the missing response. By doing this, the responses to the missing item will be more consistent to other responses.

**Group Mean:** We will replace the missing value using other Veterans’ average responses on the items. This method has the advantage of being simple, but it has the disadvantage of neglecting individual-level information, and we expect it will exhibit systematic bias: the imputed composite measure will likely be systematically biased down at the high end of the distribution, and systematically biased up at the low end of the distribution.

**Individual Mean:** We will replace the missing value using Veterans’ average responses on other items of K6 in this simulation study. The individual mean approach is appropriate because it is simple and can be effective and robust because it uses individual-level information. Since this method as described is not appropriate for weighted sums, and since some VOA measures are weighted sums, we will use a straightforward generalization to adapt this method to the composite measures that use weighted item sums.

For a measure whose composite is a weighted sum of composite responses such as SF-12, i.e.,

\[ C = \sum_i w_i r_i , \]

the composite, after imputation, should be a rescaled weighted composite which accounts for the missing weighted items, and which gives the same results as \( C \) (above) when all data are present, i.e.,

\[ C_{imputed} = \frac{\sum_i w_i}{\sum_{i \in \text{non-missing}} w_i} \sum_{i \in \text{non-missing}} w_i r_i . \]

Note that if the original weights sum to 1, then this imputed composite is the weighted sum of the non-missing items with weights rescaled to sum to 1.

To derive a value to impute for the items, note that the imputed composite must be equal to the following:
The unweighted individual mean imputes an equal value to each missing term, so we will do the same by giving an equal value to each weighted term, so that \( w_i r_i = w_j r_j \) for all indices \( i \) and \( j \) corresponding to missing items. It follows from a simple mathematical derivation that the individual mean imputation method for the weighted mean case will impute to each missing item, say the \( j \)th item, the following value:

\[
r_j \leftarrow \frac{1}{w_j} \frac{\sum_{i \in \text{missing}} w_i \sum_{i \in \text{non-missing}} w_i r_i}{\sum_{i \in \text{non-missing}} w_i}.
\]

This quantity (above), is the extension of individual mean imputation to the case where each item is given a different weight, and where multiple items may be missing. The weighted mean imputation approach is a generalization of the unweighted mean approach, where the unweighted mean imputation has \( w_i = 1 \) for every item.

**Regularized Interpolation of Individual Mean and Single Regression:** This method generalizes the individual mean method by running a regression model to predict missing values, with a regularization penalty function which penalizes differences in coefficients in the model. When the penalty function is infinite for nonzero differences in coefficients, it reduces to the individual mean model. This method we expect would perform better than individual mean because it has an element of flexibility granted by incorporation of a regularization parameter, and because it includes individual mean as a special case.

**Multiple Imputation (MI):** We will apply the MI procedure in SAS (proc MI) to impute the missing values. The imputation is carried out in three steps. The missing data are filled 5 times generating 5 complete unique data sets. Each data set is analyzed separately to calculate a mean, and standard deviation. Then, the results from each analysis are combined to produce an overall mean and standard deviation for each missing value.

For imputed values under each scenario and using different imputing approach, we calculated the Kessler score and compared them with the “true” Kessler/SF-12 score. The Evaluation Team calculated the Pearson correlation among the simulated Kessler/SF-12 scores and “true” Kessler/SF-12 scores. As shown in Table 1 and 2, multiple imputation had the highest performance across all five simulations. Individual mean was a close second. Random selection was clearly the worst imputation method. The results suggest multiple imputation as the preferred method for handling missing data.
**Missing Data Imputation Approach Comparison for K6**

Table: Pearson correlations of K5 composite scores from imputed data with actual data.

<table>
<thead>
<tr>
<th></th>
<th>sim_1</th>
<th>sim_2</th>
<th>sim_3</th>
<th>sim_4</th>
<th>sim_5</th>
</tr>
</thead>
<tbody>
<tr>
<td>imp_6</td>
<td>0.9951</td>
<td>0.9895</td>
<td>0.9753</td>
<td>0.9868</td>
<td>0.9872</td>
</tr>
<tr>
<td>imp_6A</td>
<td>0.9951</td>
<td>0.9895</td>
<td>0.9753</td>
<td>0.9868</td>
<td>0.9872</td>
</tr>
<tr>
<td>imp_4</td>
<td>0.9942</td>
<td>0.9881</td>
<td>0.9725</td>
<td>0.9848</td>
<td>0.9846</td>
</tr>
<tr>
<td>imp_3</td>
<td>0.9925</td>
<td>0.9846</td>
<td>0.9660</td>
<td>0.9791</td>
<td>0.9794</td>
</tr>
<tr>
<td>imp_5</td>
<td>0.9917</td>
<td>0.9824</td>
<td>0.9611</td>
<td>0.9778</td>
<td>0.9784</td>
</tr>
<tr>
<td>imp_5A</td>
<td>0.9917</td>
<td>0.9824</td>
<td>0.9611</td>
<td>0.9778</td>
<td>0.9784</td>
</tr>
<tr>
<td>imp_2</td>
<td>0.9890</td>
<td>0.9780</td>
<td>0.9543</td>
<td>0.9722</td>
<td>0.9722</td>
</tr>
<tr>
<td>imp_1</td>
<td>0.9813</td>
<td>0.9613</td>
<td>0.9165</td>
<td>0.9497</td>
<td>0.9508</td>
</tr>
</tbody>
</table>

Note. *Imp_6a = MI (w cov & categ model)*

*Imp_6    = multiple imputation*

*Imp_4    = individual mean*

*Imp_3    = group mean*

*Imp_5a   = single reg’n (cov & categ)*

*Imp_5    = single regression*

*Imp_2    = preceding response*

*Imp_1    = random selection*

*Sim_1    = MCAR – 5%*

*Sim_2    = MCAR – 10%*

*Sim_5    = MNAR – 20% / 10%*

*Sim_4    = MAR – 20% / 10%*

*Sim_3    = MCAR – 20%*
Missing Data Imputation Approach Comparison for SF-12

Table: Pearson correlations of SF-12 composite scores from imputed data with actual data

<table>
<thead>
<tr>
<th></th>
<th>sim_1</th>
<th>sim_2</th>
<th>sim_5</th>
<th>sim_4</th>
<th>sim_3</th>
</tr>
</thead>
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<tr>
<td>PCS12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>imp_6A</td>
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<td>0.98584</td>
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<td>0.98254</td>
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<tr>
<td>imp_5A</td>
<td>0.98909</td>
<td>0.97800</td>
<td>0.97657</td>
<td>0.97090</td>
<td>0.95090</td>
</tr>
<tr>
<td>imp_1</td>
<td>0.97803</td>
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<td>0.94047</td>
<td>0.90110</td>
</tr>
<tr>
<td>imp_6</td>
<td>0.96885</td>
<td>0.93743</td>
<td>0.93737</td>
<td>0.92065</td>
<td>0.87451</td>
</tr>
<tr>
<td>imp_5</td>
<td>0.96885</td>
<td>0.93743</td>
<td>0.93737</td>
<td>0.92065</td>
<td>0.87451</td>
</tr>
<tr>
<td>imp_3</td>
<td>0.96885</td>
<td>0.93743</td>
<td>0.93737</td>
<td>0.92065</td>
<td>0.87451</td>
</tr>
<tr>
<td>MCS12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sim_1</td>
<td>0.99201</td>
<td>0.98328</td>
<td>0.98079</td>
<td>0.97957</td>
<td>0.96284</td>
</tr>
<tr>
<td>sim_2</td>
<td>0.98724</td>
<td>0.97299</td>
<td>0.96927</td>
<td>0.96502</td>
<td>0.94172</td>
</tr>
<tr>
<td>sim_5</td>
<td>0.97435</td>
<td>0.94713</td>
<td>0.93533</td>
<td>0.93333</td>
<td>0.88462</td>
</tr>
<tr>
<td>sim_4</td>
<td>0.96190</td>
<td>0.92545</td>
<td>0.91862</td>
<td>0.91188</td>
<td>0.85242</td>
</tr>
<tr>
<td>sim_3</td>
<td>0.96190</td>
<td>0.92545</td>
<td>0.91862</td>
<td>0.91188</td>
<td>0.85242</td>
</tr>
</tbody>
</table>

\*Imp_6a = MI (cov & categ model)\*

\*Imp_5a = single regression (cov & categ)\*

\*Imp_1 = random selection\*

\*Imp_6 = MI\*

\*Imp_5 = single regression\*

\*Imp_3 = group mean\*

\*Sim_1 = MCAR – 5%\*

\*Sim_2 = MCAR – 10%\*

\*Sim_5 = MNAR – 20% / 10%\*

\*Sim_4 = MAR – 20% / 10%\*

\*Sim_3 = MCAR – 20%\*
Weight Calculation

Baseline Weight to Address Non-Equal Selection/Non-Coverage

To add sampling weights, the first step entails applying a weight to adjust the different selection probability of each mental health program. For example, as shown below, because PC-MHI is overrepresented in the VOA baseline sample, we will apply a smaller weight (0.865, less than 1) to adjust.

Table X. Sampling Weights to Adjust Different Selection Probability of Programs

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Contacted for Baseline</th>
<th>$W_1$</th>
<th>Reached for Baseline</th>
<th>$W_2$</th>
<th>Completed Baseline</th>
<th>$W_3$</th>
<th>$W_{123}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMHS</td>
<td>115174</td>
<td>78846</td>
<td>0.997</td>
<td>51534</td>
<td>0.992</td>
<td>8556</td>
<td>0.981</td>
<td>0.970</td>
</tr>
<tr>
<td>AIMHS</td>
<td>19253</td>
<td>13447</td>
<td>0.977</td>
<td>7863</td>
<td>1.109</td>
<td>1072</td>
<td>1.195</td>
<td>1.294</td>
</tr>
<tr>
<td>PC-MHI</td>
<td>43178</td>
<td>29657</td>
<td>0.993</td>
<td>19798</td>
<td>0.971</td>
<td>3596</td>
<td>0.897</td>
<td>0.865</td>
</tr>
<tr>
<td>PTSD</td>
<td>16309</td>
<td>11092</td>
<td>1.003</td>
<td>7457</td>
<td>0.964</td>
<td>1146</td>
<td>1.060</td>
<td>1.026</td>
</tr>
<tr>
<td>RRTP</td>
<td>2526</td>
<td>1039</td>
<td>1.659</td>
<td>596</td>
<td>1.130</td>
<td>88</td>
<td>1.103</td>
<td>2.069</td>
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<tr>
<td>SUD</td>
<td>17371</td>
<td>12124</td>
<td>0.978</td>
<td>7497</td>
<td>1.048</td>
<td>971</td>
<td>1.258</td>
<td>1.289</td>
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<tr>
<td>TSES</td>
<td>1103</td>
<td>436</td>
<td>1.726</td>
<td>316</td>
<td>0.894</td>
<td>57</td>
<td>0.903</td>
<td>1.395</td>
</tr>
</tbody>
</table>

Baseline Post-Stratification Weight

Next, we considered key demographic variables (e.g., gender, race, and age group) to adjust for the differences between VOA sample and VOA eligible population (presented in Table 1). A 3-way crosstab table was constructed for each program to calculate the corresponding survey weights. For each cell in Table X, the weight was derived using the formula:

\[ \text{Weight} = \frac{p_{\text{population}}}{p_{\text{sample}}} \]
Baseline Post-Stratification Weight

GMHS

<table>
<thead>
<tr>
<th></th>
<th>Black</th>
<th>Hispanic</th>
<th>Other</th>
<th>White</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male &lt;36</td>
<td>1.224</td>
<td>1.143</td>
<td>1.106</td>
<td>1.107</td>
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</tr>
<tr>
<td>Male 36-65</td>
<td>1.099</td>
<td>1.074</td>
<td>1.008</td>
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<td>1.048</td>
</tr>
<tr>
<td>Male &gt;65</td>
<td>0.964</td>
<td>0.800</td>
<td>1.015</td>
<td>0.831</td>
<td>0.830</td>
</tr>
<tr>
<td>Female</td>
<td>1.231</td>
<td>1.150</td>
<td>1.157</td>
<td>1.032</td>
<td>1.273</td>
</tr>
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</table>

PC-MHI

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<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male &lt;36</td>
<td>1.268</td>
<td>1.548</td>
<td>1.255</td>
<td>1.123</td>
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<tr>
<td>Male 36-65</td>
<td>1.095</td>
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<td>0.946</td>
<td>1.049</td>
</tr>
<tr>
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<td>0.935</td>
<td>1.053</td>
<td>1.055</td>
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<tr>
<td>Female</td>
<td>1.195</td>
<td>1.273</td>
<td>1.360</td>
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SUD

<table>
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<tbody>
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<td>3.800</td>
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<tr>
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<td>0.784</td>
<td>0.429</td>
<td>0.744</td>
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<tr>
<td>Female</td>
<td>0.903</td>
<td>0.476</td>
<td>0.841</td>
<td>1.385</td>
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</table>

PTSD

<table>
<thead>
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<th>Other</th>
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<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male &lt;36</td>
<td>1.213</td>
<td>1.500</td>
<td>1.459</td>
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</tr>
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<td>1.069</td>
</tr>
<tr>
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<td>0.731</td>
<td>0.943</td>
</tr>
<tr>
<td>Female</td>
<td>1.089</td>
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</table>

AIMHS

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<th>Other</th>
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<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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</tr>
<tr>
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<td>0.978</td>
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<td>1.143</td>
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</table>

Note: A missing cell indicates no presence of the subgroup in the sample.
### GMHS

<table>
<thead>
<tr>
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<th>Hispanic</th>
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<th>White</th>
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<tbody>
<tr>
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</tr>
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<td>1.000</td>
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### PC-MHI

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<tbody>
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<td>1.067</td>
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</tr>
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### SUD

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<td>1.066</td>
<td>0.897</td>
<td>0.959</td>
<td>0.977</td>
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</tr>
<tr>
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<td>0.859</td>
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<td>1.000</td>
<td>0.897</td>
<td>1.086</td>
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### PTSD

<table>
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<th>Hispanic</th>
<th>Other</th>
<th>White</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.892</td>
<td>0.988</td>
<td>0.972</td>
<td>1.118</td>
</tr>
<tr>
<td>Male 36-65</td>
<td>1.071</td>
<td>1.012</td>
<td>0.954</td>
<td>0.984</td>
<td>0.989</td>
</tr>
<tr>
<td>Male &gt;65</td>
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<td>1.182</td>
<td>1.018</td>
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### AIMHS

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</tr>
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<td>0.983</td>
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<td>1.130</td>
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<tr>
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<td>1.008</td>
<td>1.273</td>
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<td>0.888</td>
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Propensity Weighting to Address Non-Responses to Baseline

In the last step for calculating sampling weights, logistic regression was completed to adjust for non-responses and determine “propensity of responses.” A propensity score of response in surveys is the conditional probability of response given the covariates (Rosenbaum and Rubin, 1984). Veterans were weighted by the inverse probability of participating in a VOA baseline measure once they were reached for survey participation. For VOA baseline, it is calculated using the following steps:

1. Before running logistic regression to estimate the propensity score, we tested the multicollinearity of all variables we thought might be related to participation. Those variables were described in the table below using the cutting threshold of the Variance Inflation Factor (VIF) score of 3, which is a widely used measures of the degree of multi-collinearity, we excluded covariates that have high degree of multi-collinearity. We also manually excluded variables that almost all respondents (>95%) having the same responses. When selecting covariates for propensity score estimation, we wanted to include variables that influence simultaneously the participation decision and the outcome variable. For those variables where responders and non-responders had the equal probabilities of responses, we considered them lacking variance. Hence, we excluded them from the logistic regression model. For most programs, the variables we excluded through multi-collinearity diagnosis were the same. However, for the SUD program, we further excluded SUD_cohort and SUDOUTPATIENT_TX variables due to their high VIF scores.

Variables Used in Logistic Regression

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>MH Diagnosis</th>
<th>SAE</th>
<th>EH Comorbidity Index</th>
<th>Care-related Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Base_weight</td>
<td>• MH_cohort</td>
<td>• SAE_ACET</td>
<td>• Total counts of EH comorbidity index (range 0-30)</td>
<td>• EMERGDEPT_TX</td>
</tr>
<tr>
<td>• Current marriage status</td>
<td>• SUD_cohort</td>
<td>• SAE_FALLS</td>
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<td>• INPATIENT</td>
</tr>
<tr>
<td>• Homeless status</td>
<td></td>
<td>• SAE_OPIOID</td>
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<td>• MENTALHEALTHACUTE_TX</td>
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<tr>
<td>• OIEF</td>
<td></td>
<td>• SAE_OTHRA</td>
<td></td>
<td>• MENTALHEALTHINPATIENT_TX</td>
</tr>
<tr>
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<td></td>
<td>CC</td>
<td></td>
<td>• MENTALHEALTHOUTPATIENTN_OCP_TX</td>
</tr>
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<td></td>
<td>• SAE_OTHRD</td>
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<td>• MENTALHEALTHOUTPATIENT_TX</td>
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<td>RG</td>
<td></td>
<td>• MENTALHEALTHRESIDENTIAL_TX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAE_SED</td>
<td></td>
<td>• SUDINPATIENT_TX</td>
</tr>
<tr>
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<td></td>
<td>• SAE_SUICIDE</td>
<td></td>
<td>• SUDOUTPATIENT_TX</td>
</tr>
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<td></td>
<td></td>
<td>• SAE_VEHCL</td>
<td></td>
<td>• TELEPHONE_TX</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• PRIMARYCARE_TX</td>
</tr>
</tbody>
</table>

Note: Greyed out variables were excluded due to multicollinearity and lack of responses in other categories (ceiling effect).

After identifying the covariates used to estimate propensity score, we ran stepwise logistic regressions for each program using response/non-response indicator as the dependent variable.
2. The estimated logit value obtained from the logistic model established in step 1 was converted into the predicted probability of response, i.e., the propensity score, using the following equation:

$$\text{PROB} = \frac{\text{EXP}(\text{LOGIT})}{1 + \text{EXP}(\text{LOGIT})}$$

The results of the stepwise logistic regression are shown in the table below. For each program, significant covariates that related to survey participation at baseline are different. The significant variables were used in a logistic regression to estimate the propensity score. Each Veteran was assigned the logit value and we then calculated the probability of participation through the formula above. The adjusted weight is the inverse probability of the propensity score, which is $1/\text{PROB}$. All of the baseline responses will be adjusted using the basic weight (the same baseline weight achieved by multiplying design weights and post-stratification weights) multiply by the weights achieved through propensity score estimation.

**Significant Covariates in Logistic Regression for Each Program in VOA Baseline**

<table>
<thead>
<tr>
<th>Covariate</th>
<th>GMHS</th>
<th>PC-MHI</th>
<th>PTSD</th>
<th>SUD</th>
<th>AIMHS</th>
<th>TSES</th>
<th>RRTP</th>
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<td>&lt;.0001</td>
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</tr>
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<td>&lt;.0001</td>
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</tr>
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<td>&lt;.0001</td>
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<td>&lt;.0001</td>
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<td>0.0008</td>
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**Propensity Weighting to Address Non-Responses to Follow-up**

When reached out for follow-up VOA surveys, not all of the baseline survey responders responded. In order to adjust for bias due to follow-up non-responses, we also applied the propensity score weighting approach to VOA follow-up survey. The process of this step is similar to the propensity score weighting for VOA baseline in which we ran multicollinearity tests first to identify possible covariates to be included in the
logistic regression, then we ran stepwise logistic regressions for each program to estimate the propensity score and calculate follow-up response weight. The final follow-up response weight is the product of calculated baseline weight multiplied by propensity score adjusted follow-up weights.

The multicollinearity diagnosis results are the same to the VOA baseline, so we proceed with the stepwise logistic regression using the same covariates. The table below presents the logistic regression results for follow-up responses.

**Significant Covariates in Logistic Regression for Each Program in VOA Follow-up**

<table>
<thead>
<tr>
<th>Covariate</th>
<th>GMHS</th>
<th>PC-MHI</th>
<th>PTSD</th>
<th>SUD</th>
<th>AIMHS</th>
</tr>
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<tbody>
<tr>
<td>AGEGROUP</td>
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Appendix B: Details for Results

GMHS: Descriptives for Baseline and Follow-Up Measures

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<th>Baseline</th>
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<td>1.2</td>
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GMHS: Mixed Effect Model Analysis Results

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<td>F Value</td>
<td>Pr &gt; F &lt; 0.01</td>
<td>F Value</td>
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225
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<th>Follow-up Unweighted</th>
<th>Follow-up Weighted</th>
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<td>Mean</td>
<td>STD</td>
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</table>

**PC-MHI: Descriptives for Baseline and Follow-Up Measures**
## PC-MHI: Mixed Effect Model Analysis Results

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<th>BAM_USE</th>
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<th>PCS</th>
<th>MCS</th>
</tr>
</thead>
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<td>F Valu e</td>
<td>Pr &gt; F</td>
<td>F Valu e</td>
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### Specialized PTSD: Descriptives for Baseline and Follow-Up Measures

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PRRC: Descriptives for Baseline and Follow-Up Measures

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PTSD-RRTTP Descriptives for Baseline, Discharge, and Follow-Up Measures

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PTSD-RRTP: Mixed Model Results for PCL

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PTSD-RRTP: Mixed Effect Model Results for BAM_Use

Follow-up - Admission
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Details for Analysis of Uncertainty in CEA
Bootstrap Results for AIMHS Admissions: 2 Years Post

Cost and Effect Difference (Overall)

100% of simulated ICER replicates that fall in the northeast quadrant (negative effect and positive cost of ICMHR relative to controls) for AIMHS admissions 2 years post overall.
100% of simulated ICER replicates that fall in the northeast quadrant (negative effect and positive cost of ICMHR relative to controls) for AIMHS admissions 2 years post for males.

100% of simulated ICER replicates that fall in the northeast quadrant (negative effect and positive cost of ICMHR relative to controls) for AIMHS admissions 2 years post for females.

Bootstrap Results for Mental Health-Related ER Visits: 2 Years Post
66.80 percent of simulated ICER replicates that occur in the northwest quadrant of the CE plane (negative effect and positive cost of ICMHR relative to controls) and the 33.20 percent of simulated ICER replicates that fall in the northeast quadrant (positive effect and positive cost of ICMHR relative to controls) for ER visits 2 years post overall.

84.80 percent of simulated ICER replicates that occur in the northwest quadrant of the CE plane (negative effect and positive cost of ICMHR relative to controls) and the 15.20 percent of simulated ICER replicates that fall in the northeast quadrant (positive effect and positive cost of ICMHR relative to controls) for ER visits 2 years post for males.
94.70 percent of simulated ICER replicates that occur in the northwest quadrant of the CE plane (negative effect and positive cost of ICMHR relative to controls) and the 5.30 percent of simulated ICER replicates that fall in the northeast quadrant (positive effect and positive cost of ICMHR relative to controls) for ER visits 2 years post for females.

**Additional Cost-Effectiveness Results for 6 Months and 1 Year Post**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect</th>
<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>13,394</td>
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<tr>
<td>ICMHR</td>
<td>18,958</td>
<td>5,564</td>
<td>0.32</td>
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</table>

A negative CE ratio due to negative incremental effect and positive incremental cost indicates the intervention strategy was not cost-effective.

<table>
<thead>
<tr>
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<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect</th>
<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($)</th>
</tr>
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### CEA Results Mental Health Admissions 6 Months Post (Females)

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<th>Average Effect</th>
<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($ IncAvgCost /ΔMH Admissions Averted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
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### CEA Results Mental Health Admissions 1-Year Post:

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<th>Incremental Average Effect Mental Health Admissions Averted</th>
<th>Incremental CE Ratio ($ IncAvgCost /ΔMH Admissions Averted)</th>
</tr>
</thead>
<tbody>
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### CEA Results Mental Health Admissions 1-Year Post (Males)

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<tr>
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### CEA Results Mental Health Admissions 1-Year Post (Females)

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<th>Average Effect</th>
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### CEA Results Emergency Room Visits 6 Months Post

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239
<table>
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<th>Average Cost ($)</th>
<th>Incremental Average Cost ($)</th>
<th>Average Effect</th>
<th>Incremental Average Effect ER Visits Averted</th>
<th>IncAvgCost /ERVisits Averted</th>
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</thead>
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<tr>
<td>Control</td>
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<td>0.32</td>
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<tr>
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<td>5,564</td>
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### CEA Results Emergency Room Visits 6 Months Post (Males)

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<th>Incremental Average Cost ($)</th>
<th>Average Effect</th>
<th>Incremental Average Effect ER Visits Averted</th>
<th>IncAvgCost /ERVisits Averted</th>
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<tbody>
<tr>
<td>Control</td>
<td>13,637</td>
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### CEA Results Emergency Room Visits 6 Months Post (Females)

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<th>Incremental Average Effect ER Visits Averted</th>
<th>IncAvgCost /ERVisits Averted</th>
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## CEA Results Emergency Room Visits 1 Year Post

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<th>Incremental Average Effect ER Visits Averted</th>
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## CEA Results Emergency Room Visits 1 Year Post (Males)

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<tbody>
<tr>
<td>Control</td>
<td>23,785</td>
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<td>ICMHR</td>
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<td>11,687</td>
<td>0.55</td>
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<td>283,600</td>
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### Additional Details from Regression Analyses

**The GENMOD Procedure for AIMHS Admissions 2 Years Post-ICMHR**

#### Model Information

- **Data Set**: SASOUT.PSM3F2_TRT_CNTRL_REMDRPTS_PSM
- **Distribution**: Zero Inflated Poisson
- **Link Function**: Log
- **Dependent Variable**: Post-Acute Admissions_2y

- **Number of Observations Read**: 17042
- **Number of Observations Used**: 17042

#### Class Level Information

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#### Criteria for Assessing Goodness of Fit

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<th>Value</th>
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Pearson Chi-Square | 1.2885  
Scaled Pearson X2 | 1.2885  
Log Likelihood | 6616.0614  
Full Log Likelihood | -19536.892  
AIC (smaller is better) | 39101.7784  
AICC (smaller is better) | 39101.8030  
BIC (smaller is better) | 39210.1865  

Algorithm converged.

### Analysis of Maximum Likelihood Parameter Estimates

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<th>Parameter</th>
<th>DF</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald 95% Confidence Limits</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>-0.1778</td>
<td>0.0315</td>
<td>-0.2395 to -0.1160</td>
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<td>0.0193</td>
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<tr>
<td>Schizophrenia Disorder</td>
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<td>0.3107</td>
<td>0.0205</td>
<td>0.2705 to 0.3508</td>
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<tr>
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<td>Substance Use Disorder</td>
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<td>0.0235</td>
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Note: The scale parameter was held fixed.

### Analysis of Maximum Likelihood Zero Inflation Parameter Estimates

<table>
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<tr>
<th>Parameter</th>
<th>DF</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald 95% Confidence Limits</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
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<tbody>
<tr>
<td>Intercept</td>
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<td>0.1288</td>
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<tr>
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---

### The TTEST Procedure- Unadjusted Mean Number of Admissions 2 Years Post-ICMHR

**Variable:** Post_Days_Acute_2Y

<table>
<thead>
<tr>
<th>ICMHR Veterans</th>
<th>Method</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Std Error</th>
<th>Minimum</th>
<th>Maximum</th>
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</thead>
<tbody>
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<td>Diff (1-2)</td>
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<td>0.0315</td>
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<th>Std Dev</th>
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<th>95% CL Std Dev</th>
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### The TTEST Procedure - Adjusted Mean Number of Admissions 2 Years Post-ICMHR

Variable: pred (Predicted Value)

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<th>Mean</th>
<th>Std Dev</th>
<th>Std Err</th>
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<th>Maximum</th>
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### Average Number of Admissions in Treatment and Control Groups 2 Years Post-ICMHR

<table>
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<th>ICMHR Veterans</th>
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<th>Average Number of Admissions 2 Yrs Post</th>
<th>Count of Veterans</th>
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<tr>
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</table>

### The GENMOD Procedure for Emergency Room Visits 2 Years Post-ICMHR

Model Information

<p>| Data Set | SASOUT.PSM3F2_TRT_CNTRL_REMDRPTS_PSM |</p>
<table>
<thead>
<tr>
<th>Distribution</th>
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<td>Dependent Variable</td>
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<tbody>
<tr>
<td>Number of Observations Used</td>
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</table>

### Class Level Information

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### Criteria For Assessing Goodness Of Fit

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<th>Value/DF</th>
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<td>AICC (smaller is better)</td>
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<td>BIC (smaller is better)</td>
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</table>
Algorithm converged.

### Analysis of Maximum Likelihood Parameter Estimates

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DF</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald 95% Confidence Limits</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
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</thead>
<tbody>
<tr>
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<td>0.0271</td>
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<td>0.0188</td>
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<tr>
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<td>0.0179</td>
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<td>0.0189</td>
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Note: The scale parameter was held fixed.

### Analysis of Maximum Likelihood Zero Inflation Parameter Estimates

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DF</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Wald 95% Confidence Limits</th>
<th>Wald Chi-Square</th>
<th>Pr &gt; ChiSq</th>
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<tbody>
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<td>0.0407</td>
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<td>0.0450</td>
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The TTEST Procedure - Unadjusted Mean Mental Health ER Visits 2 Year Post-ICMHR

Variable: ER_VISITS_2YR_POST
<table>
<thead>
<tr>
<th>ICMHR Veterans</th>
<th>Method</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Std Err</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
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</table>

<table>
<thead>
<tr>
<th>ICMHR Veterans</th>
<th>Method</th>
<th>Mean</th>
<th>95% CL Mean</th>
<th>Std Dev</th>
<th>95% CL Std Dev</th>
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<td>0.0622</td>
<td>0.1002</td>
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</table>

| Method         | Variances  | DF    | t Value | Pr > |t| |
|----------------|------------|-------|---------|------|------|
| Pooled         | Equal      | 17040 | 0.46    | 0.6462 | |
| Satterthwaite  | Unequal    | 16873 | 0.46    | 0.6462 | |

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<th>Den DF</th>
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Generated by the SAS System ('SASApp', Linux) on August 22, 2019 at 5:02:21 PM

The TTEST Procedure - Adjusted Mean Mental Health ER Visits 2 Year Post-ICMHR

Variable: pred (Predicted Value)

<table>
<thead>
<tr>
<th>ICMHR Veterans</th>
<th>Method</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Std Err</th>
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<th>Maximum</th>
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<td>1.2887</td>
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PTSD-RRTP Cost Analysis Tables

Descriptive Statistics of PTSD-RRTP Cost Analysis Patients by Gender

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247
## TTEST Procedure

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249
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**Equality of Variances**

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**Diff (1-2)Satterthwaite**
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### Cost Differences

#### The TTEST Procedure

**Variable: AIMHS_Cost_post_M_PRE**

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**Diff (1-2)Satterthwaite**
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**Equality of Variances**

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255
### Variable: MH_Cost_post_M_PRE

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#### Method Variances

| Method               | Variances | DF | t Value | Pr > |t| |
|----------------------|-----------|----|---------|------|------|
| Pooled               | Equal     | 4610 | 1.060 | 0.290 | |
| Satterthwaite        | Unequal   | 899.18 | 0.970 | 0.329 | |

#### Equality of Variances

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### Variable: OthOutpt_Cost_post_M_PRE

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#### Method Variances

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| Pooled               | Equal     | 4638 | 0.030 | 0.976 | |
| Satterthwaite        | Unequal   | 946.66 | 0.030 | 0.977 | |

#### Equality of Variances

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Utilization Differences by LOS (<45 days vs. >45 days)

The TTEST Procedure

Variable: AIMHS_Admissions_Post_M_Pre

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| Method         | Variances | DF | t Value | Pr > |t| |
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| Pooled         | Equal     | 1769| 0.090 | 0.9299|
| Satterthwaite  | Unequal   | 284.08| 0.080 | 0.9327|

Equality of Variances

Variable: AIMHS_LOS_Post_M_Pre

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| Pooled         | Equal     | 1769| 0.310 | 0.7560|
| Satterthwaite  | Unequal   | 292.56| 0.310 | 0.7547|

Equality of Variances

Folded F 1546 223 1.0208916
### Variable: RRTP_Admissions_Post_M_Pre

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| Pooled | Equal     | 1769 | 0.2907  | 0.7719|
| Satterthwaiete | Unequal | 282.42 | 0.2808 | 0.7286|

#### Equality of Variances

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| Satterthwaiete | Unequal | 313.08 | 1.6101 | 0.1081|

#### Equality of Variances

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Equality of Variances

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Equality of Variances

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260
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### LOS <45 v >45 Method

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Cost Differences by LOS (<45 days vs. >45 days)

The TTEST Procedure

Variable: AIMHS_Cost_post_M_PRE

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| Satterthwaite Unequal | 278.55 | -0.0609494 |       | |

Equality of Variances

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Variable: RRTP_Cost_post_M_PRE

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| Satterthwaite Unequal | 285.41 | 2.000.0464 |       | |

Equality of Variances

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### Equality of Variances

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### AIMHS Cost Analysis Tables

#### Total Cost Difference

**The TTEST Procedure**

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**The TTEST Procedure**

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| Satterthwaite | Unequal | 5233 | 1.52 | 0.1294 |

Equality of Variances

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Variable: CWTTR_Cost.Diff

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|--------|-----------|-----|-------------|---------|--------|----------|
| Pooled | Equal     | 3782 | 1.01 | 0.3113 |
| Satterthwaite | Unequal | 34999 | 2.92 | 0.0035 |

Equality of Variances

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| Satterthwaite | Unequal | 34999 | 2.92 | 0.0035 |

Equality of Variances

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#### Utilization Difference by Program and Gender

The TTEST Procedure

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<th>Pr &gt;</th>
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### Equality of Variances

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