San Mateo County Adult NMT Pilot Fiscal Year 2016-17 Evaluation Report

A Mental Health Services Act Innovation Project

Prepared by:

Resource Development Associates

December 2017

Table of Contents

Introduction

Project Overview

San Mateo Behavioral Health and Recovery Services (BHRS) implemented the Neurosequential Model of Therapeutics© (NMT) within the Adult System of Care as part of the three-year Mental Health Services Act (MHSA) Innovation (INN) plan. The MHSA INN project category and primary purpose of the NMT pilot project are as follows:

- **MHSA INN Project Category:** Makes a change to an existing mental health practice that has not yet been demonstrated to be effective.
- **MHSA Primary Purpose:** Increase quality of mental health services, including measurable outcomes.

The Mental Health Services Oversight and Accountability Commission (MHSOAC) approved the project on July 28, 2016 and BHRS began implementation in September 2016. In 2017, BHRS contracted Resource Development Associates (RDA) to evaluate the adult NMT pilot project. This report provides findings from the first year of NMT implementation in the BHRS Adult System of Care.

Project Need

Through the MHSA Community Planning Process in San Mateo, BHRS and community stakeholders identified the need to provide alternative treatment options to broaden and deepen the focus on trauma informed care and provide better outcomes in recovery for adult BHRS consumers. To address this need, BHRS proposed implementing the NMT approach within the BHRS Adult System of Care. NMT is an innovative approach to treating trauma that is grounded in neurodevelopment and neurobiology. Subsequent sections provide a more in-depth description of NMT and its application to adults.

Project Innovation

While NMT has been integrated into a variety of settings serving infants through young adults, there is no literature or research of NMT in a strictly adult setting or population. BHRS intends to adapt, pilot, and evaluate the application of the NMT approach to an adult population with a history of trauma. This expansion to and evaluation of NMT in an adult system of care is the first of its kind.

Project Description

NMT Background

The Child Trauma Academy (CTA) developed NMT as an alternative approach to addressing trauma, typically used with children, that is grounded in neurodevelopment and neurobiology. NMT is not a single therapeutic technique or intervention. Rather, NMT uses assessments to guide the selection and sequence of a set of highly individualized therapeutic interventions (e.g., therapeutic massage, drumming,

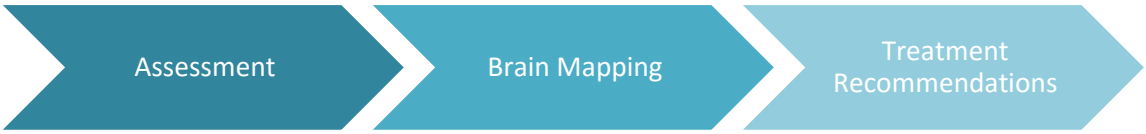
yoga, expressive arts, etc.) that best match each NMT consumer's unique strengths and neurodevelopmental needs.[1]

NMT is guided by the principle that trauma during brain development can lead to dysfunctional organization of neural networks and impaired neurodevelopment. The selected set of therapeutic interventions intends to help change and reorganize the neural systems to replicate the normal sequence of brain and functional development. Selected interventions first target the lowest, most abnormally functioning parts of the brain. Then, as consumers experience functional improvements, interventions are selected that target the next, higher brain region. The sequence of interventions aims to help consumers better cope, self-regulate, and progress in their recovery.

NMT Processes and Activities

As depicted in Figure 1, the NMT process consists of three main phases: 1) assessment, 2) brain mapping, and 3) the development of individualized treatment recommendations. These phases are briefly described below.

Figure 1. Key phases of the NMT Process



Assessment. NMT-trained providers collect information pertaining to the consumer's history of adverse experiences—including their timing, nature, and severity—as well as any protective factors. This information is used to estimate the risk and timing of potential developmental impairment. The assessment also includes an examination of current functioning and relationship quality (e.g., with parents, family, peers, community, etc.).

Brain Mapping. NMT-trained providers enter assessment data into a web-based tool designed by the CTA, which uses assessment data to generate a brain map illustrating the brain regions most affected by developmental impairment. Through this "mapping" process, scores are calculated in four functional domains: 1) Sensory integration, 2) Self-regulation, 3) Relational, and 4) Cognitive. The functional domain values are compared with age typical domain values to assess the degree of developmental impairment and identify the consumer's functional strengths and challenges.

Treatment Recommendations. Therapeutic interventions are identified that address the consumer's needs in the four functional domains, first targeting the lowest brain regions with most severe impairment. Throughout treatment, assessments and brain mapping are performed at regular intervals to evaluate any changes in functional domains, and treatment recommendations are adapted as appropriate.

[1]Perry, B.D. & Hambrick, E. (2008) The Neurosequential Model of Therapeutics. *Reclaiming Children and Youth*, *17*(3), 38-43.

Application of NMT to Adults

Since its development, NMT has been most widely used with children who experienced maltreatment and/or trauma, and BHRS has been using the NMT approach with children since 2012. However, the use of NMT with adults is limited. Given the high prevalence of trauma among adult behavioral health consumers and the relationship between childhood trauma and behavioral health issues in adulthood, there is a strong theoretical basis to predict that adult mental health consumers could benefit from the NMT approach.[2,3]

Nevertheless, NMT's effectiveness in the adult population is unknown. As mentioned, NMT has not been formally implemented into an adult system of care, and no outcome studies have been conducted to evaluate NMT in an adult population. BHRS is adapting, piloting, and evaluating the application of the NMT approach to an adult population with hopes of increasing the quality of mental health services and improving recovery outcomes for adult mental health consumers with a history of trauma.

BHRS NMT Pilot Project

NMT Providers

As mentioned, BHRS has been using the NMT approach with youth since 2012. In that time, 30 clinical staff in the BHRS Child and Youth System of Care and 10 clinical staff from community-based partner agencies received training through CTA.[4] In addition, 10 BHRS providers have become certified NMT trainers, and certify other providers in NMT through the CTA training. These trainers teach NMT principles and provide consultation to other providers. To expand NMT to the adult population, 12 providers within the BHRS Adult System of Care began NMT training with CTA in January 2017. The providers work in a variety of settings and programs, including BHRS specialty mental health or regional clinics as well as programs targeted toward consumers re-entering the community following incarceration.

Target Population

BHRS estimates that the adult NMT pilot project will serve approximately 75 to 100 adult consumers annually once the BHRS providers in the Adult System of Care are fully trained. Providers refer existing

[2]It is estimated that 40-80% of adults with mental illness and/or substance use issues also have experiences of trauma.
Source: Missouri Institute of Mental Health. (2004). Trauma among people with mental illness, substance use disorders and/or developmental disabilities. *MIMH Fact Sheet, January 2004.* Retrieved from: https://dmh.mo.gov/docs/mentalillness/traumafactsheet2004.pdf

[3]Anda, R.F., Felitti, V.J., Bremner, J.D., Walker, J.D., Whitfield, C., Perry, B.D., … Giles, W.H. (2006). The enduring effects of abuse and related adverse experiences in childhood: a convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), 174-186.

[4]CTA operates the formal training certification program. The training takes place over one year, with trainees learning through a combination of readings, videos, webinars, and case-based trainings. Trainees begin implementing the NMT model with consumers shortly after the training commences and must conduct a minimum of 10 NMT assessments annually. In order to ensure fidelity to the NMT model, CTA requires that all certified NMT providers complete fidelity assessments twice annually, wherein the providers evaluate the same client data and inter-rater reliability scores are calculated.

BHRS consumers from their caseloads to NMT, targeting three populations of adult mental health consumers:

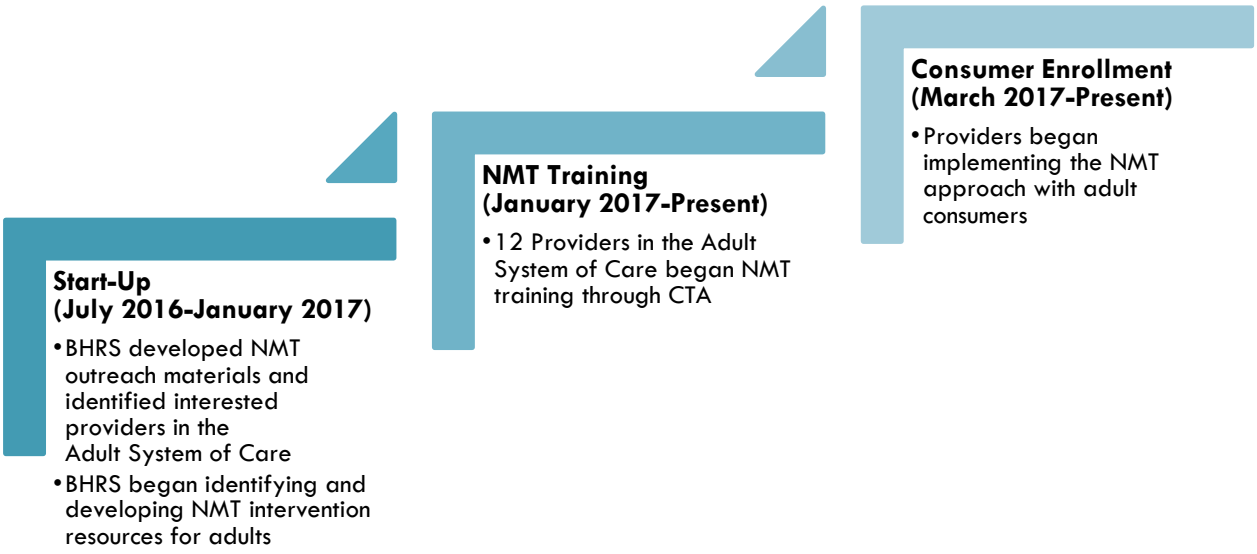
- General adult consumers (ages 26+) receiving specialty mental health services;
- Transition age youth (TAY) consumers (ages 18-25); and
- Criminal justice-involved consumers re-entering the community following incarceration.

The three target populations likely have different experiences, needs, and coping skills and, as a result, could respond to NMT differently. For example, TAY are still undergoing brain development and therefore may be more responsive to neurodevelopmental treatment approaches such as NMT. In addition, the re-entry population might have different coping mechanisms than the general adult and TAY consumer populations, such as engaging in high-risk behaviors that might lead to incarceration. For the re-entry population, the experience of incarceration could also further contribute to trauma.

Project Timeline and Implementation Update

As mentioned, the NMT pilot was approved in July 2017, at which time BHRS began preparing for NMT implementation in the Adult System of Care. Figure 2 highlights key activities and accomplishments during the first year of pilot project.

Figure 2. NMT Pilot Key Activities and Accomplishments



The NMT provider training was scheduled for January 2017, allowing time for BHRS to disseminate information about NMT, identify interested providers, prepare for training implementation, and begin identifying and establishing NMT intervention resources for adult consumers. In January, 12 providers in the BHRS Adult System of Care—all of whom are at least master's level clinicians—began the scheduled CTA NMT training. The NMT training occurs over a one-year period, therefore providers in the adult system completed approximately half of the training by the end of the reporting period.

When beginning NMT training, providers conduct practice assessments on "typical" individuals—individuals without known trauma or neurodevelopmental impairment. As providers progress through the training and become more comfortable with the assessment, providers begin implementing NMT with clinical cases. In March 2017, providers began referring and implementing NMT with adult consumers. As providers were not yet fully trained and had just begun implementing the NMT approach with adult consumers in March, only 20 consumers received NMT-based services during this first training year. In subsequent years, when providers are fully trained, BHRS anticipates approximately 75 to 100 adult consumers will receive NMT services annually. There were no other project modifications during the reporting period.

Evaluation Overview and Learning Goals

As mentioned, BHRS contracted RDA to evaluate the pilot and support project learning. BHRS developed two learning goals for the NMT evaluation. The first learning goal pertains to the adaptation and implementation of the NMT approach in the adult consumer population, while the second learning goal pertains to the effectiveness and impact of the NMT approach in improving recovery outcomes. To further guide the NMT evaluation, RDA developed evaluation sub-questions associated with each learning goal. The learning goals and evaluation questions (EQ) are listed below. To the extent possible, the evaluation will examine implementation and outcome differences across the three target populations to identify how BHRS can adapt the NMT approach to best meet each population's unique needs. More in-depth information about the evaluation is available in the evaluation plan included in the Appendix.

Learning Goal 1: Can NMT, a neurobiology and trauma-informed approach, be adapted in a way that leads to better outcomes in recovery for BHRS adult consumers?

> **EQ 1.1.** How is the NMT approach being adapted to serve an adult population?
>
> **EQ 1.2.** Who is being served by the adult NMT project, what types of NMT-based services are consumers receiving, and with what duration and frequency?

Learning Goal 2: Are alternative therapeutic and treatment options, focused on changing the brain organization and function, effective in adult consumers' recovery?

> **EQ 2.1.** To what extent is the NMT approach supporting improvement in adult consumers' functional outcomes and overall recovery and wellbeing?
>
> **EQ 2.2.** To what extent is the experience of care with the NMT approach different from consumers' previous care experiences?

During fiscal year 2016-2017 (FY16-17)—July 1, 2016, through June 30, 2017—RDA developed the evaluation plan, worked with BHRS staff to inform modifications to their Electronic Health Record (EHR), and developed additional data collection tools. RDA worked with CTA and BHRS when planning the evaluation to validate the theory of change for NMT specific to the adult population and the types of

variables that may support or complicate outcomes in adults (e.g., current substance use, psychiatric medication, and current trauma from homelessness and/or jail).[5]

This first year of the evaluation focuses on Learning Goal 1 to identify how BHRS is implementing and adapting the NMT approach with the adult population. As NMT implementation progresses and more consumers participate in NMT, the evaluation will focus on NMT effectiveness and changes in consumers' functional and recovery outcomes.

Evaluation Methods

Data Collection

RDA employed a mixed-methods evaluation approach (i.e., using both qualitative and quantitative data) to identify who is participating in NMT and how BHRS is adapting the NMT approach for the adult population. This report includes information about NMT implementation as well as about the adults who participated in NMT services during the evaluation period, FY16-17.

RDA worked closely with BHRS to identify and obtain appropriate outcome measures and data sources to address the evaluation questions. RDA collected quantitative information about NMT consumers from BHRS's EHR, Avatar, as well as from the NMT Database operated by CTA. RDA also conducted a focus group with BHRS NMT providers on October 3, 2017 to gather qualitative data about the adaptation of the NMT approach to the adult population. Table 1 outlines the outcome data available for FY16-17 as well as the respective data sources. The Data Collection and Analysis section of the Appendix includes the types of additional outcome data expected to be available in later reports.

Table 1. Measurable Outcomes and Data Sources

Outcome Type	Outcome Measures	Data Sources
Process Outcomes	Provider experience of NMT training and NMT implementation with the adult population	Focus Group with NMT Providers
	Number of consumers participating in NMT services	Electronic Health Records
	Characteristics of NMT consumers	Electronic Health Records
	Types of recommended NMT interventions	Provider Focus Group[6]
Consumer Outcomes	Baseline functional domain values[7]	NMT Database
	Baseline participation in BHRS outpatient services	Electronic Health Records
	Baseline psychiatric emergency service utilization and psychiatric hospitalization	Electronic Health Records

[5]A discussion of the application of NMT to adults and the theory of change are included in the Appendix.
[6]In September 2017, BHRS began including NMT services in their EHR. For subsequent reports, RDA will obtain NMT service data from Avatar to include quantitative information about NMT-related services.
[7]At the time of this report, baseline functional domain values were only available for half of NMT consumers and are therefore not reported. Functional domain values will be included in subsequent reports as more consumers participate in NMT and complete assessments.

Data Analysis

To analyze the quantitative data (e.g., consumer characteristics and service utilization), RDA used descriptive statistics to examine frequencies and ranges. To analyze qualitative data, RDA transcribed focus group responses to appropriately capture the responses and reactions of NMT providers. RDA then thematically analyzed responses from participants to identify commonalities and differences in providers' experiences.

NMT Implementation

NMT Provider Selection and Training

NMT Provider Selection

NMT training was voluntary, and all clinical staff opted in. Providers received information about NMT and the NMT training opportunity from supervisors, team members, and a training announcement circulated by BHRS. Eligibility requirements were minimal for licensed clinicians and the provider's interest and commitment to the project were key selection criteria. Providers shared that they chose to participate in the training because they were already working with consumers with a history of trauma and adverse experiences. Providers indicated interest in strengthening their abilities to respond to and treat the impact of trauma. They also felt that the NMT approach sounded promising in helping to better serve the consumers with whom they were working.

NMT Training

The NMT training model relies on a case conference or group supervision approach with intensive, weekly self-study. In this approach, the providers attend an initial training and then begin implementing NMT. To conduct their self-study throughout training year, providers receive a detailed training syllabus with variety of training materials and resources and must participate in NMT study groups and learning communities. Clinicians also participate in a monthly meeting where they discuss real-life cases. These group discussions are the foundation for supervision of NMT implementation, provide opportunities for clinicians to refine their knowledge and skills, and allow for fidelity monitoring.

Providers shared that they found the NMT training interesting and they appreciated learning about the neurobiology and impact of trauma. Their increased knowledge and understanding about the impact of trauma has helped them better understand the behaviors and presentation of consumers. Many of the providers noted that their previous education and training did not necessarily include brain development. As the majority of providers who opted in are master's level clinicians, this training provided an opportunity for more advanced training in neuropsychology related to trauma. However, for providers

who have not had substantial training in neuropsychology, there may be a steeper learning curve to understand the NMT principles.

> *"NMT was recommended to me by my then supervisor… it sounded really logical and made a lot of sense, so I decided to do it. I liked that it was a new approach being applied to adults."*
> *–NMT Provider*

The NMT training uses a variety of instructional techniques that clinicians felt were helpful in promoting learning, particularly because much of the information was new. The training includes videos, lectures, recordings, readings, and other tools as well as exposure to real-life cases and scenarios. Providers mentioned that the case studies in particular helped give a broader understanding of the assessment process, theoretical underpinnings, and the types of interventions most likely to be successful. However, providers also acknowledged that the videos, readings, meetings, and trainings take dedication and require a lot of time in addition to their existing caseloads and other responsibilities.

> *"It's a bigger group [of trainees] and less train-the-trainers this year…[The mentorship to new trainees] was impacting our own daily work, but we've noticed it's impacting them, not having someone to talk to and ask questions. There was also more contact with the supervisor in the past, which helped them be more supportive of the process."*
> *–NMT Trainer*

As mentioned, BHRS also had 10 providers within the Child and Youth System of Care who became certified as NMT trainers. These providers bring more senior experience with implementing NMT. The trainers noted that this year's cohort of NMT trainees is larger than in previous years, primarily because of this INN project. In addition, in recent years, two trainers left BHRS due to job changes. As a result, there are more trainees per trainer and new trainees may not be getting as much mentorship and support as in previous years. Given the novel nature of the pilot, clinicians who are applying NMT in the adult mental health population may have a need for additional support and consultation to address questions and issues that arise related to modifying the program for adults.

NMT Consumer Population

Demographics

As mentioned previously, BHRS aims to serve three adult populations through the NMT pilot project: adult consumers (ages 26+) receiving specialty mental health services, TAY (ages 18-25) receiving mental health services, and criminal justice-involved consumers re-entering the community following incarceration.

During FY16-17, 20 adult consumers received NMT services, all of whom reflect the intended target population. Most consumers (n=13, 65%) were adults ages 26-59, while seven consumers (35%) were TAY.

No consumers were under the age 18. In addition, at least seven consumers (35%), including both adults and TAY, were also part of the re-entry population.[8]

Figure 3. NMT Consumer Population, FY16-17, N=20

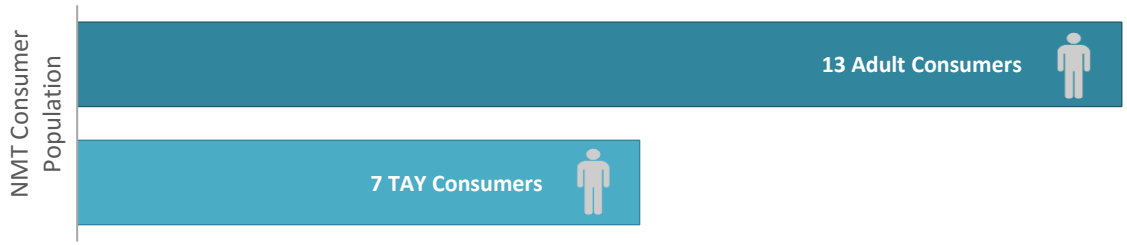


Table 2 describes the demographic characteristics of the NMT consumers. Two-thirds of consumers reported they were female (n=13, 65%) and one-third reported they were male (n=7, 35%); no consumers reported a different sex.[9] The largest racial group was White (n=8, 40%), while the remaining consumers reported Asian, Native Hawaiian or other Pacific Islander, Other, or more than one race.[10] Among the 19 consumers who reported their ethnicity, approximately one-third were Hispanic/Latino (n=7, 37%).

Nearly all consumers (n=16, 80%) spoke English as their primary language, while some consumers primarily spoke another language or more than one language. Of the 18 consumers who reported sexual orientation, the majority reported heterosexual (n=14, 78%) and the others reported LGBTQ+.[11] Over half of consumers (n=11, 69%) had a known disability, including a chronic health condition, an intellectual disability, or another type of disability. No consumers reported that they were a veteran.

Table 2. Demographic Characteristics of Consumers, FY16-17[12]

Characteristic	Consumers	% of Total
Gender (N=20)		
Female	13	65%
Male	7	35%
Race (N=20)		
White	8	40%
Other	12	60%
Ethnicity (N=19)		
Hispanic/Latino	7	37%

[8]Consumers were identified as part of the criminal justice/re-entry population if they received behavioral health services in custody, services through the BHRS mental health court, or services through a provider aimed at serving the re-entry population (e.g., Service Connect).

[9]Information regarding gender identity was not available for this report. However, BHRS is actively working to incorporate gender orientation questions into their EHR.

[10]In accordance with HIPAA, demographic categories comprised of fewer than five consumers were aggregated to protect consumer privacy.

[11]LGBTQ+ refers to lesbian, gay, bisexual, transgender, questioning or gender queer, intersex, asexual, or other sexual orientations.

[12]For some characteristics, information was unknown or not reported for all consumers. As a result, the total number of consumers may be less than 20.

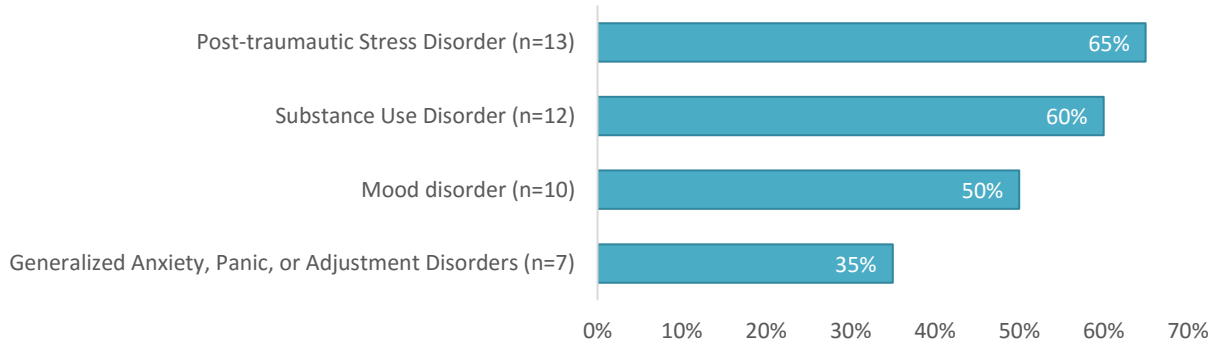
Characteristic	Consumers	% of Total
Not Hispanic/Latino	12	63%
Primary Language (N=20)		
English	16	80%
Other	4	20%
Sexual Orientation (N=18)		
Heterosexual	14	78%
Other	4	22%
Disability (N=16)		
Any Disability	11	69%
No Known Disability	5	31%

Clinical Profile

Consumers who participated in NMT had a variety of mental health diagnoses. Typically, the majority of adult consumers receiving specialty mental health services have been diagnosed with a psychotic disorder (e.g., schizophrenia or schizoaffective disorder) or a mood disorder (e.g., bipolar or major depressive disorders). However, the NMT population served in this first year of implementation had a wider variety of behavioral health diagnoses.

The majority of consumers (n=13, 65%) had a posttraumatic stress disorder (PTSD) diagnosis (Figure 4). Half of consumers had a primary or secondary diagnosis of a mood disorder (n=10, 50%). Additionally, 35% (n=7) were diagnosed with generalized anxiety, panic, or adjustment disorders. Over half of consumers (n=12, 60%) also had a documented substance use disorder. Of these 12 consumers, most reported using several substances, while some were diagnosed with specific cannabis, alcohol, or amphetamine use disorders.

Figure 4. Behavioral Health Diagnoses of NMT Consumers, N=20, FY16/17



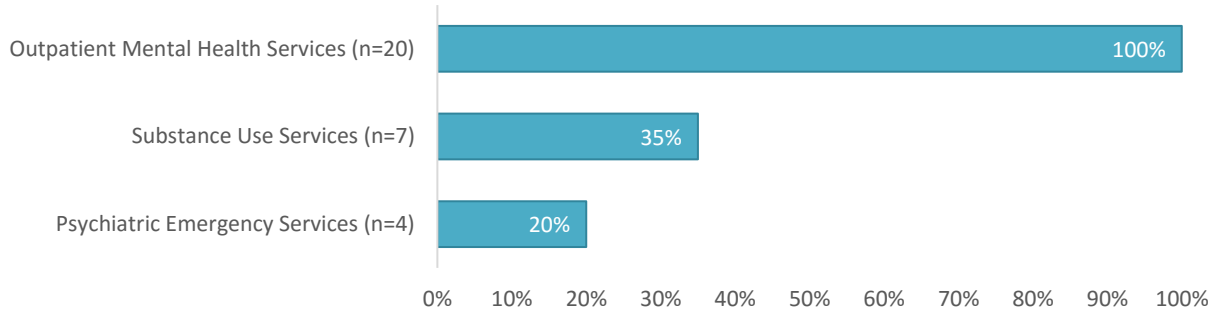
This variability in terms of specific diagnoses aligns with some of the diagnostic challenges that arise when working with individuals who have experienced significant trauma. Adults who have experienced trauma often have a more complex clinical presentation, frequently characterized by symptoms of anxiety, depression, and other mood fluctuation. Symptoms reflective of trauma may not clearly align to any one diagnosis within the existing diagnostic classification systems (e.g., DSM-IV TR or DSM-V). NMT consumers

were also more likely to have documented personality disorders, which may be indicative of pervasive childhood trauma. The clinical profile of NMT consumers may also suggest that providers are referring consumers with less intensive mental health needs (e.g., those without psychotic disorders) to the program. As more consumers participate in NMT, it will be possible to explore consumers' clinical profile in greater depth.

Behavioral Health Service Utilization

All consumers who received NMT services were enrolled in and receiving outpatient mental health services. This aligns with the model of integrating NMT within existing mental health services rather than creating a stand-alone program. In addition to outpatient mental health services, one-third of consumers (n=7, 35%) also participated in outpatient and/or residential substance use services; most of these consumers were involved with the criminal justice system. Additionally, in the year prior to NMT enrollment, 20% of consumers (n=4) experienced a mental health crisis that required psychiatric emergency services.

Figure 5. Behavioral Health Service Utilization, N=20, FY16-17



Preliminary Findings

Learning the NMT Assessment Tool and Consumer Selection

The NMT assessment process is fairly intensive, and includes a number of detailed questions to understand a consumer's developmental history and past experiences of trauma. For all new NMT trainees—in both adult and youth systems of care—it takes time for providers to learn and gain comfort with the assessment tool, which is a natural aspect of the training process. Providers in adult systems may also have a slightly steeper learning curve with the assessment, as these providers do not regularly conduct developmental histories with the adult population with the same level of detail required for the

> *"The first client I did the [NMT assessment] on, I knew he didn't have too much trauma. I purposely chose him for that reason because I could go through the assessment at a good pace and there would be minimal risk of re-traumatization."*
>
> *–NMT Provider*

NMT assessment. In contrast, taking detailed developmental history is a more common aspect of the intake and treatment process in youth systems of care. Nevertheless, as *all* NMT trainees first learn the assessment questions and process, the providers often administer the assessment in a direct way, going question by question. This approach may trigger or risk re-traumatizing consumers who are not accustomed to direct questions about past trauma and may not have developed the necessary coping skills. As providers become more experienced with the assessment and more familiar with the questions, providers often make the assessment more of a conversation and obtain the necessary information with less direct questions. This conversational approach may be less triggering for consumers.

When referring consumers to NMT, providers are mindful of their own comfort with the assessment. Providers mentioned that while the consumers that could most benefit from NMT are the ones with significant trauma, providers consider the risk of the assessment process based consumers' coping skills and ability to self-regulate as well as on providers' own experience with the assessment.

When weighing the risks of engaging in the assessment itself with the potential benefits of NMT, some of the factors that contributed to providers' clinical decision-making included:

- Providers' experience and comfort with the assessment questions and process;
- Providers' rapport and trust with the consumer;
- Consumers' willingness and ease in talking about their trauma; and
- Consumers' coping skills to manage whatever thoughts, feelings, and reactions that may arise as a result of the assessment.

In addition, some providers mentioned that they only referred higher functioning or stable consumers that are compliant with medication, not actively abusing substances, and are not floridly psychotic.

NMT Assessment Process

Assessment Differences between Children and Adults

As BHRS has already been implementing NMT with children, some providers serving both children and adults noted differences in the NMT assessment process. For children and youth, NMT assessment questions are often directed toward the caregiver or parent. In addition, child providers are often accustomed to taking detailed developmental histories and parents may be more accustomed to answering similar questions to those in the in the NMT assessment. For adults, the consumers are the primary respondents. However, adults may not be as used to providing developmental history about themselves, and providers may be less familiar with taking detailed

> *"I work with children and adults, and the children are a lot easier. With the adults, the assessment can trigger because they don't recall things or it brings up memories. So, we have to stop, and take a break. With one consumer, we're on the third session, and we're only halfway through the assessment."*
>
> *–NMT Provider*

developmental histories from adults. Providers noted three main factors that make it more challenging to administer and complete the assessments with adults than with children.

First, the adult consumer may not know or recall information about their childhood experiences. In comparison, for children, the information is more recent and parents may more easily recall experiences. For some adult consumers, not being able to answer all of the questions may result in anger or frustration, a sense of inadequacy, or feeling like they disappointed their provider. The consumers sometimes reach out to a family member to ask for additional information. Although this is not necessarily problematic, it could present challenges if the consumer is estranged from their family member or if the family relationships are unhealthy.

Second, as adult consumers may be less accustomed to discussing early experiences—including trauma—the developmental history questions may bring up emotions that the consumer is not prepared to manage. Some providers expressed concern that there may be a risk of re-traumatization for adult consumers in these situations, particularly for NMT trainees who are still learning the assessment and may be less experienced conducting developmental histories with adult consumers. This contributes to providers' decision to primarily refer higher functioning consumers and/or consumers who are comfortable discussing past experiences of trauma until the providers are more experienced in the NMT approach.

Third, the NMT assessments are more time consuming with adult consumers. For adults, the NMT assessment is longer because the assessment collects information for a consumers' entire developmental history—fetal stages through adulthood. For children, the assessment is shorter as it only collects information through the child's current developmental stage. The assessments are also more time consuming for adults if consumers cannot recall information and/or they need to take breaks or stop the assessment if it brings up difficult experiences.

NMT Assessment Adaptations

To address the concerns related to gaps in information or recollection, the length of the assessment, and the risk of re-traumatization, providers discussed how they are adapting the assessment process to the adult population. The primary adaptations to administering the assessment to the consumer were:

1) Breaking up the assessment over multiple visits if the consumer had reactions to the questions or struggled to focus long enough to complete the assessment; and
2) Asking broader questions or combining questions to help make the assessment more conversational, less burdensome, and less-time consuming for the consumer and to reduce the risk of re-traumatization.

It should be noted that the first strategy—breaking up the assessment—can be and is adopted by all NMT providers, regardless of their level of comfort and experience with the assessment. However, as mentioned previously, learning how to ask broader questions requires more familiarity with the assessment and practice taking developmental histories. As is to be expected, newer trainees who are still

learning the tool are more likely to ask the assessment questions as written, and learn to make the assessment more conversational as they progress through the training and gain more NMT experience.

> *"There are a lot of questions that ask similar things, so sometimes I'll just ask an adult, do you remember domestic violence in your early life? Then I'll ask if they remember around what age. So, I don't go through every stage because it would take too long, especially with lower functioning clients."*
>
> *–NMT Trainer*

During the assessment process, consumers may not be able to answer all questions, and providers are handling this inconsistently. Some providers noted that they sometimes give a "neutral" score to an item if the consumer does not know how to respond. Other providers stated that they sometimes reach out to an additional respondent who may have information about the consumer, such as another provider who is familiar with the consumer's history.

Another factor that appears to influence the assessment process is the relationship of the provider to the NMT consumer. Some clinicians are administering the assessment to consumers for whom they are the primary clinician. In this case, the consumer is already receiving mental health services from the clinician so the clinician is familiar with the consumer's mental health history. In other situations, the clinician administering NMT may administer the assessment to a consumer who is primarily being served by a different therapist. In this scenario, the NMT assessor completes the assessment and then serves as a consultant to the primary therapist for developing and implementing NMT-informed recommendations. The relationship of the assessor to the consumer may influence the consumer's level of comfort with the assessor as well as the assessment process (e.g., the consumer's willingness to share information, reliance on other providers to obtain information, etc.).

NMT Interventions

> *"It's not just what we're connecting them to, but how we do it…we build scaffolding and support…and take into account developmentally where they are socially."*
>
> *–NMT Provider*

The types of recommended interventions that NMT consumers receive depend on consumers' specific strengths and needs. As BHRS expands NMT to include adult consumers, the breadth of NMT interventions for adults has thus far been limited by available resources. Providers noted that many children's clinics already have tools and resources that could be used for NMT interventions, such as weighted blankets. Additionally, children have easier access than adults to adjunct therapies, such as occupational therapy, which are closely related to many of the NMT-informed recommendations. These kinds of resources and therapies are typically not as readily available in adult systems of care. Currently, BHRS is working to equip adult clinics with supplies that would be useful for NMT-informed interventions and is establishing relationships with other types of services and programs, such as yoga classes, drumming, a community pool, and animal-assisted therapy.

That being said, not all interventions require connections to external resources. Several providers noted they are incorporating NMT principles into the overall approach to care and treatment with the resources they have available. Some of these interventions include:

- Using treatment sessions to support consumers in a relationship they trust;
- Encouraging the consumer to sit in a park or attend a church or a community center for 15 minutes;
- Practicing social skills interactions with social behavior cards;
- Using parallel play with adults to support social development; and
- Having fidget spinners, weighted blankets, rocking chairs, and different kinds of lighting to make consumers more comfortable in therapy rooms.

Regardless of the specific intervention, providers agreed that any recommended NMT interventions must support consumers and align with consumers' unique needs—developmentally, functionally, and socially.

NMT Outcomes

Although the NMT pilot was still in the early phases of implementation during FY16-17, providers reported changes in their approach to care as a result of the NMT training. Providers also observed some positive consumer outcomes. These findings are preliminary and will be further explored with quantitative data as the program matures and more consumers participate in NMT.

Provider Approach to Care

> *"NMT can be geared more toward youth and children, and the fact that there's curiosity and engagement with NMT [in the adult system of care] is a big accomplishment."*
>
> *–NMT Provider*

Providers noted that being trained in NMT and the neurodevelopmental impacts of trauma has changed the way they approach care, regardless of whether they implement NMT with consumers. Moreover, providers observed that the presence of NMT is beginning to influence other providers who are not trained in NMT but work with NMT-trained providers. NMT-trained providers noted that they and non-NMT providers have made changes to their office set-up and have added objects in therapy rooms to increase consumer comfort. NMT-trained providers have also received requests to conduct NMT assessments for consumers who are not on their caseload. This suggests that training providers in the adult system of care in NMT principles may support adult clinics in being more trauma-informed and trauma-capable organizations overall.

Preliminary Consumer Outcomes

Although preliminary, providers noted that some consumers appear to be benefiting from the NMT approach. For example, providers suggested that while the NMT assessment process may be challenging for both providers and consumers, the assessment also appears to be helping some consumers process their experiences and better understand the impact that trauma has had on their current behaviors. Providers also reported that consumers appreciate and enjoy the NMT-informed interventions, particularly the interventions related to movement and music. One provider mentioned that she thinks NMT has helped one consumer better self-regulate and observed decreases in this consumer's impulsivity and suicidal ideation since beginning NMT interventions.

> *"The adults I'm working with, they're doing the rhythm and movement. It's starting to make sense to them and they want more of it."*
>
> *–NMT Provider*

Conclusion

During FY16-17, BHRS began the expansion and evaluation of NMT in an adult system of care, the first undertaking of its kind. Twelve providers within the BHRS Adult System of Care began NMT training and served 20 consumers from diverse populations. As was to be expected, providers experienced some difficulties in learning and adapting the NMT approach to an adult population. Some issues arose surrounding consumers' ability to recall information about past experiences, the length of the assessment, and the natural learning curve trainees experienced with learning and administering the NMT assessment with an adult population.

To address these issues, providers carefully select who they refer for NMT—typically referring higher functioning consumers until providers are more experienced and comfortable with the NMT assessment—and are adapting the assessment process to limit the burden on consumers and prioritize consumers' well-being. Given the positive reception by NMT-trained and non-trained providers alike, as well as indications that NMT is benefiting consumers, NMT shows promise in supporting the adoption of trauma-informed practices and treatment options in the BHRS Adult System of Care. Over the next year, BHRS and RDA will continue to evaluate implementation progress to identify facilitators, challenges, and possible recommendations for adapting NMT in an adult system of care and will continue to collect consumer-level data to examine changes in consumer outcomes.

Appendix. Adult Neurosequential Model of Therapeutics Evaluation Plan

Introduction

The Neurosequential Model of Therapeutics© (NMT) within the Adult System of Care was developed as part of the San Mateo Behavioral Health and Recovery Services (BHRS) three-year Mental Health Services Act (MHSA) Innovation plan. At their core, MHSA programs are intended to provide counties with funding to create fundamental changes to the access and delivery of mental health services. The goal of MHSA Innovation (INN) programs are to test novel approaches and interventions created by local communities through an inclusive Community Program Planning (CPP) process. INN programs seek to do the following:

- Increase access to mental health programs for underserved groups,
- Increase quality of services and outcomes, and
- Promote interagency collaboration.

Through the CPP process, BHRS identified the need to provide alternative treatment options to broaden and deepen the focus on trauma informed care and provide better outcomes in recovery for BHRS consumers. To address this need, BHRS proposed implementing the NMT approach within the BHRS Adult System of Care. NMT is an innovative approach to treating trauma, typically used with children, that is grounded in neurodevelopment and neurobiology.

BHRS intends to adapt, pilot, and evaluate the application of the NMT approach to an adult population in order to increase the quality of mental health services and recovery outcomes for adult mental health consumers with a history of trauma. The NMT pilot meets INN requirements as it represents a change to an existing practice which has not yet been demonstrated to be effective. This expansion and evaluation of NMT within an adult system of care will be the first of its kind.

The San Mateo County Board of Supervisors approved the Adult NMT project on May 24, 2016, and BHRS began implementation of the three-year pilot in September 2016. BHRS selected Resource Development Associates (RDA) to conduct a two-year evaluation of the adult NMT pilot project beginning in January 2017. The NMT evaluation is intended to help BHRS achieve the following objectives:

1. Meaningfully engage stakeholders throughout the evaluation process;
2. Measure the impact of the program;
3. Support data-driven decisions about program implementation and continuation;
4. Increase knowledge about what works in mental health and with the adult consumers; and
5. Comply with INN regulatory and reporting requirements.

NMT Literature Review: Support for NMT

NMT Background

Adverse childhood experiences (ACEs) (e.g., chronic stress, neglect, abuse, trauma, etc.) can profoundly impair neurodevelopment and brain functioning. Disordered brain functioning can in turn contribute to a myriad of physical, cognitive, emotional, and behavioral problems that may persist throughout the lifespan (Perry, Pollard, Blakly, Baker, & Vigilante, 1995; Felitti et al., 1998; Anda et al., 2006). The impact of adverse experiences on brain development and the resulting functional and behavioral issues also vary with the timing, severity, pattern, and nature of the trauma, as well as by the unique experiences and genetic characteristics of each individual. However, many treatment approaches designed to help individuals cope and progress in their recovery do not consider or adequately address the complexity and variability of neurodevelopmental impairment caused by childhood trauma.

The Child Trauma Academy (CTA) developed NMT as an alternative approach to trauma-informed treatment that is grounded in neurodevelopment and neurobiology (Perry, 2008). NMT is not a single therapeutic technique or intervention. Rather, NMT aims to guide the selection and sequence of a set of highly individualized educational, enrichment, and therapeutic interventions (e.g., therapeutic massage, drumming, yoga, expressive arts, etc.) that best match each NMT consumers' unique strengths and neurodevelopmental needs to help consumers better cope, self-regulate, and progress in their recovery. (Perry & Hambrick, 2008).

As trauma during brain development can lead to dysfunctional organization of neural networks and impaired neurodevelopment, the selected set of interventions are intended to help change and reorganize the neural systems to replicate the normal sequence of both brain and functional development (Perry & Hambrick, 2008). Interventions are selected to first target the lowest, most abnormally functioning parts of the brain. Then, as functional improvements are made, therapies are selected that target the next, higher brain region (Perry & Hambrick, 2008). The sequence of interventions aim to help consumers better cope, self-regulate, and progress in their recovery.

Since its development, NMT has been implemented in various behavioral health settings (Perry & Dobson, 2013), including BHRS which has been using the NMT approach with youth since 2012. To date, the number of studies evaluating the effectiveness of NMT are limited. However, some studies have found evidence of increased social-emotional development and improvements in problematic behavior in children receiving NMT (Barfield, Gaskill, Dobson, & Perry, 2012). In BHRS, among a sample of 10 youth receiving NMT assessments and interventions, all showed improved self-regulation, and two-thirds showed improvements in sensory integration, relational, and cognitive domain measures.

Application of NMT for Adults

Currently, NMT is most widely used with maltreated and traumatized children, and the use of NMT with adults is limited. However, there is a strong theoretical basis to predict that adult mental health consumers may also benefit from the NMT approach. As mentioned, NMT is built upon the premise that trauma can cause neurological damage and that sequential, neurodevelopmentally appropriate interventions can help improve coping skills and recovery outcomes.

A study of over 17,000 adults revealed a strong positive relationship between ACEs and the increased likelihood of behavioral health issues, suggesting disordered brain functioning in response to child trauma (Anda et al., 2006). In particular, adults who experienced four or more ACEs were 3.6 times more likely to be depressed, 2.4 times more likely to experience anxiety, 7.2 times more likely to suffer alcoholism, and 4.5 times more likely to use illicit drugs than adults with no ACEs (Anda et al., 2006). The relationship between trauma and mental health is further strengthened by the high prevalence of adult consumers with mental illness and/or substance use issues who also have experiences of trauma, approximately 40 to 80% (Missouri Institute of Mental Health, 2004). These findings suggest that interventions, such as NMT, that address the neurological impacts of trauma may be effective in helping consumers improve coping skills and achieve better recovery outcomes.

Despite the potential of using NMT with adults, there are also important differences between the adult and youth consumer populations that should be considered. In comparison to children, the extent of neurological damage is likely greater among adult mental health consumers who may suffer continued brain impairment beyond the effects of childhood trauma. For instance, many adult mental health consumers also have a history of long-term psychiatric medication usage as well as long-term substance abuse, both of which can further impair brain functioning.

In addition, initial studies of NMT have found the approach is most effective for children in safe, stable, and nurturing environments (Perry & Hambrick, 2008). However, many adult consumers may still be experiencing patterns of instability and trauma. One study found that nearly a third of mental health consumers had been victimized within the previous six months (Desmarais et al., 2014), while other studies found that consumers with serious mental illness are more than 10 times more likely to be homeless than the general population (Treatment Advocacy Center, 2016).

Nevertheless, the effectiveness of NMT in improving recovery outcomes in the adult population is unknown. As of yet, no outcome studies have been conducted to evaluate NMT in an adult population and NMT has not yet been formally implemented into an Adult System of Care. Given this opportunity and the preliminary success of NMT with youth, San Mateo BHRS has undertaken a project to adapt, pilot, and evaluate the application of the NMT approach to an adult population within the BHRS Adult System of Care.

San Mateo BHRS Adult NMT Pilot Project

NMT Providers

As mentioned previously, BHRS has been using the NMT approach with youth for the past five years. In that time, 10 BHRS providers have become certified NMT trainers. These NMT trainers cannot certify other providers in NMT; however, the trainers can provide consultation and teaching of NMT principles. In January 2017, 14 mental health clinicians began NMT training.[13] The clinicians work in a variety of settings within the BHRS Adult System of Care, including BHRS specialty mental health or regional clinics as well as programs targeted toward consumers re-entering the community following incarceration.

Target Population

The NMT providers will incorporate the NMT process into their clinical work, targeting three main populations of adult mental health consumers, including:

- General adult consumers receiving specialty mental health services,
- Transition age youth (TAY) consumers (ages 18-25), and
- Criminal justice-involved consumers re-entering the community following incarceration.

It is important to note that the three target populations likely have different experiences, needs, and coping skills and as a result, could respond to NMT differently. For example, TAY are still undergoing brain development and therefore may be more responsive to neurodevelopmental treatment approaches, such as NMT. The re-entry population may have different coping mechanisms than the general adult and TAY consumer populations, such as engaging in high risk behaviors that are more likely to lead to incarceration. In addition, for the re-entry population, the experience of incarceration could contribute to trauma.

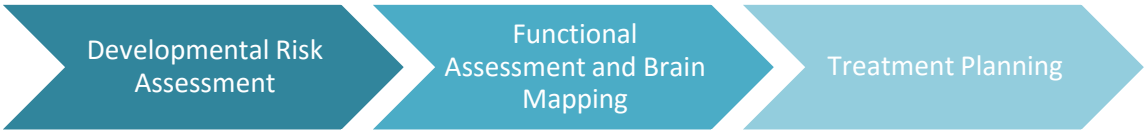
BHRS estimates that through the adult NMT pilot project, approximately 75 to 100 adult consumers will receive NMT-based services annually. Providers will refer existing BHRS consumers from their caseloads to NMT. Due to the novel nature of this pilot, clear selection criteria for adults referred to NMT have not yet been established. Although, adult consumers who will most benefit will likely have a history of crisis or trauma. Additionally, NMT is not intended for consumers diagnosed with serious psychotic disorders or who are currently cycling in and out of psychiatric hospitalization. As implementation progresses, BHRS will establish guidance in case selection with the support of NMT trainers and mentors.

[13]The formal training certification program takes place over one year, with trainees learning through a combination of readings, videos, webinars, and case-based trainings. Trainees begin implementing the NMT model with consumers shortly after the training commences and must conduct a minimum of 10 NMT assessments annually. In order to ensure fidelity to the NMT model, CTA requires that all certified NMT providers complete fidelity assessments twice annually, wherein the providers evaluate the same client data and inter-rater reliability scores are calculated.

NMT Process and Activities

The NMT approach helps clinicians identify the developmental strengths and challenges of each individual to help create an individualized treatment plan matching their unique developmental needs. As depicted in Figure 1, the NMT process consists of three main phases: 1) developmental risk assessment, 2) functional assessment and brain mapping, and 3) the development of individualized treatment recommendations. These phases are described in greater detail below. However, the elements of the NMT process and specific NMT-based services will likely be modified as the approach is adapted to the adult population.

Figure 6. Key phases of the NMT Process



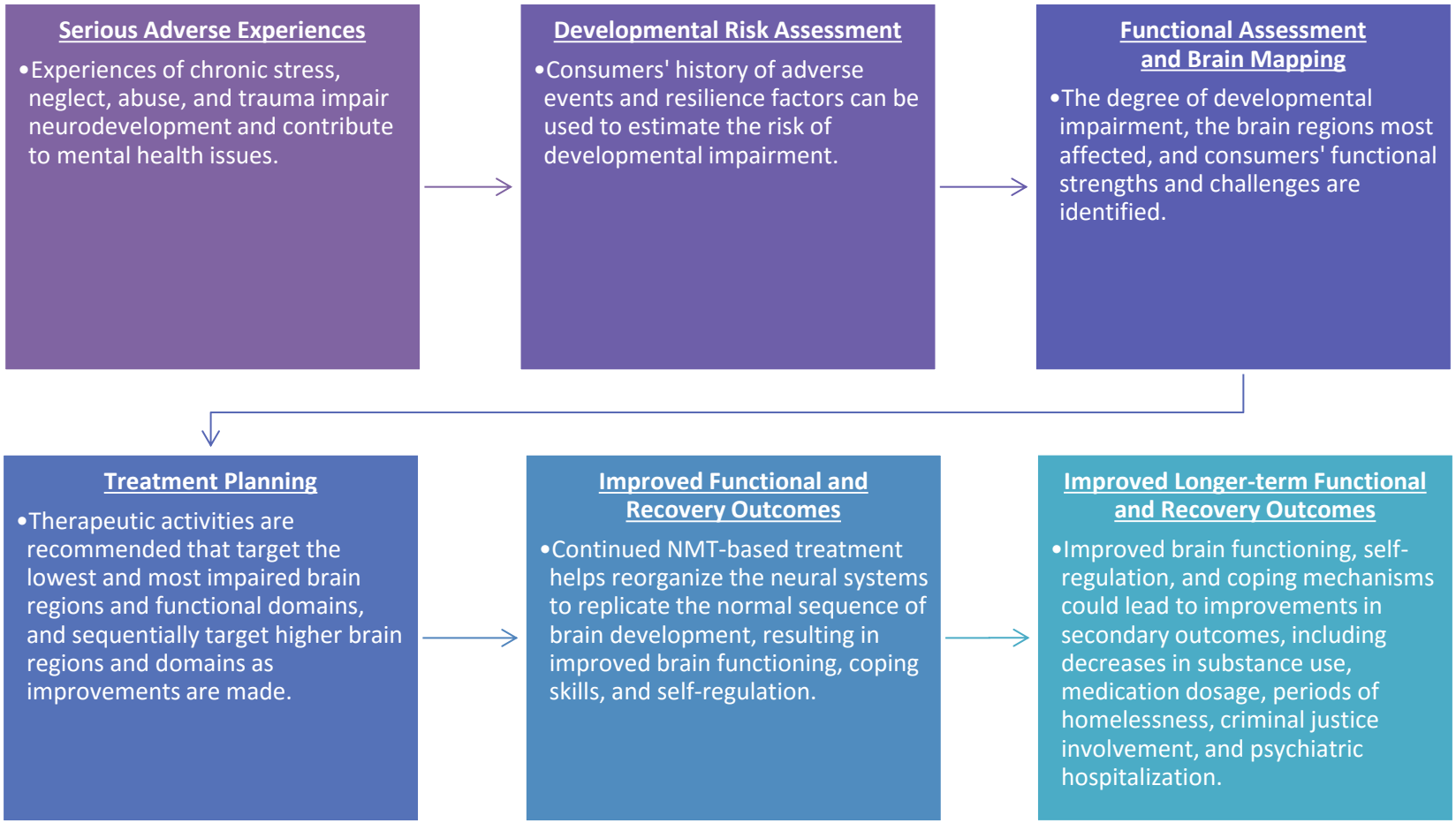
Developmental Risk Assessment. NMT-trained clinicians collect information pertaining to consumers' history of adverse experiences – including their timing, nature, and severity – as well as any protective factors to estimate the risk and timing of potential developmental impairment.

Functional Assessment and Brain Mapping. NMT-trained clinicians conduct an assessment various brain-mediated functions (e.g., heart rate, motor skills, short-term memory, speech and language, etc.) to develop a brain map identifying the brain regions most affected by developmental impairment. Through this "mapping" process, scores are calculated in four functional domains: 1) Sensory integration, 2) Self-regulation, 3) Relational, and 4) Cognitive. The functional domain values are then compared with age typical domain values to assess the degree of developmental impairment, identify the consumers' functional strengths and challenges, and track progress over time.

Treatment Planning. In the third phase of the NMT process, therapeutic activities are identified that address the consumers' needs in the four functional domains, first targeting the lowest brain regions with most severe impairment. For example, consumers with severely impaired self-regulation scores often have hyper-reactive response systems and may benefit from deep-breathing techniques and the use of weighted vests or blankets. Consumers impaired in the sensory integration domain may benefit from patterned, repetitive somatosensory activities such as drumming and yoga. Treatment may include a mix of activities that are tailored to each consumers' unique developmental needs and activity preferences.

Throughout treatment, functional assessment and brain mapping are performed at regular intervals to evaluate any changes in functional domains. As functional improvements are made, treatment recommendations are adapted, with therapeutic activities becoming more advanced and/or targeting higher brain regions. Ultimately, as NMT treatment progresses, it is expected that consumers will experience improved functional and recovery outcomes. The NMT process and outcomes pathway is summarized in Figure 7.

Figure 7. NMT Process and Outcomes Pathway



Evaluation Overview

Learning Goals and Evaluation Questions

BHRS developed two main learning goals for the NMT evaluation. The first learning goal pertains to the adaptation and implementation of the NMT approach in the adult consumer population, while the second learning goal pertains to the effectiveness and impact of the NMT approach in improving recovery outcomes. To further guide the NMT evaluation, RDA developed evaluation sub-questions associated with each learning goal. The learning goals and evaluation questions (EQ) are listed below.

Learning Goal 1: Can NMT, a neurobiology and trauma-informed approach, be adapted in a way that leads to better outcomes in recovery for BHRS adult consumers?

> **EQ 1.1.** How is the NMT approach being adapted to serve an adult population?
>
> **EQ 1.2.** Who is being served by the adult NMT project, what types of NMT-based services are consumers receiving, and with what duration and frequency?

Learning Goal 2: Are alternative therapeutic and treatment options, focused on changing the brain organization and function, effective in adult consumers' recovery?

> **EQ 2.1.** To what extent is the NMT approach supporting improvement in adult consumers' functional outcomes and overall recovery and wellbeing?
>
> **EQ 2.2.** To what extent is the experience of care with the NMT approach different from consumers' previous care experiences?

Evaluation Strategy

RDA will implement a mixed methods evaluation that is collaborative and emphasizes continuous quality improvement.

Mixed Methods. A mixed methods approach utilizes both qualitative and quantitative data to address the research questions. Utilizing mixed methods allows the evaluator to identify the correlation between program participation and outcomes and also identify the program strengths and challenges from the participants' perspective. This allows program staff to make adjustments to the program in real-time.

Collaborative. RDA conceptualizes its role as research partners rather than outside evaluators. In this approach, BHRS staff, service recipients, and other invested parties work collaboratively with evaluators to articulate program goals, develop outcome measures, and interpret and respond to evaluation findings.

Continuous Program Improvement. RDA will work with BHRS and its stakeholders to build capacity for evaluation and engage in ongoing continuous program improvement. Continuous program improvement

is a framework by which evaluation is not a one-time event, but an ongoing way of providing data for the program to use to strengthen program design and implementation.

Data Collection and Analysis

In order to develop a comprehensive understanding of program implementation and impact, BHRS and RDA identified a number of expected measurable outcomes including process outcomes, clinical outcomes, functional and recovery outcomes, and consumers' experience of care. Process outcomes will largely be descriptive, and will include documentation of any training and NMT implementation activities, the number of consumers served, and the types of services provided. Consumer-level outcomes, including clinical, functional, and recovery outcomes, will be evaluated before and during NMT treatment to assess the impact of NMT services.

During the first year, the evaluation will focus on collecting and analyzing process outcomes to assess NMT implementation, as well as collecting individual-level clinical, functional, and recovery baseline data. The second year will focus on measuring progress in NMT implementation and changes in clinical, functional, and recovery outcomes from baseline. Throughout both years, RDA will provide technical assistance to BHRS staff implementing the NMT intervention to support their ability to collect client data.

BHRS and RDA identified a number of data sources to collect outcome measures, including NMT metrics, the NMT treatment plan, Avatar electronic health records, the NMT consumer form, and focus groups with NMT providers and with NMT consumers. Table 3 lists the expected measurable outcomes as well as the data sources that will be used to collect each outcome measure. The data sources are described in greater detail below. In addition, Table 5 in Appendix I summarizes the data sources and information that will be used to address each learning goal and evaluation question, and Table 6 in Appendix II outlines the specific data requested.

Table 3. Expected Measurable Outcomes and Data Sources

Outcome Type	Outcome Measures	Data Sources
Process Outcomes	Clinician experience of NMT training and implementation	Provider Focus Group
	Number and demographics of consumers participating in NMT services	Avatar Electronic Health Records (EHR)
	Number and type of NMT services provided	NMT Treatment Plan
Clinical Outcomes	Changes in brain map values	NMT Database
	Changes in functional domain values	NMT Database
Shorter-term Functional and Recovery Outcomes	Changes in coping skills and self-regulation	Consumer & Provider Focus Groups
	Continued participation in NMT services	NMT Database
	Continued participation in BHRS outpatient services	Avatar EHR
Longer-term Functional and Recovery Outcomes	Changes in substance use	Avatar EHR
	Changes in medication dosage	NMT Consumer Form
	Changes in homelessness	NMT Consumer Form
	Changes in criminal justice involvement	NMT Consumer Form
	Changes in psychiatric hospitalization	Avatar EHR

Outcome Type	Outcome Measures	Data Sources
Experience of Care	Consumer experience of NMT services and perceived impact	Consumer Focus Group

Data Sources

NMT Metrics. RDA will work with CTA and BHRS to obtain NMT Metrics with which to measure clients' functional domain values. NMT metrics will be obtained from consumers' initial NMT brain mapping and at agreed upon intervals thereafter (e.g., every six months). The NMT functional domain values will be used to establish consumers' baseline functioning at service start and documenting any change that occurs over the course of service delivery. To the extent that adult age typical functional domain values are available, RDA will also compare BHRS consumers' functional domain scores to age typical values to assess the degree of impairment and progress toward age typical functioning.

NMT Treatment Plan. RDA will work with BHRS to obtain information from consumers' treatment plans at agreed upon intervals. The NMT Treatment Plans include information about the types of treatment or activities that are recommended, treatment received, and any progress notes. This information will be used to assess NMT treatment participation and adherence to the service plan.

Avatar Electronic Health Record Data. RDA will work with BHRS to obtain relevant consumer-level information from BHRS' electronic health record (EHR) system, Avatar. Information obtained from the EHR may include client demographic information, clinical diagnoses, BHRS mental health service utilization, and psychiatric hospitalization. EHR Data will be requested for the year prior to NMT enrollment as well as during NMT participation to assess any changes in mental health service utilization during NMT treatment.

NMT Consumer Form. RDA developed a NMT consumer form to capture additional consumer-level information that is not currently captured or not readily extractable from existing data sources. The NMT consumer form includes information regarding consumers' current psychiatric medication, substance use, housing and homelessness, and criminal justice system involvement (e.g., arrests and incarcerations). NMT providers will administer the consumer form during NMT assessments at agreed upon intervals (e.g., once a month). This information will be used to assess changes in longer-term functional and recovery-oriented outcomes throughout NMT participation (e.g., changes in the frequency or duration of incarcerations or arrests, frequency of substance use, and medication dosage). The NMT consumer form is available in Appendix III.

Focus Groups with Providers Trained in NMT. RDA will facilitate focus groups with BHRS Adult System of Care staff who were trained in the NMT model. During the first year of the evaluation, these focus groups will explore providers' experiences with the NMT training and initial application of the NMT model, including the quality and applicability of their training in NMT, successes and challenges in adapting the model for adult consumers, and the integration of the brain mapping and other elements of the NMT approach into their existing service delivery processes. During the second year of the evaluation, the focus groups with providers will assess how their experiences using the NMT approach have changed over time, any new successes or challenges that have emerged, and their perceptions of the impact of the NMT

approach on client wellbeing, including improvements in functional and recovery outcomes. The focus group protocol is available in Appendix IV.

Focus Groups with Clients Participating in NMT. During the second year of the evaluation, RDA will facilitate focus groups with adult BHRS clients who have received the NMT-based services. During the first year of the evaluation, the focus groups will ascertain clients' experiences with the NMT approach, how NMT services differ from other mental health services received, and consumers' perception of the impact of NMT on their own wellness and recovery. Before beginning the focus groups, the intention of the focus groups will be explained and informed consent will be obtained from all consumers. The focus group protocol is available in Appendix IV and the consent form is available in Appendix V.

Data Analysis

RDA will begin our analysis by organizing and cleaning the NMT and client-level data as well as information from the focus groups. To analyze the quantitative data we will conduct both descriptive and inferential statistics, as appropriate, to describe the outcomes as well as to identify changes over time. To assess process outcomes, descriptive statistics will primarily be used, while pre-post analyses will be used assess changes in clinical, functional, and recovery outcomes before and during NMT services.

Qualitative data will inform both the process and consumer outcomes. To evaluate qualitative data, focus group participants' responses will be transcribed so that participants' responses and reactions are appropriately captured. RDA will then thematically analyze responses from participants to identify any recurring themes and key takeaways from the focus groups. RDA will triangulate qualitative findings with quantitative findings to develop a complete picture of the extent to which the NMT goals have been achieved.

Reporting

On an annual basis, RDA will draft a report that provides a comprehensive understanding of the implementation and impact of the NMT project to date as well as comply with new MHSA INN regulations. The report will address the learning goals and evaluation questions, including an information about the progress of NMT implementation and related process outcomes, preliminary outcome measures, and recommendations for actionable program improvements.

Findings will be shared with relevant BHRS staff through a findings work session prior to drafting the report. This work session will give BHRS staff an opportunity to interpret and respond to findings as well as provide feedback. Following the work session, RDA will draft the annual report and send it to BHRS for review. RDA will then address and incorporate BHRS feedback, finalize the report, and send it to BHRS for submission to the Mental Health Services Oversight and Accountability Commission (MHSOAC). The final report will then be available for presentation to the MHSA Steering Committee and the Stakeholder Advisory Committee.

Timeline

The NMT evaluation is a two-year evaluation, beginning in January 2017 and running through December 2018. Table 4 below provides an outline of evaluation activities over the two year evaluation period, including the organization responsible for conducting each activity (i.e., RDA and/or BHRS). RDA understands that program needs develop and evolve, so RDA will be flexible in adapting the evaluation timeline to align with BHRS needs. RDA will confer with BHRS when creating any modifications to the evaluation timeline.

Table 4. NMT Evaluation Activities Timeline

Phase	Major Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year 1 (2017)	Project Kickoff Meeting (RDA & BHRS)	■											
	Evaluation Planning (RDA & BHRS)	■	■	■	■	■	■	■	■				
	Compile and Send NMT Consumer Data (BHRS)									■			
	Focus Groups: Service Providers and Consumers (RDA)										■		
	NMT Data Analysis (RDA)									■	■		
	Findings Work Session (RDA & BHRS)										■		
	Draft Annual Report (RDA)										■	■	
	Review Report and Provide Feedback (BHRS)												■
	Finalize Annual Report (RDA)												■
	Submit Annual Report to MHSOAC (BHRS)												X
Year 2 (2018)	Compile and Send NMT Consumer Data (BHRS)								■	■			
	Focus Groups: Service Providers and Consumers (RDA)									■	■		
	NMT Data Analysis (RDA)										■	■	
	Findings Work Session (RDA & BHRS)											■	
	Draft Annual Report (RDA)											■	■
	Review Report and Provide Feedback (BHRS)												■
	Finalize Annual Report (RDA)												■
	Submit Annual Report to MHSOAC (BHRS)												X
Ongoing	Regular Meetings and Communication (RDA and BHRS)	■	■	■	■	■	■	■	■	■	■	■	■
	Technical Assistance (RDA)	■	■	■	■	■	■	■	■	■	■	■	■

References

Anda, R.F., Felitti, V.J., Bremner, J.D., Walker, J.D., Whitfield, C., Perry, B.D., … Giles, W.H. (2006). The enduring effects of abuse and related adverse experiences in childhood: a convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), 174-186.

Barfield, S., Gaskill, R., Dobson, C. & Perry, B.D. (2012). Neurosequential Model of Therapeutics© in a Therapeutic Preschool: Implications for Work with Children with Complex Neuropsychiatric Problems. *International Journal of Play Therapy.* Advance online publication. doi:10.1037/a0025955

Desmarais, S.L., Van Dorn, R.A., Johnson, K.L, Grimm, K.J., Douglas K.S. & Swartz, M.S. (2014). Community violence perpetration and victimization among adults with mental illnesses. *American Journal of Public Health, 104*(12), 2342-2349.

Felitti, V.J., Anda, R.F., Nordenberg, D., Williamson, D.F., Spitz, A.M., Edwards, V., … Marks, J.S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, *14*(4), 245-258.

Missouri Institute of Mental Health. (2004). Trauma among people with mental illness, substance use disorders and/or developmental disabilities. *MIMH Fact Sheet, January 2004.* Retrieved from: https://dmh.mo.gov/docs/mentalillness/traumafactsheet2004.pdf

Perry, B.D., Pollard, R.A., Blakley, T.L., Baker, W.L. & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation, and use-dependent development of the brain: how states become traits. *Infant Mental Health Journal, 16*(4), 271-291.

Perry, B.D. (2008). Child maltreatment: the role of abuse and neglect in developmental psychopathology. In T.B. Beauchaine & S.P. Hinshaw (Eds.), *Child and Adolescent Psychopathology* (pp. 93-128). New Jersey: John Wiley & Sons Inc.

Perry, B.D. & Hambrick, E. (2008) The Neurosequential Model of Therapeutics. *Reclaiming Children and Youth*, *17*(3), 38-43.

Perry, B.D. & Dobson, C. (2013) Application of the Neurosequential Model (NMT) in maltreated children. In J. Ford & C. Courtois (Eds.), *Treating Complex Traumatic Stress Disorders in Children and Adolescents* (pp.249-260). New York: Guilford Press.

Treatment Advocacy Center. (2016). Serious Mental Illness and Homelessness. Retrieved from: http://www.treatmentadvocacycenter.org/storage/documents/backgrounders/smi-and-homelessness.pdf

Information Collected for Evaluation Questions

Table 5. Data Sources and the Evaluation Questions Addressed

Data Source	Information Collected	Learning Goal 1		Learning Goal 2	
		EQ 1.1	EQ 1.2	EQ 2.1	EQ 2.2
NMT Metrics	• Brain Map Values • Functional Domain Values			✓	
NMT Treatment Plan	• Recommended Treatment • Treatment Participation		✓	✓	
Avatar Electronic Health Records	• Demographic Information • Clinical Diagnosis • BHRS Mental Health Service Utilization • Psychiatric Hospitalization • Substance Use		✓	✓	
NMT Consumer Form	• Current Psychiatric Medication • Housing and Homelessness • Criminal Justice System Involvement (Arrests and Incarcerations)		✓	✓	
Focus Groups with NMT Providers	• Providers' experience with NMT training and implementation • Successes and challenges in adapting NMT to adults • Providers' perceived impact of NMT on consumers' recovery and wellbeing	✓	✓	✓	
Focus Groups with NMT Consumers	• Consumers' experience of NMT services and activities • Consumers' perceived impact of NMT on their recovery and wellbeing			✓	✓

NMT Data Request

Description: The table below lists the data requested for every adult consumer who was or is currently enrolled in BHRS NMT services as of the end of the given fiscal year (i.e., June 30th). Data for the previous fiscal year(s) will be requested once annually, in September. The asterisks (*) denote specific consumer data that is requested by the MHSOAC for the Annual Innovative Project Report.

Table 6. Data Requested for Adult NMT Consumers

Domain	Categories	Variables	Data Source	Time Period
Consumer Information	Identifying Information	Medical Record/Mental Health Number	Avatar Electronic Health Records	Most Recent Information
		Client Name		
	Demographic Information*	Date of Birth*		
		Gender*		
		Race*		
		Ethnicity*		
		Primary Language*		
		Sexual Orientation*		
		Veteran Status*		
	Physical or Mental Impairment*	Difficulty hearing, speaking, communicating*		
		Limited physical mobility*		
		Learning disability*		
		Chronic health conditions*		
		Other disabilities/health conditions*		
	Clinical Diagnoses	Primary diagnosis code		
		Primary diagnosis description		
		Secondary diagnosis code		
		Secondary diagnosis description		
		Substance use disorder diagnosis		
Psychiatric Medication Prescriptions	Identifying Information	Medical Record/Mental Health Number	Avatar Electronic Health Records – Order Connect	All Data during NMT Enrollment
		Client Name		
	Medication	Medication Name		
		Medication Dosage		
		Instructions for Use		
Substance Use, Housing, and Criminal Justice	Substance Use	Substances used	Avatar Electronic Health Records – NMT Consumer Form (to be added)	All Data during NMT Enrollment (Not yet collected)
		Substance use frequency		
		Substance use route of administration		
	Housing Status	Residence last night		
		Nights homeless in last month		
	Criminal Justice Involvement	Arrests in last month		
		Incarcerations in last month		
BHRS Mental Health and Substance Use Service Utilization	Identifying Information	Medical Record/Mental Health Number	Avatar Electronic Health Records	All Data during NMT Enrollment and Previous Year
		Client Name		
	Service Episode Information	Episode Number		
		Provider Organization/Level of Care (e.g., Outpatient, Adult Residential, etc.)		
		Program Name		
		Episode Opening Date		

Domain	Categories	Variables	Data Source	Time Period
		Episode Closing Date		
	Service Encounter Information	Service Code		
		Service Description		
		Date of Service		
		Service Length (minutes)		
Psychiatric Inpatient and Emergency Service Utilization – Service Episodes	Identifying Information	Medical Record/Mental Health Number	Billing/Claims Data	All Data during NMT Enrollment and Previous Year
		Client Name		
	Episode Information	Episode Number		
		Provider Organization/Level of Care (e.g., Psychiatric Emergency Services, Psychiatric Inpatient, etc.)		
		Program Name		
		Episode Admission Date		
		Episode Discharge Date		
		Service Length (days)		
NMT Assessments and Metrics	Identifying Information	Medical Record/Mental Health Number	CTA NMT Database	All Data during NMT Enrollment
		Client Name		
	Assessment Information	Assessment Date		
		Assessment Type (e.g., Initial assessment, Follow-up assessment)		
	NMT Metrics	Developmental History Values		
		Functional Brain Map Values		
		Functional Domain Values		
	NMT Treatment Plan	NMT Treatment Recommendations		

Adult NMT Consumer Form

Instructions: These questions are intended to provide information about adult NMT consumers' substance use, housing status, and criminal justice involvement. Please administer the questionnaire to consumers every six months during the NMT assessment. Please inform the consumers that this information will only be used to identify any changes throughout NMT participation, and there will be no repercussions for any illicit activity. Additionally, consumers can choose not to respond to any questions they feel uncomfortable answering.

1. a. In the past 30 days, did you use the following substances (if any)?

   b. If yes, how frequently did you use the substance and what was the primary route of administration?

Substance Type	Y/N	Frequency (check one)	Route (check one)
a. Alcohol	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
b. Cocaine/Crack	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
c. Hallucinogens (PCP, LSD, Mushrooms, Mescaline/Peyote)	☐ Yes	☐ Daily	☐ Oral

Substance Type	Y/N	Frequency (check one)	Route (check one)
	☐ No ☐ Don't Know ☐ Refused to Answer	☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
d. MDMA (Ecstasy, Molly)	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
e. Methamphetamine or other Amphetamines	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
f. Synthetics (Spice, Flakka, Bath Salts)	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection

Substance Type	Y/N	Frequency (check one)	Route (check one)
		☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Don't Know ☐ Refused to Answer
g. Inhalants	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
h. Other Downers (Ketamine, GHB)	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer
i. Other Prescription Drugs (Benzodiazepines, Barbiturates)	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer

Substance Type	Y/N	Frequency (check one)	Route (check one)
j. Other: _____	☐ Yes ☐ No ☐ Don't Know ☐ Refused to Answer	☐ Daily ☐ Several times a week ☐ Every weekend ☐ A few times a month ☐ Once ☐ Don't Know ☐ Refused to Answer	☐ Oral ☐ Nasal ☐ Smoking ☐ Injection ☐ Don't Know ☐ Refused to Answer

2. Where did you sleep last night?

☐ Own house or apartment
☐ Family home
☐ Couch or someone else's home
☐ Transitional housing
☐ Emergency shelter
☐ Streets
☐ Other: _____
☐ Don't Know
☐ Refused to Answer

3. In the past 30 days, how many nights did you spend homeless, if any (e.g., on the streets, in a car, an emergency shelter, someone's couch or home without paying rent, etc.)?

# of Homeless Nights: _____ ☐ Don't Know ☐ Refused to Answer

4. In the past 30 days, how many times were you arrested, if at all?

# of Arrests: _____ ☐ Don't Know ☐ Refused to Answer

5. In the past 30 days, how many nights did you spend in jail/prison, if any?

# of Nights in Jail: _____ ☐ Don't Know ☐ Refused to Answer

NMT Provider Focus Group Protocol

Thank you for making time to join our focus group today. My name is _____ and this is _____. We are with a consulting firm from Oakland, California called Resource Development Associates (RDA) and we were hired by San Mateo Behavioral Health and Recovery Services (BHRS) to evaluate BHRS' implementation of the Neurosequential Model of Therapeutics (NMT) program within the Adult System of Care. As part of this evaluation, we will be conducting focus groups with staff members, as well as consumers, to better understand program processes and outcomes as well as the strengths and challenges of implementing NMT in the Adult System of Care. We're here to talk to you today about your experiences as NMT providers.

I will be facilitating this focus group and _____ is here to take notes. Please note that what you say in this focus group will remain anonymous, but we will be taking notes of the discussion. My role as the facilitator means that it is my job to ensure everyone has a chance to say what is on his or her mind in a respectful way. We have a few guidelines to help us do that. Please:

- Silence your cell phones
- There are no "wrong" or "right" opinions, please share your opinions honestly
- Engage in the conversation
- Listen to understand
- Be curious about others' opinions
- Limit "side conversations" or "cross talk" so that everyone can hear what is being said
- Your names will not be linked to any comments unless we specifically ask if we can use your comment as a quote

Does anyone have any questions before we begin?

Introductions

Before we get started I would like everyone to answer these two questions:

- What is your name?
- What is your position/role?

NMT Training

1. Please describe the NMT training you received.
    a. Where are you in your NMT training?
    b. What has been challenging about the training? Working well?
    c. What types of ongoing training and/or support do you receive?

NMT Referral/Recruitment

2. Could you describe the recruitment or referral process for the NMT?
    a. What is the consumer population that you are serving?
    b. How do you identify consumers that may benefit for NMT?
    c. What information do you provide to consumers about the NMT program?
    d. What about the referral and recruitment process is working well? What is not working well?

NMT Services

3. Could you describe the NMT assessment process?
    a. What is working well about the assessment process? What has been challenging?
    b. How do consumers respond to the NMT assessments?
    c. What information, if any, do you share with consumers?

4. Could describe the NMT services and activities?
    a. How often do you meet with consumers?
    b. How do you decide the treatment plan? What types of activities are included?
    c. How do you involve the consumer in the treatment planning?
    d. How do you involve family members or their social network in the treatment planning?
    e. How do NMT services differ from other mental health services you have provided?

5. Thinking about consumers who are doing well, what has been helpful in getting them to participate in NMT treatment or what has helped them in their recovery?
    a. What makes it difficult to get consumers to engage in treatment?
    b. What strategies do you use in those situations where the consumer is difficult to engage?

Overall Experience and Perspective

6. From your perspective, what has been working well about implementing NMT with the adult population? What has been challenging?
    a. What could be done to improve the NMT approach among the adult population?

7. From your perspective, how would you describe the impact of the NMT approach on consumers?
    a. Changes in coping mechanisms and self-regulation?
    b. Changes in other wellness and recovery outcomes?

8. Think about your team, what is something you are most proud of?

9. Is there anything else you would like to add?

Thank you for your time! We value your input and appreciate you sharing your experiences with us.

NMT Consumer Focus Group Protocol

Thank you for making the time to join our focus group today. My name is _____ and this is _____. We are with a consulting firm from Oakland, California called Resource Development Associates (RDA) and we were hired by San Mateo Behavioral Health and Recovery Services (BHRS) to evaluate BHRS' implementation of the Neurosequential Model of Therapeutics (NMT) program within the Adult System of Care. As part of this evaluation, we will are conducting focus groups with people who have participated in the NMT program to understand how the program is working and what people like you are experiencing.

I will be facilitating this focus group and _____ is here to take notes. Please note that what you say in this focus group will remain anonymous, but we will be taking notes of the discussion. My role as the facilitator means that it is my job to ensure everyone has a chance to say what is on his or her mind in a respectful way. We have a few guidelines to help us do that. Please:

- Silence your cell phones
- There are no "wrong" or "right" opinions, please share your opinions honestly
- Engage in the conversation
- Listen to understand
- Be curious about others' opinions
- Limit "side conversations" or "cross talk" so that everyone can hear what is being said
- Your names will not be linked to any comments unless we specifically ask if we can use your comment as a quote

Does anyone have any questions before we begin?

Introductions

Before we get started let's go around the room and have everyone share:

- Your name
- Where you're from

Referral Process

1. How did you learn about NMT?
    a. Who referred you?
    b. What type of information did you receive about NMT?
    c. Why did you decide to participate in NMT?

NMT Experience

2. How would you describe the NMT assessment (e.g., risk assessment, brain mapping, etc.)
    a. What kinds of questions do they ask you?
    b. Is there anything about the assessment that feels stressful?
    c. Is there anything the provider does to make it less stressful? Anything you do?
    d. What kinds of information about the assessment did the provider share with you?

3. How would you describe the NMT treatment you have received (e.g., yoga, drumming, art, etc)?
    a. What kinds of activities did the provider recommend? What kinds of activities are you doing?
    b. How did the provider decide the activities?
    c. How are you involved in planning NMT activities?
    d. How is your family involved in the NMT activities?
    e. How often do you participate in NMT activities?
    f. Have the activities been like what you thought they would be?
    g. How have NMT services differed from other mental health services you have received in the past?

4. How has NMT helped you?
    a. What do you like about the NMT program?
    b. What has been challenging?
    c. What has helped you continue to participate in the different activities?

Consumer Perceptions and Recommendations

5. What is the best part about NMT?

6. What is something you would do or change to make NMT better?

7. What is something you would add or include in the program, that isn't already happening?

8. What have been some of your accomplishments since starting NMT services?
    a. What has helped you achieve this?

9. Is there anything else you'd like to add that we haven't already talked about?

Thank you for your time! We really value your input and appreciate you sharing your experiences with us.

Focus Group Consent Form for NMT Consumers

Before we start the focus group, we want to make sure you understand what our questions are about and that you give us your informed consent to participate. Please take as much time as you need to review this form.

San Mateo Behavioral Health and Recovery Services (BHRS) has hired Resource Development Associates (RDA), a planning and evaluation organization in Oakland, to evaluate the implementation and impacts of the BHRS' Neurosequential Model of Therapeutics (NMT) program within the Adult System of Care. We are having group discussions with individuals such as yourselves to help BHRS better understand your experiences with NMT services.

Participating in this focus group is voluntary, and you may decide to stop participating at any point. We are interested in hearing about your experiences with NMT services, including the referral process, the types of NMT services and activities you participated in, how your experience with NMT differs from other services you have received, your relationships and interactions with the NMT providers, as well as any accomplishments you have experienced since beginning NMT services. We are also interested in hearing your suggestions about how you would improve NMT services.

We will not ask about your personal history, and you should only share what you feel comfortable sharing. The information you share will be kept private and anonymous. If you do not want to be part of the focus group, it will not affect any services or treatment you receive now or in the future.

If you have any questions about the focus group, please contact Roberta Chambers at (510) 984-1478 or rchambers@resourcevelopment.net

I understand that:

- *I am free to decide not to participate in the focus group*
- *I can change my mind at any time about participating*
- *I do not have to share any information that I do not feel comfortable sharing*
- *If I choose not to participate, it will not affect the treatment and services I receive*
- *My name will not be used as part of the information gathered during the focus group*

By signing this form, you are saying that you understand what the focus group is about, that you have been given the above information, and that you are agreeing to participate voluntarily.

_____

Print Name of Participant

_____

Signature of Participant DATE