Response to Request for Information

Involuntary Medication Longitudinal Study

Prepared for
Vermont Department of Health

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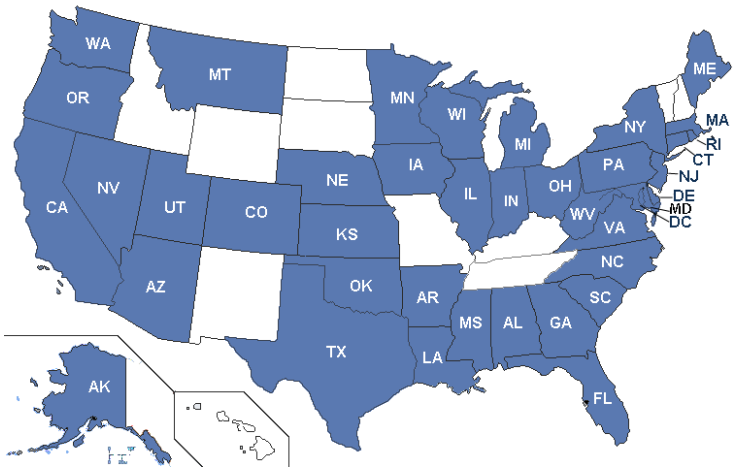
Experience

Hornby Zeller Associates, Inc. (HZA) is a management consulting firm with over 20 years of experience providing data collection and analysis, evaluation and research services to government agencies to improve their programs. The firm has offices in four states and a staff of 40 professionals. Offices are located in Troy, New York, where the firm is headquartered; South Portland, Maine; Little Rock, Arkansas; and Harrisburg, Pennsylvania. The firm has had contracts in over 35 states as shown in the map, as well as in the province of Ontario, Canada.



The firm was founded as Zeller Associates in 1988 by Dennis E. Zeller, Ph.D., M.S.S.W., who had been Director of the Bureau of Policy Planning of New York State's Division of Family and Children's Services. The firm became Hornby Zeller Associates, Inc. in 1995 when Helaine Hornby left her post as founder and Director of one of the national child welfare resource centers (University of Southern Maine, Organizational Improvement) to become a partner.

Corporate Experience

HZA brings to this project extensive experience evaluating mental health, substance abuse, child welfare and juvenile justice programs. In addition, it has the three primary qualities needed for conducting this project successfully: experience with mental health programs; thorough understanding and capacity for longitudinal analysis; and the ability to match clients across multiple data systems without a common identifier. The table below lists several of the projects HZA has completed demonstrating one or more of these qualities. Descriptions of each of the projects follow.

Project	Mental Health Program	Substance Abuse Program	Longitudinal Analysis	Data Matching
Evaluation of the Anchorage and Palmer Coordinated Resource Projects	✓		✓	✓
Maine Co-occurring State Integration Initiative (COSII) Evaluation	✓	✓	✓	✓
Moving Forward: Achieving Independence in Transition-Aged Youth	✓		✓	✓

Project	Mental Health Program	Substance Abuse Program	Longitudinal Analysis	Data Matching
Alaska Study of Trust Beneficiaries in the Alaska Department of Corrections	✓			✓
Evaluation of Maine's Statewide Adult Drug Court Program		✓	✓	✓
Evaluation of Maine's Title IV-E Waiver Evaluation		✓	✓	✓
Evaluation of Implementing a Trauma-informed System of Care for Children with Serious Emotional Disturbances in Maine	✓		✓	✓
New Jersey Longitudinal Data Processing, Analysis and Reporting			✓	
Michigan Study of 17-Year-olds in the Adult Court and Correctional Systems				✓

Evaluation of the Anchorage and Palmer Coordinated Resource Projects

Between 2007 and 2008, HZA conducted a comprehensive process and outcome evaluation of two county mental health courts in Alaska, Anchorage and Palmer. The two specialized criminal court dockets are aimed at diverting individuals with severe mental illness from incarceration into a regimen of court-supervised, community based treatment and recovery support services. Interviews were conducted with clients as well as stakeholders to learn about the operations of the court initiatives and the effectiveness of the services provided. Data collected from outside sources (i.e., Medicaid, Alaska Psychiatric Institute) about treatment information were matched to administrative data from the courts as part of the measure of recidivism both while the clients were in the program as well as post-discharge (i.e., within 12 months).

Co-occurring State Integration Initiative (COSII) Evaluation

Between 2005 and 2010, HZA served as the evaluator of the State Incentive Grants for Treatment of Persons with Co-occurring Substance Related and Mental Disorders, Co-occurring State Integration Initiative, or COSII. The goal of this multi-year project, funded by a grant from the Substance Abuse and Mental Health Services Administration (SAMHSA), was to institute broad and far-reaching changes in the services offered to the estimated 10,000 people across Maine who experience co-occurring psychiatric and alcohol or drug-related disorders. HZA conducted a rigorous evaluation of both process and outcome measures to determine whether the changes in service organization and content increased the percentage of programs that screen, assess and treat people with co-occurring disorders, and whether this in turn reduced the percentage of clients who experienced impairment from a co-occurring disorder following treatment. HZA developed a software program for data collection which was used by each of the 30 grantees to collect data on people enrolled in the evaluation. HZA matched the client data to the Maine Claims Management System

database to gather additional information on the health care claims of these individuals (including those for mental health care) for a service and cost analysis.

Moving Forward: Achieving Independence in Transition-Aged Youth

Between 2009 and 2015, HZA served as the evaluator of a project, implemented by Maine Children's Behavioral Health Services, to ensure the successful transition to adulthood for youth and young adults with mental health disorders who are homeless or who are at risk of homelessness. Supported by SAMHSA, this Healthy Transitions Initiative occurred at two levels: first, at the state level to affect policy changes to decrease systemic barriers to successful transition; and second, at the local level to implement the Transition to Independence Process (TIP) model of case management services within three agencies serving youth and young adults.

At the state level, HZA employed qualitative evaluation methods to collect data, including semi-structured stakeholder interviews and focus groups to assess the initiative's success in affecting policy changes. At the local level, stakeholder interviews and focus groups, as well as structured interviews with youth and young adults, were used to assess the success of the implementation of the TIP model in achieving positive outcomes for its clients across a number of life domains (e.g., health, education, employment, parenting, criminal justice). Data were also gathered through a document review of case management agency service plans to evaluate goal setting and achievement, and administrative sources, including the state's Medicaid claims database, were used for a comparative service and cost analysis.

Alaska Study of Trust Beneficiaries in the Alaska Department of Corrections

HZA was contracted by the Alaska Department of Corrections in 2006 to conduct a comprehensive, four-year, retrospective study of Alaska Mental Health Trust beneficiaries (persons qualifying as a Trust beneficiary because of a mental illness, developmental disability, substance use disorder or Alzheimer's and related dementias), who are served by the Department of Corrections. The purpose was to quantify the numbers of beneficiaries entering and exiting correctional facilities, including their demographic and clinical characteristics as well as their service needs. Using administrative data obtained from the Alaska Department of Health and Social Services Division of Public Assistance, Alaska Psychiatric Institute and the Alaska Department of Corrections in conjunction with interviews and case reviews of a sample of beneficiaries, HZA identified the services which are available within the correctional system to address these conditions, along with the services the beneficiaries received by matching the Trust beneficiaries to each of the data files received from other systems. The study was conducted in part to identify specific target groups of Trust beneficiaries who might be appropriately diverted from the correctional system without compromising public safety. Rates of recidivism and factors associated with recidivism were examined to project outcomes while HZA used a literature review to identify evidence-based programs with the potential to achieve appropriate diversion and reduce recidivism among Trust beneficiaries.

Evaluation of Maine's Statewide Adult Drug Court Program

With funding from the Bureau of Justice Assistance to the State of Maine Judicial Branch, HZA was retained from 2009 through 2013 to conduct a process and outcome evaluation of Maine's adult drug court system, from the perspective of drug court team members as well as its consumers. Maine has nine drug courts throughout the state (five adult, three family, and one adult co-occurring and veterans) serving six of Maine's sixteen counties, with the co-occurring and veterans court being a statewide program. Using qualitative and quantitative methods, HZA measured the extent to which each program operates with evidence-based practices and assessed the long-term impact of the programs on reducing recidivism and system-level costs. Two data sources were used to measure the successes of drug court participants. Recidivism, which was defined as having a new incarceration within 12 months of the participant's admission to drug court but prior to discharge from the drug court and having a new incarceration within one of year of discharge, was measured using data from the Maine Judicial Information System. HZA also used data from the Maine Drug Treatment Court Information System to measure intermediate outcomes of treatment receipt, behavioral compliance and drug use. Outcomes of drug court participants were compared with a matched sample of traditionally adjudicated offenders as part of the measure of the impact of the program.

Maine Title IV-E Waiver Evaluation

In 2015, HZA won the competitively bid contract to serve as the Title IV-E Waiver evaluator for the Maine Office of Child and Family Services (OCFS). Maine's Waiver initiative is targeting families with children ages zero to five whose families have been assessed at moderate to high risk, particularly for substance abuse. The innovation is to provide two types of evidence-based services at the same time, Matrix Intensive Outpatient and Triple P-Positive Parenting programs. By providing families with access to these evidence-based practices which improve parenting skills at the same time that they are being treated for substances, Maine is moving toward increasing family stability by reducing the number of children who enter foster care, reducing repeat maltreatment, increasing reunification and improving child and family well-being.

Soon after the start of the contract award, HZA developed a comprehensive evaluation plan which received federal approval. Interviews with OCFS managers, supervisors and caseworkers as well as wraparound facilitators are being used to inform the process evaluation, in addition to surveys administered to families as they discharge from the program. A risk assessment administered at the time families enroll in the program and then at discharge are used to measure outcomes. Data from Maine's Statewide Automated Child Welfare Information System (MACWIS) are also being used for the longitudinal analysis of outcomes, measuring outcomes at six and 12 months following exit of the program. A matched group of families, using Propensity Score Matching, is being used to measure improved safety and permanency over time between families served by the program to those who resemble treatment participants, but for whom the program was not in existence at the time they became involved with OCFS. Data from MACWIS and MaineCare, the state's Medicaid information system, are being used to measure the costs of the program,

matching the client identifiers within the two files to assess costs incurred by clients within comparison and treatment cohorts.

Evaluation of Implementing a Trauma-informed System of Care for Children with Serious Emotional Disturbances in Maine

Over a six-year period, beginning in 2005, Maine's Department of Health and Human Services contracted with HZA to serve as the state and local evaluator for the Trauma-informed Systems of Care, THRIVE. The goal of the Substance Abuse Mental Health Services Administration (SAMSHA) funded project was to build an infrastructure and implement an integrated system of care for children ages birth through eighteen with serious emotional disturbances while learning more about effectively addressing the needs of a particularly vulnerable and high-risk group, young people who have experienced trauma such as domestic violence, child abuse and out-of-home placement. HZA conducted five local evaluations including: trauma exposure and prevalence among THRIVE children and their families, focused longitudinal outcome study of effectiveness of trauma-informed approach to service delivery, a cost effectiveness study matching Medicaid data to program data, characteristics and evolution of trauma-informed approach to services within the community, and the effectiveness of trauma-specific treatments and practices such as Cognitive Behavioral Therapy. Given the positive results of the initiative, the program was expanded to include youth known to Maine's juvenile justice system. For a number of years, HZA worked closely with Maine to implement the THRIVE model for delinquent youth and to measure outcomes prospectively.

New Jersey Longitudinal Data Processing, Analysis and Reporting

In 2012, HZA was contracted by the New Jersey Department of Children and Families (DCF) to produce longitudinal data, analysis and reporting to comply with the terms of a consent decree. Using New Jersey's SACWIS, the Statewide Protective Investigation, Reporting and Information Tool (NJ Spirit), HZA built both statewide and county-specific automated dashboards to calculate and report on the agency's rates of achieving a variety of successful safety and permanency outcomes for children and families served by the agency. The statewide dashboard contained 22 descriptive measures and five permanency measures. Similar to the state dashboard, the county-specific dashboards contained 19 measures, several of which use the federal outcome measures to assess performance. Each measure displays trends over time in both table and graphic format, showing comparisons across the various characteristics selected for analysis. This latter is especially important because it provides success rates on each measure for various sub-populations, e.g., children under five, allowing administrators to see with which populations they are most and least successful. HZA carried on this work until its contract expired in 2017, at which point the work was put up to bid and ultimately awarded to Rutgers, The State University of New Jersey. Rutgers hired HZA in 2017 to stay on the project as a subcontractor to assist with the processing, analysis and reporting of longitudinal outcome data performed on behalf of the New Jersey Division of Child Protection and Permanency.

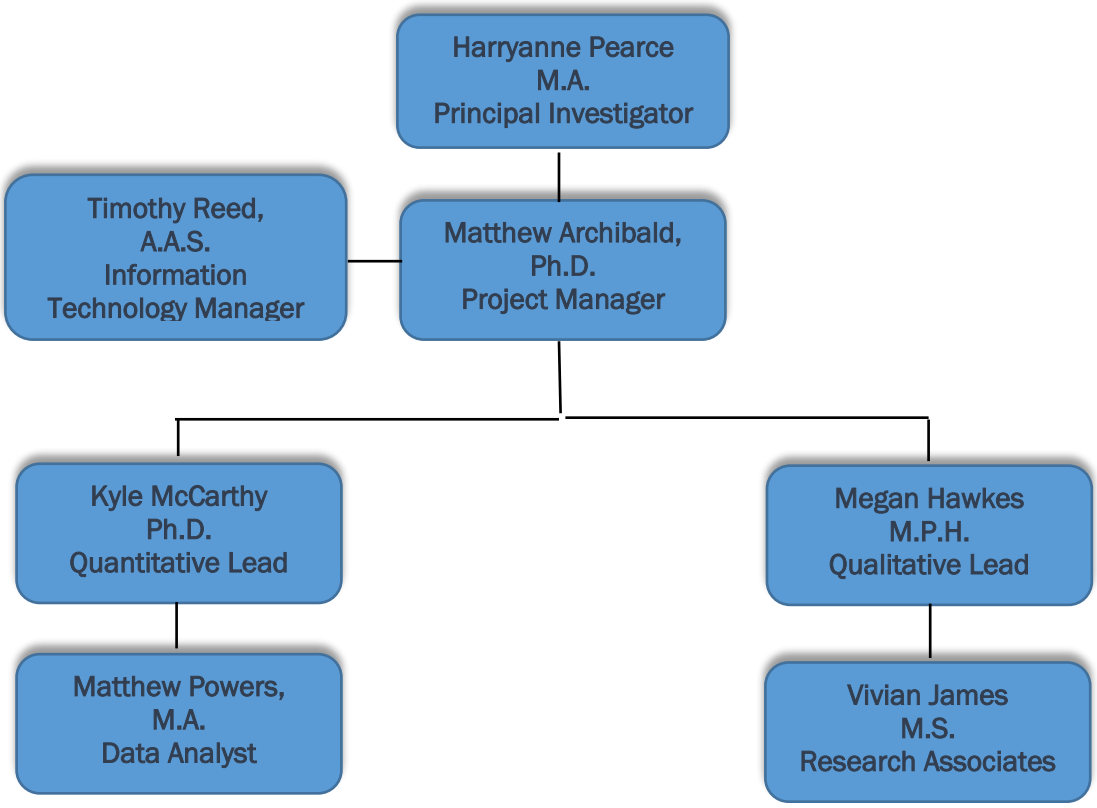
Michigan 17-Year-olds in the Adult Court and Correctional Systems

In 2017, the Michigan Legislative Council's Criminal Justice Policy Commission hired HZA to conduct a study to measure the workload and financial costs to the State of Michigan and its counties of proposed legislation to move 17-year-olds from the adult corrections system to the juvenile justice system and/or separate 17-year-olds from adult offenders. The project is intended to collect cost, workload and cost data at State and county levels across multiple court-involved agencies, including the Courts, Sheriff Offices, Prosecuting and Defense Attorneys, and the Department of Health and Human Services if the age was to be raised. Using court-related data of youth petitioned before the court, propensity score matching is being used to project the number of 17-year-olds who would be served by the juvenile system, using the characteristics and outcomes of 15- and 16-year-olds treated as juvenile offenders. Youth included within the court data file who are treated as juveniles are being matched to 17-year-olds in Michigan's prison system to project the number of youth who would likely transfer to a detention or residential treatment program. In the midst of completing its data analysis, HZA is drafting a comprehensive report for the Legislative Council, including an executive summary of the findings, an introduction of the study objectives, a description of the methodology and an evaluation and description of the results.

Staff Experience

Harryanne Pearce, HZA's South Portland, Maine Office Manager, will serve as the Principal Investigator for this engagement. She will provide conceptual guidance and oversight to ensure activities are carried out in an effective, efficient and quality manner. Matthew Archibald, Ph.D., will serve as the Project Manager for this engagement and will be the primary contact person with the DMH Project Team. Megan Hawkes, M.P.H., will lead the qualitative evaluation team; she will be supported by Vivian James. M.S. Kyle McCarthy, one of HZA's Senior Data Analysts, will serve as the lead for the quantitative evaluation team; he will be supported by Data Analyst Matthew Powers. Timothy Reed, HZA's Information Technology Manager, will provide support in accessing data files and ensuring they remain confidential. A brief description of the lead staff who would be involved in this engagement follows the organizational chart of the project team.

Project Team Organizational Chart



Harryanne Pearce, M.A., Principal Investigator

Harryanne Pearce brings sixteen years of corporate research and management expertise to HZA. Her quantitative methodological skillset includes market research, business analytics, qualitative/survey research program management and development and statistical analysis (including syndicated and secondary data analysis, regression, predictive modeling, and needs assessments). Ms. Pearce oversees the research staff in the Maine office who are engaged in projects involving public health, substance abuse, mental health and child welfare, among other related social services programs. For one of HZA's undertakings in Maine, Ms. Pearce participated in the development of performance and outcome measures to be used in evaluating the effectiveness of the state's mental health and substance abuse treatment programs in reducing clients' return to care or relapse. She also worked with Maine's Office of Substance Abuse and Mental Health Services to develop a quality management plan to monitor the measures and use them for decision-making.

For HZA's ongoing evaluation of Maine's Title IV-E Waiver program, Ms. Pearce provides guidance and management support in the collection of data from multiple sources. Additionally, she monitors and reviews the analyses to ensure the accurate and timely completion of quarterly and annual reports for project stakeholders.

Prior to joining HZA, Ms. Pearce held a series of high-level research management roles across a broad array of industries, including Healthcare, Life Sciences, Pharmaceutical and Biotechnology, and the media. For several years she worked at one of the top 10 consulting firms, Oliver Wyman, in New York City where she led the development of primary and secondary research capabilities to enable the firm's Health and Life Sciences business unit to meet the research demand requested by healthcare insurers and providers prior to the Affordable Care Act's national roll-out.

Ms. Pearce holds two Master's degrees: one in Statistics/Sociology from the State University of New York at Albany, and one in Sociology/Qualitative Research Methods from Goddard College in Montpelier, Vermont.

Matthew Archibald, Ph.D., Project Manager

Matthew Archibald is currently directing several Substance Abuse and Mental Health Services Administration funded evaluations. These include a system of care grant with the youth division of Maine's Department of Corrections, as well as a Partnerships for Success grant and a Strategic Prevention Framework Rx (SPF Rx) grant, both for the Disease Prevention/Tobacco and Substance Use Prevention and Control division within Maine's Department of Health and Human Services. The focus of SPF Rx and Dr. Archibald's work is to increase the number of citizens living safe, healthy and productive lives by reducing the number of individuals addicted to opiates across the State of Maine, focusing on Mainers ages 12 and older as well as on medical and pharmaceutical providers. In the first phase of the project, he is leading the development of a strategic plan using data from multiple sources including federal and state data sets, helping to shape these complex datasets into easily digestible information for a multi-faceted group of substance abuse treatment and prevention specialists.

Dr. Archibald has led and coordinated large-scale, complex projects that address theoretical and socially relevant questions about the nature of health and healthcare in the United States, primarily behavioral health (mental health and substance use and abuse), as well as HIV/AIDS. His work has included project development, as well as coordination of research in which he provided training, supervision and guidance to team members and stakeholders. While grounded in the sociological tradition, his research has reached and includes stakeholders in disciplines including mental health, substance abuse treatment, public health, social services, medicine and business. His methods cover the range of covariance techniques, including spatial and structural equation modeling, longitudinal analyses and survival models for numerical data and institutional ethnographies and actor-network analyses for field research.

He has more than 30 years of experience in corrections, substance abuse and public health research and has authored two dozen books, book chapters, and peer-reviewed articles on these topics. Prior to his work with HZA, Dr. Archibald was a Research Analyst for the Office of the Commissioner of Probation in Massachusetts and has held numerous teaching and research positions including receipt of a research grant to provide resources, training and

technical assistance to an addiction services agency, The Atlanta Harm Reduction Center, for which he served as Principal Investigator.

Dr. Archibald received a B.A. in Philosophy from the University of Massachusetts and went on to earn his M.A. and Ph.D. in Sociology from the University of Washington, Seattle.

Kyle McCarthy, Ph.D. Quantitative Lead

Kyle McCarthy is an integral member of HZA's evaluation team, taking the lead in conducting longitudinal analyses for three state's Title IV-E Waiver initiatives, including Maine where the focus is on treating drug affected parents whose children have been removed from the home or at risk of being removed. He developed code in SQL and SPSS to select comparison groups using propensity score matching as part of the outcome evaluations. Given statewide implementation of the Waiver initiatives, it has been necessary to select children and families served prior to implementation of the various initiatives to compare the successes of the Waiver initiatives to those served previously with similar characteristics and case circumstances. Dr. McCarthy has also developed code in SQL to measure the prospective outcomes of each state's Waiver initiatives, analyzing the case management and risk assessment data to identify the extent to which children with particular characteristics benefit more than others, trending the results over time.

For a study HZA is conducting for the Michigan Legislative Council to measure the workload and financial costs to the State and its counties of proposed legislation to move 17 year olds from the adult corrections system to the juvenile justice system, Dr. McCarthy is matching youth between the ages of 14 and 17 to the corrections system. The data are being used to identify what would have happened to 17 year olds had they been involved in the justice system as a juvenile offender.

Dr. McCarthy received a B.S. *Cum Laude* in Physics from Georgia State University in 2010. In 2013, he received his M.A. in Physics from the University of Kentucky, and he went on to earn his Ph.D. in Physics from the University of Kentucky in 2015.

Megan Hawkes, M.P.H., Qualitative Lead

Megan Hawkes specializes in projects aimed at reducing or preventing substance abuse or promoting population-level health and has been working closely with Dr. Archibald to evaluate the Partnerships for Success and Strategic Prevention Framework Rx grants as well as Prevention for States, a US Center for Disease Control and Prevention (CDC) project aimed at reducing prescription drug deaths and hospitalizations by enhancing state prescription monitoring programs. She also provided support to Dr. Archibald with the conduct of an assessment conducted in Delaware to identify deficiencies in prescription opioid and heroin addiction treatment.

Ms. Hawkes serves as HZA's liaison for its work with Drug Free Community coalitions, working closely with community coalitions and school districts to help identify where youth are at risk of engaging in risky behavior. She also is evaluating the Maine General Medical Center's CDC-funded Partnerships to Improve Community Health grant, which is aimed at

making a population-level impact on chronic disease and chronic disease risk factors by improving residents' access to community and clinical sectors to improve their health. For the initiatives to reduce high-risk drinking, prescription drug abuse and marijuana use among youth and young adults, Ms. Hawkes conducted key informant interviews and focus groups, synthesized the qualitative data and interpreted outcome data.

Prior to joining HZA, Ms. Hawkes worked for the Northern New England Division of the Salvation Army where she was responsible for grant writing and grant management. She created a grant program for the division, which included conducting research of funding opportunities for Salvation Army programs in Maine, New Hampshire and Vermont. She also created tools to facilitate the grant application process, drafted and reviewed proposals, developed outcome measurements and managed grants from proposal to final report. Ms. Hawkes earned her M.P.H. from Boston University.

Project Understanding

In the spring of 2017, the Vermont Legislature passed Act 82, which includes a call for an examination of mental health care and care coordination. The Act, following upon an earlier law (Act 79) is intended to address a number of ongoing gaps in Vermont's mental health system including factors such as: long wait times in emergency rooms for inpatient hospital beds, underutilization of available beds, inadequate staffing in the community, and limited community mental health programming. The Act calls for empirical analysis of mental health care data in order to determine how well the system is functioning and what resources are needed for improvement.

A pivotal component of Vermont's mental health system singled out by the Act is the civil commitment of individuals to mandatory or involuntary treatment including the provision of psychiatric medications. Nearly every state has civil commitment laws establishing policy and guidelines requiring treatment for individuals with severe mental illness who cannot seek care voluntarily. While a number of factors impact psychiatric care, a key question in Vermont remains: what is the impact of mandated treatment/court-ordered mental health treatment, especially court-ordered medication, on individuals and the mental health system?

A 2014 law in Vermont concerning involuntary psychiatric treatment (Act 192) allows the commissioner of mental health to request an expedited process for people who have received court-ordered medication before they become or, who remain, very dangerous to themselves or others, even when hospitalized. The law also allows hearings on patient's hospitalizations and medications that usually take place a week or more apart to be combined for anyone whose mental condition is deteriorating. Additionally, it mandates a judicial review of any application for involuntary treatment, including legal representation for the patient.

Treatment, both voluntary and involuntary, can take place in inpatient and/or outpatient settings. The most common type of involuntary mental health treatment is court-ordered commitment to an inpatient mental health facility. Treatment may also encompass involuntary medication; electro-convulsive therapy; treatment in correctional settings or as a condition of probation, supervision or parole; commitment to an outpatient treatment plan and guardianship or conservatorship.[1]

While involuntary treatment is expected to overcome patient nonadherence to treatment regimens and therefore result in beneficial outcomes, studies examining involuntary hospitalization vary widely in the answers they provide to the question of the relative effects of involuntary versus voluntary commitment on patients' well-being. In meta-analyses of forty-one research papers, Kallert, Glockner and Schutzwohl show that length of stay,

[1] Mental Health America (2015). Position Statement 22: Involuntary Mental Health Treatment Accessed November 13, 2017. Retrieved from http://www.mentalhealthamerica.net/positions/involuntary-treatment.

readmission risk, and risk of involuntary readmission were often greater for patients who received services involuntarily (although sometimes no differences were evidenced). Such patients demonstrated lower levels of social functioning, were more dissatisfied with treatment and more frequently felt that hospitalization was not justified.[2] In a more focused study, Russ and John[3] show that among three groups of patients, those who received involuntary court-ordered medication compared to patients who agreed to treatment as well as those who refused medication, patients receiving medication under court order were less likely to link to an aftercare provider, were more likely to be transferred to a state hospital, had poorer insight on admission, had a longer average stay, and were more likely to utilize mandatory outpatient treatment and long-acting injectable medications after discharge.

Approach

In response to the Department's Request for Information (RFI) to conduct a longitudinal study of outcomes for patients receiving psychiatric medication under court order, HZA is pleased to present its proposed approach for conducting such a study. In order to allow the Department to gain as much information about the manner in which such a study might be conducted and potential obstacles which may prevent the completion of a successful analysis, HZA is presenting its proposed approach as if responding to a formal Request for Proposals.

Defining Measures

Act 82 specifies that seven measures be used to study the impact of administering court-ordered psychiatric medications to Vermonters. To aid in assessing the impact, the Act states that comparisons should be drawn to patients who voluntarily accepted psychiatric medications as well as those who did not receive any (psychiatric) medications. Those measures are the following:

a) length of involuntary hospitalization;
b) time spent by individuals in inpatient and outpatient settings;
c) number of hospital admissions, including both voluntary and involuntary admissions;
d) number of and length of time of residential placements;
e) an individual's success in different types of residential settings;
f) employment or other vocational and educational activities after hospital discharge; and
g) criminal charges after hospital discharge.

[2] Kallert, Glockner and Schutzwohl. 2008. Involuntary vs. voluntary hospital admission: A systematic literature review on outcome diversity. European Archives of Psychiatry and Clinical Neuroscience. June: 258 8, Issue 4, pp 195–209

[3] Mark J. Russ and Majnu John. Outcomes Associated With Court-Ordered Treatment Over Objection in an Acute Psychiatric Hospital. Journal of the American Academy of Psychiatry and the Law, 2013;41(2):236-244.

While the first measure specified by the Legislature is limited to patients who incurred an involuntary hospitalization, the length of hospitalization will also be measured for those who were voluntarily admitted.

The Act also lists an eighth measure, i.e., "other parameters determined in consultation with representatives of inpatient and community treatment providers and advocates for the rights of psychiatric patients." The Act, itself, identifies other factors which might be taken into consideration, e.g., admittance through an emergency room, while literature on differences in the impact of involuntary and voluntary patient status identifies factors such as social functioning, general psychopathology, treatment compliance and satisfaction as contributing factors.[4] It will be important at the start of the project to work with DMH and Vermont's medical professionals and patient advocates to identify a complete set of measures to study. The measures will help to define the data which will be needed to generate each of those measures. A series of in-person meetings will be conducted to gain the insight of health care professionals and patient advocates, as well as the areas they think should be examined to identify the needs of working with individuals diagnosed with a mental health disorder.

A literature review will also be used to identify other measures which would benefit Vermont's longitudinal study of outcomes of mental health patients. For example, most states have Assisted Outpatient Treatment (AOT) statutes that mandate court-supervised treatment be provided within the community (also known as outpatient commitment). Studies have found that AOT reduces the incidence of psychiatric emergency/crisis services, inpatient psychiatric utilization, criminal justice involvement, and reduces the costs for at-risk adults with severe mental illness. In the five boroughs of New York City and the five outlying jurisdictions, hospitalization was found to decline markedly in the first 12 months after AOT was initiated and, with it, the cost of inpatient treatment. Medicaid costs also declined substantially as participants in the program experienced fewer psychiatric emergencies and needed fewer crisis services and clinical visits.[5]

Identifying Data Sources

The most efficient and effective means to conduct a comprehensive longitudinal study of the impact of providing patients who received court-ordered psychiatric medications while hospitalized to those who did not, is to use administrative data to measure the system-related impacts on those served under different conditions. Especially given Vermont's desire to include those served since 1998 to present, presumably to identify differences in practices over time and the extended impact of services, the use of other approaches to measure the impact of those served, such as via surveys or focus groups, is not likely to yield sufficient data to draw comparisons. Beginning with the measures set forth by Act 82 and as additional measures are considered, it will be important to examine the existing data sources available to conduct the analyses.

[4] Ibid.
[5] Swanson, Van Dorn and Swartz (2013). The Cost of Assisted Outpatient Treatment: Can It Save States Money? American Journal of Psychiatry, December. 1423-1432

Vermont has several data sources that can provide valuable information for the study. The Vermont Health Care Uniform Reporting and Evaluation System (VHCURES) offers a starting point by which to examine the hospitalizations of Vermonters with mental health disorders. HZA assumes that at a minimum, this information will be available electronically for the full population of patients served in each of Vermont's seven hospitals[6] that are designated to provide psychiatric inpatient care. Other data sources which should be available include electronic files maintained by the Vermont Department of Corrections of prosecutions, convictions and incarcerations, as well as those from the Vermont Judiciary which report on criminal involvement, such as arrests for felonies and other violent behaviors, and family and probate court involvement, among others. Data available within the Vermont Agency of Education can provide an opportunity to evaluate the extent to which patients discharged from psychiatric hospitalizations achieve educational outcomes while data from the Vermont Department of Taxes can be used to identify the extent to which patients are employed. Other data sources which might be used include data from the Vermont Department for Children and Families, including the Office of Economic Opportunity and Family Services Division. These latter files can be used to identify the extent to which patients necessitate assistance in meeting their daily needs, e.g., food and/or housing, and avoid involvement in the child welfare program, focusing here on patients with children under the age of 18.

Once a list of data to be supplied for inclusion in the longitudinal study is compiled, a final set of measures will be developed for review and approval by the DMH project team. This will also help to inform the final work plan of the activities to be carried out for the study. For example, some of the data sources may not be available for the complete study period prescribed under Act 82, 1998 to current.

One challenge which needs to be considered in the formation of the final work plan is the extent to which VHCURES will be able to identify patients who received court-ordered psychiatric medications and those who received such medications voluntarily. HZA proposes a review of medical records be conducted for a sample of cases in the event such data are not available electronically. A sample of 500 cases, selected for more recent periods and stratified across Vermont's hospitals, will be used to project the number of patients who fall into either category. A more serious challenge is the extent to which electronic data files are available and agencies are willing to share data files, with client identifying information. Beyond the onsite case reviews to identify the population groups, HZA proposes the study of outcomes be limited to only those agencies willing to share electronic data files.

Defining the Population Cohorts

The proposed analysis will take the form of a longitudinal study comparing the outcomes for patients who received court-ordered medications while hospitalized with those who voluntarily received medications and those who did not receive any. The analysis, as noted earlier, will cover the period 1998 to current. Anticipating the study would take place in

[6] The seven "designated hospitals" are Brattleboro Retreat, Central Vermont Meidcal Center, Rutland Regional Medical Center, University of Vermont Medical Center, Vermont Psychiatric Care Hospital, White River Junction VA Medical Center and Windham Center at Springfield Hospital.

2018, patients committed between 1998 and 2016 will be identified, providing at least 12 months to follow for those hospitalized in 2016 to measure the impact of services.

As will be described in the Work Plan, cohorts will be developed for each population group to help identify trends between 1998 and the present, taking into account changes in policy and practice. If an onsite case review is required to identify patients who were court-mandated to receive psychiatric medications, HZA will examine a sample of 1,000 records corresponding to admissions in 1998, 2002, 2006, 2010 and 2014, to identify the proportion of patients who belong in both the treatment and the two comparison groups. The number of records sampled from each facility will be proportional to the total number of admissions for mental health issues to each facility during the corresponding year.

Beyond the challenge of accessing data from the myriad sources described, it will be important that clients can be matched across data sources, to the extent they are commonly known. Ideally, a common, unique identifier is used across all systems to uniquely track each person receiving service, e.g., Social Security Number (SSN). HZA's experience, however, has been that agencies do not commonly collect a SSN from all of their clients. When a common identifier is not available, HZA will employ a probabilistic approach to matching records using a combination of common data fields. Examples are provided below:

- first name and/or last name, including "sounds like" variants;
- month and year of birth;
- race and ethnicity;
- gender and
- home address or zip code.

The extent to which data may be "matched" across these data systems may depend in large part on the nature of the data-sharing set up with each agency, especially whether HZA is able to obtain "full" data sets from an agency listing all clients served, or whether the data provided will be limited to only those records specifically requested. In the latter scenario, HZA's ability to developing matching routines between elements in each data set will be severely constrained. Answering all the questions the Legislature wants to explore can only be done with relatively complete access to the administrative data sets.

Measuring Outcomes

As with any longitudinal study, the analysis cohorts must be carefully defined, as must the timeframes over which success on each outcome measure will be evaluated. HZA proposes to analyze the data based on the year during which each patient was discharged from psychiatric care. For each cohort analyzed, HZA will examine the population of patients discharged from care, including their overall length of stay, whether it was their first time in a psychiatric hospitalization, and whether they received psychiatric medication (and if so, whether it was court-ordered or involuntary). To the extent demographic characteristics of each patient (such as sex, race/ethnicity and age at discharge) are available, the data will also be evaluated by those factors.

This granularity will allow HZA to identify the extent to which outcomes differ among the treatment group of patients receiving psychiatric medication under court order, a comparison group of patients voluntarily taking medication, and a second comparison group of patients not prescribed psychiatric medication. The analysis will also examine whether the length of stay in psychiatric care, or prior involvement with the mental health system impacts future outcomes; and whether the outcomes are improving or declining over time.

For each cohort of patients, HZA will then analyze the post-hospitalization data to measure outcomes of the services received, including:

a) the proportion of patients voluntarily admitted to a subsequent hospitalization;
b) the proportion of patients involuntarily admitted to a subsequent hospitalization;
c) the proportion of patients who stay in a residential treatment facility;
d) the proportion of patients who achieve a timely discharge from a residential treatment facility;
e) the proportion of patients who are subsequently arrested;
f) the proportion of patients who are subsequently convicted of a crime;
g) the proportion of patients who served time in prison or jail;
h) the proportion of patients who obtain additional education;
i) the proportion of patients who earn a high school equivalency;
j) the proportion of patients who attend college or trade school;
k) the proportion of patients who graduate from college or trade school; and
l) the proportion of patients whose income exceeds the federal poverty level.

As noted above, HZA proposes to analyze data using yearly cohorts of patients discharged through 2016 to follow them forward in time for up to five years to measure outcomes. For more recent periods, such as patients who were discharged in more recent periods, longitudinal analyses will be restricted to a shorter time frame, e.g., one, two or three years, depending on the amount of time that has passed since discharge. At the discretion of the DMH project team, the proposed timeframe of five years may easily be shortened or extended for each outcome measure, keeping in mind that for more recent cohorts, longer timeframes are not available.

Reporting Results

Each of the measures will be reported longitudinally, including breakdowns based on the characteristics of the initial hospitalization incurred by the patient. For example, the below table shows how a single year's discharge cohort might be reported for the outcome measure comparing future arrest rates for both the treatment group of patients involuntary medicated, as well as the comparison groups of patients voluntarily taking medication and those prescribed no medication.

	Involuntary Medication			Voluntary Medication			No Medication		
	2011 Discharges	Arrested within 24 Months		2011 Discharges	Arrested within 24 Months		2011 Discharges	Arrested within 24 Months	
		#	%		#	%		#	%
Total Discharges	**422**	**128**	**30.3%**	**618**	**196**	**31.7%**	**522**	**123**	**23.6%**
By Length of Stay									
0-6 Months	254	47	18.5%	371	50	13.5%	314	45	14.3%
6-12 Months	106	51	48.1%	155	92	59.4%	131	53	40.5%
12-24 Months	43	28	65.1%	62	49	79.0%	53	24	45.3%
24+ Months	19	2	10.5%	30	5	16.7%	24	1	4.2%
By First-Time Hospitalization									
First Hospitalization	254	77	30.3%	371	118	31.8%	314	74	23.6%
Not First Hospitalization	168	51	30.4%	247	78	31.6%	208	49	23.6%

The timeframe against which each measure is calculated may vary among the different measures, e.g., arrest data might be analyzed based on a one-year timeframe following discharge, while the percentage of patients subsequently graduating from a college or trade school might be more appropriate to measure on a five-year timeframe. Additionally, multiple timeframes may be analyzed for each outcome measure, e.g., the measure evaluating the percentage of patients arrested might involve looking at arrest occurring within six, twelve or twenty-four months following the discharge, as in the below example.

	2011 Discharges	Involuntary Medication					
		Arrested within 6 Months		Arrested within 12 Months		Arrested within 24 Months	
		#	%	#	%	#	%
Total Discharges	**422**	**128**	**30.3%**	**196**	**31.7%**	**123**	**23.6%**
By Length of Stay							
0-6 Months	254	47	18.5%	50	13.5%	45	14.3%
6-12 Months	106	51	48.1%	92	59.4%	53	40.5%
12-24 Months	43	28	65.1%	49	79.0%	24	45.3%
24+ Months	19	2	10.5%	5	16.7%	1	4.2%
By First-Time Hospitalization							
First Hospitalization	254	77	30.3%	118	31.8%	74	23.6%
Not First Hospitalization	168	51	30.4%	78	31.6%	49	23.6%

As the analysis of each cohort is completed, HZA will prepare for DMH a case-level data file that includes a unique identifier for each patient, the demographic information available for that client, the characteristics of their hospitalization and the extent to which each successful outcome was achieved (and where applicable, the timeframes). These case-level summary files will be delivered to DMH at the conclusion of the project; this will allow DMH and its stakeholders to take a closer look at any client populations that warrant further exploration.

Work Plan

A description of the activities which would be carried out to complete the longitudinal study for Vermont is provided below, along with a timeline and the resources needed to complete each of the activities.

Startup Activities

At the start of the project, HZA will meet with the DMH project team to review the project scope and goals, and review the work plan and timeframes. This initial meeting will also be used to facilitate a discussion of the data sources that will be available to conduct the requested analyses and to initiate steps to gain access to them.

HZA will review with the DMH project team how to obtain data regarding each of the measures, i.e., psychiatric hospital stays, residential treatment facility placements, criminal involvement, as well education and employment data, and how to distinguish among the three population groups: (a) patients receiving court-ordered psychiatric medications; (b) patients who voluntary received such medications; and (c) patients who did not receive medication. The meeting will also be used to identify other agencies with useful data which might be included in the study, such as the Vermont Department for Children and Families.

Meetings will be scheduled with the agencies intended for inclusion in the study to gain their cooperation and to review the data available to support the study. Steps will be taken to initiate access to the relevant data files, including a review of the data elements and completion of authorizations to receive confidential data files. In-person meetings will also be scheduled with representatives at each of Vermont's hospitals and with psychiatric patient advocates to identify additional measures which might be considered in the longitudinal study.

In order to facilitate the collection of the data extracts, HZA will deploy two tools at the beginning of the project – an encrypted SQL Server 2012 database into which each data set will be populated and a secure, encrypted web site via which providers and agencies may upload data directly to HZA to include in the analysis.

During this initial phase, HZA will also conduct a literature review to identify states and agencies that may have conducted a similar cross-system longitudinal analysis of outcomes following discharges from psychiatric hospitalization episodes; here, the focus will be on states similar to Vermont. The literature review will be used to in conjunction with the assembly of a comprehensive list of measures for the longitudinal study to be incorporated into the final work plan. Results of other states identified as part of the literature review will also provide a basis for comparison to the measures to be produced of Vermont's patients. The results of the literature review will be presented to the DMH project team no later than 60 days following the start of the project, and will be used to facilitate a final draft of the measures, along with a compilation of the available data sources and how they will be used in the longitudinal study.

Table 1: Startup Activities

Task	HZA Staff	Days	Timeframe
Project Kickoff Meeting	Pearce, Archibald	2	January 2018
Coordinate data sharing	Archibald, McCarthy, Powers, Reed	20	January-February 2018
Conduct meetings with health care professionals and patient advocates	Archibald, Hawkes	6	January-February 2018
Create data warehouse and secure data transfer site	McCarthy, Reed	5	January 2018
Conduct literature review	Archibald, James	4	January-February 2018
Compile list of measures	Archibald, McCarthy	2	February 2018
Finalize work plan	Pearce, Archibald	2	February 2018

Data Analysis

The data analysis will take place across three phases: identification of the study populations, matching of clients within the populations to other data systems, and generating the longitudinal analysis. Each is described below.

Identification of Study Populations

Assuming VHCURES has all of the relevant information, upon receipt of the data file, HZA will identify the first hospital stay incurred by patients with a mental health diagnosis or for whom at least one psychiatric medication was prescribed. That information will be used to establish the three population groups: (a) patients who received court-ordered psychiatric medications; (b) patients who voluntarily received such medications; and (c) patients who did not receive medication. Cohorts will then be developed for each group, using the year in which the discharge from the hospital stay was first incurred, to define the cohort. It is expected that up to 19 cohorts for each population group could be created, with one cohort developed beginning with calendar 1998 through calendar year 2016. Anticipating the study is to take place during 2018, stays incurred during 2017 will be used to identify the extent to which patients incurred a subsequent hospital stay, either for a physical or mental health condition, i.e., for measures which use a 12-month cohort to measure the impact of services.

Depending on the number of patients identified for inclusion in each cohort, it may be necessary to combine years, e.g., in increments of three, four or five years, providing sufficient counts of patients to demonstrate statistical significance of the outcome measures. Sample sizes of fewer than 50 patients will not be useful.

If, on the other hand, the data are not sufficient to identify whether psychiatric medication was administered voluntarily or by court order, a sample will be created to conduct an onsite review of medical records at the various hospitals across Vermont to determine how medications were prescribed. A sample of 1,000 records will be selected, covering five different years which span the law's requirement to look back to 1998, e.g., 1998, 2002, 2006, 2010 and 2014. Each cohort will be stratified by hospital, using the number of patients admitted for a mental health condition to determine the proportion of records to be examined at each hospital, as well as by year, depending on the relative number of admissions occurring each year at each hospital. This onsite review will establish the baseline set of cases to be analyzed within each of the three cohorts.

Match Clients to Other Data Systems

The second phase involves developing the routines by which clients may be uniquely tracked between hospital discharge data and other systems. To the extent possible, clients will be matched based on a unique identifier such as SSN. In the event that such a common identifier is not used across agency files, HZA will match clients using a combination of data elements, e.g., first name, last name, date of birth, gender and/or race. Previous experience shows that the spelling of names from one system to another can differ. HZA commonly applies a matching algorithm that uses the first three letters of the individual's last name, the first initial of the first name and month and year of birth to match clients across data files.

Conduct the Data Analysis

The data analysis will occur in two stages. The first stage will begin once the cohorts within each of the three population groups have been identified. HZA will analyze the VHCURES data to examine the initial measures prescribed in Act 82, such as length of stay, time involved in inpatient and outpatient care, the number of voluntary and involuntary hospital admissions, number of encounters incurred and length of residential placement following hospital discharge as well as success of residential treatment, e.g., discharge to a lower level of care or return to home. As each of the measures is studied, HZA will examine the characteristics of the patients, e.g., gender, age, race and ethnicity, as well as diagnoses and outcomes, to determine the extent to which results are disproportionately better or worse for certain sub-populations.

The second stage involves a study of the individual records within each cohort which were matched to those of other agencies. The matching will be used by HZA to identify the extent to which patients achieved positive or negative outcomes, such as whether they were employed following discharge, whether they engaged in an educational or vocational activity or whether they became involved in the criminal (or juvenile) justice system. As described earlier, a period of five years following hospital discharge will be used to measure success as well as involvement in negative behavior, with the period of evaluation adjusted as appropriate and/or recommended by the DMH project team.

Table 2: Data Analysis Activities

Task	HZA Staff	Days	Timeframe
Develop populations using VHCURES data	McCarthy, Powers, Pearce	5	March 2018
Establish cohorts for each population	Powers, McCarthy	2	March 2018
Conduct site visits to evaluate case characteristics[7]	Archibald, Hawkes, James	45	March-April 2018
Analyze measures involving hospital and residential treatment stays	Powers, McCarthy	15	April 2018
Match patients to files received from other data systems, refining record-matching strategies as needed	Powers, McCarthy, Reed	11	April 2018
Analyze outcomes using data matched to other data systems	Powers, McCarthy	20	May 2018

Reporting

Throughout the project, HZA will prepare and deliver to the DMH project team written monthly status reports summarizing the progress of the project and any methodological updates that have been implemented. Within six months of the project's start, HZA expects to be able to present the draft results to the DMH project team; this draft report will include a summary of the populations and their cohorts, the methods used to develop the various groups and results of the analyses conducted. The measures resulting for Vermont's patients will be compared to those of similar states to help identify where practices might be strengthened. Following delivery of the draft report, HZA and the DMH project team will meet to discuss the preliminary findings, identify any findings that may warrant additional analysis, and finalize the structure of the final report.

The final results of the study will be delivered no later than July 31, 2018, applying the feedback received from the DMH project team.

Table 3: Reporting Activities

Task	HZA Staff	Days	Timeframe
Draft monthly status reports	Archibald	3	January-July 2018
Draft final report	Pearce, Archibald, McCarthy, James	9	May-June 2018
Meet with DMH to review draft report	Pearce, Archibald	2	June 2018
Finalize report	Pearce, Archibald, McCarthy	5	July 2018

[7] This task will only be required if it is not possible to identify medications which were court-ordered vs. those voluntarily received.

Budget

As described above, the budget for this project may vary depending on how the data are to be compiled. If all of the data are available electronically, and no case or medical record reviews are required, the cost to administer the project will be $95,536. The line item budget below shows the breakdown of costs.

Should on-site case reviews be required to establish the treatment and comparison groups, an additional five site visits will be required, with a per cost trip of $1,000 to be incurred. Forty-five additional days of staff time would also be incurred, increasing the total cost to $131,936.

Personnel				
Pearce	7 days @	$700	$4,900	
Archibald	21 days @	$700	$14,700	
McCarthy	36 days @	$650	$23,400	
Powers	33 days @	$600	$19,800	
Hawkes	3 days @	$600	$1,800	
James	5 days @	$600	$3,000	
Reed	8 days @	$700	$5,600	
			Total Personnel Costs:	**$73,200**
Other Direct Expenditures				
Travel	6 trips @	$500	$3,000	
Secure server web fees	7 months @	$350	$2,450	
Printing and copying	7 months @	$200	$1,400	
Mailing	7 months @	$200	$1,400	
Phone	7 months @	$300	$2,100	
Miscellaneous	7 months @	$250	$1,750	
			Total Other Direct Expenditures:	**$12,100**
			Indirect Costs (12%):	**$10,236**
			Total Budget:	**$95,536**