LINKAGES BETWEEN COMMUNITY MENTAL HEALTH SERVICES, HOMELESSNESS, AND INMATES AND PROBATIONERS WITH SEVERE MENTAL ILLNESS: AN EVIDENCE-BASED ASSESSMENT

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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***Abstract*—Closure of psychiatric hospitals in favor of community-based treatment methods (Torrey, 1997), resulted in jails and prisons becoming the "new asylums" of the United States (National Institute of Corrections, 2014). Over the past decade, research teams in Charlottesville, Virginia, have studied data from the region to better understand the nature and extent of the individuals in the criminal justice system who suffer from severe mental illnesses (Boland et al., 2019). The work presented here extends this prior research by enlarging the study population to cover a longer time period, by characterizing the dynamic paths individuals follow through various periods of incarceration, mental health services, homelessness, and probation/supervision, and by incorporating geocoding to explore whether proximity to treatment centers has an impact on linkage to mental health services.**

Under an approved Institutional Review Board (IRB) protocol, the research team partnered with multiple local criminal justice agencies and community service providers (CSPs) to share data. These agencies interact through the Albemarle-Charlottesville Evidence Based Decision Making (EBDM) Policy Team, where regular monthly meetings are held to discuss issues in the criminal justice system. The research team analyzed data across 48 months from July 2015 to June 2019. These data comprise 8,332 individuals booked into Albemarle/Charlottesville Regional Jail (ACRJ), 13,340 individuals who received Region Ten Community Services Board (R10) mental health or substance abuse services, 2,117 individuals in a locally maintained database of homeless individuals, and 4,345 individuals who received services from Offender Aid and Restoration (OAR), which supervises individuals on local probation. Of the individuals booked into ACRJ, 18 percent "screened in" for referral for mental health services according to the Brief Jail Mental Health Screener (BJMHS). Key findings and outcomes of this study include:

- **Of the 8,332 individuals booked into ACRJ, 5,499 individuals (67%) were administered the BJMHS.**
- **Of those 5,499 individuals administered the BJMHS, 1,534 screened in for referral to mental health services, which is 28% of individuals who received the screener and 18% of all individuals at ACRJ.**

These findings support the results of prior research with greater statistical confidence. New findings include:

- **Individuals who associate their current legal trouble with drugs and alcohol have a 12% higher screening-in rate than those who do not.**
- **63% of individuals in ACRJ who screened in and were available to be treated once released ultimately were linked to R10 services.**

In previous years, BJMHS results showed that there were nearly three times as many people with severe mental illness in jail than previously estimated by the state, and that linkage to mental health services could be improved. These findings led to the development of the Therapeutic Docket, an alternative to the standard judicial process for individuals with severe mental illness (Jefferson Area Community Corrections, 2018). New findings continue to help members of the Thomas Jefferson Area Community Criminal Justice Board and the EBDM Policy Team gain insight into the needs of the region's mentally ill inmate population, ultimately leading to more evidence-based decision-making regarding the treatment of these individuals within and beyond their periods of incarceration.

Keywords—Criminal justice, evidence-based decision making, mental illness, homelessness, community health services

I. Introduction

The United States correctional system has long been aware of the connection between inmates and mental illness; Department of Justice reports from 2006 show that 64 percent of jail inmates suffer from some mental health problem, including over 705,600 inmates in state prisons (Department of Justice, n.d.). Additionally, one source states that 32.5 percent of inmates with a serious mental illness or SMI, which includes severe chronic depression, schizophrenia, and bipolar disorder, were identified at intake (Teplin, 1990). The under-identification of serious mental illness (SMI) in correctional settings leads to deficiencies in services available for those that truly need it. Additionally, this leads to overcrowding in jails as recidivism rates for the SMI population exceed those of the general inmate population.

Albemarle-Charlottesville Regional Jail (ACRJ), Region Ten Community Service Board (R10), Offender Aid and Restoration (OAR) probationary services, and the Thomas Jefferson Area Coalition for the Homeless (TJACH) all collaborate to understand the specific needs of the SMI population, and to help link mental health services and criminal justice support throughout the community. These programs work together to provide offenders suffering from mental illness with a second chance at an improved life, while maintaining public safety.

This study further characterizes the population of individuals who meet the screening criteria for serious mental illness (called the "referred" population). By breaking down analysis based on each community service provider, the team is able to develop findings regarding relationships between proximity to service centers and treatment received, crossover populations between community service boards, and model indicators to predict screen-in rates and successful probation rates. Most significantly, this project provides insights to area agencies that help them prioritize for both enhancements to service provision and community support for the identified SMI population.

II. Methodology

A. Project Scope and Resources

To analyze individuals within the Charlottesville-area criminal justice system, the research team collected data from each of the four participating organizations. Individual databases were cleaned, analyzed, and merged to allow additional analyses spanning multiple organizations.

Previous research focused primarily on analyzing the demographics of individual offenders in the data and focused on providing a more detailed understanding of metrics such as length of stay and booking frequency as these relate to individuals meeting the screening criteria for SMI. This research builds on that work by collecting and analyzing an additional eighteen months of data from each source, as well as obtaining new data going back to the July 2015 start date. This new pull of previously analyzed data provided higher quality data so that all collected data could be analyzed and matched more effectively. The data in this study spans the time period from July 2015 to July 2019, totaling 48 months. This larger sample provides a longer time span to track individuals as they move through the agencies studied.

Early in the study, the research team strengthened existing relationships with data owners by meeting with them early on,

discussing their interests and needs, and gathering additional data beyond that used in prior research. Using this solid foundation, efforts turned to extracting findings from the data. Specifically, the team focused on following an individual's dynamic path through various community resources, improving data visualization capacity to better understand and track location through geocoding, and better characterizing the ACRJ population and factors affecting the screen-in rate using logistic regression and other analysis tools.

B. Data Acquisition and Merging

Several measures were taken throughout the study to ensure confidentiality of sensitive data. In order to comply with the Health Insurance Portability and Accountability Act (HIPAA), non-disclosure agreements were established with each community agency to protect personally identifiable information (PII). All data were acquired from data owners in accordance with the University of Virginia (UVA) Institutional Review Board (IRB) approved protocol. Throughout the study, all data with PII were stored and processed on a secure virtual machine hosted by UVA and was accessed through a remote connection. Additional security measures included password protection and approved access to the high security VPN. All data were deidentified on the secure virtual machine before analysis.

The ACRJ data set comprises all unique booking events and corresponding information such as gender, race, age, crime severity, and locus of release. Each booking event is identified by a unique booking number. Throughout the study, the data were grouped to create a set of all unique individuals, so that individuals with multiple booking events and interaction with multiple agencies could be identified. Data from R10 consists of treatment information for all services provided at the community agency. OAR data includes all individuals under local supervision and their associated probation information. BJMHS and Correctional Offender Management Profiling for Alternative Sanction (COMPAS) results were also acquired from ACRJ. The BJMHS is an eight question screener that indicates whether an inmate should be referred for further mental health evaluation. COMPAS is a 137-question assessment for inmates at ACRJ that predicts offenders' risks of recidivism and identifies their primary treatment needs.

Data for individuals who appeared in multiple datasets were joined using the inner join function from *dplyr*, a tool for manipulating data sets efficiently in the programming language R. This join function uses one or more identifier columns to match rows between datasets and join them together in an output set, retaining only rows where the same set of identifiers appear in both sets. For matching between the ACRJ data set, BJMHS data set, and COMPAS data set, the common identifier of jacket number was used to identify unique individuals, and the common identifier of booking number was used to identify unique booking events. For matches between datasets without common unique identifiers, combinations of non-unique identifiers were used. These included first name, middle name, last name and date of birth, depending on available data. Fig. 1 shows the data merge process.

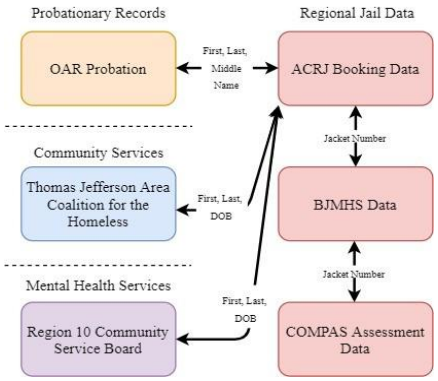

Fig. 1. Specifications for how data from various agencies were merged.

C. Research Goals and Analysis

The objective of this project was to inform evidence-based decision making by characterizing the cohort of individuals who meet the screening criteria for SMI within the Charlottesville criminal justice system, and by gaining a holistic understanding of their experiences across different community resources. The primary sub-cohorts analyzed included individuals in the ACRJ database who were screened and identified as either requiring further mental health evaluation, or not requiring further mental health evaluation. These two cohorts were further separated into individuals who had and had not been successfully linked to R10 for services pre- or post-screening. Additionally, several other cohorts were analyzed to identify further attributes potentially linked to incarceration. These include:

- Individuals in Charlottesville who experience homelessness at some point during the study period
- Individuals charged with violating their probation
- Individuals reporting a history of substance abuse
- Individuals reporting finance-related struggles (i.e. trouble paying bills, unemployment)

Given the data available and the scope and objectives of this effort, the following research questions are addressed in this paper:

- What proportion of the ACRJ population was administered the BJMHS?
- Of those who received the BJMHS, what proportion were identified for referral for mental health evaluation? What proportion received services at R10?
- What do an individual's paths among jail, mental health services, and/or homelessness typically look like in the Charlottesville-area community?
- How does geographic proximity to treatment facilities influence the rates at which individuals are linked to mental health and related services?
- Among individuals who were administered the BJMHS multiple times during their stay at ACRJ, did their screening results remain consistent over multiple screens?
- What characteristics are statistically significant with regard to whether or not an individual screens-in on the BJMHS?

- What factors are most important in determining successful probation outcome?

All statistical tests were performed at an alpha level 0.05, which implies statistical significance if a test yields a p-value less than 0.05.

III. Results

A. *Albemarle-Charlottesville Regional Jail*

The ACRJ dataset consisted of 17,584 unique booking events and 8,332 unique individuals booked during the four-year time period. From those 8,332 individuals, 66% (5,499 individuals) were administered the BJMHS at least once. Of those individuals, 28% (1,534 individuals) screened in, indicating a need for further mental health evaluation. Of the individuals administered the screener, 36% (1,966 individuals) took the screener a second time within the four-year time frame. Of those individuals who took the screener at least twice, 19% (377 individuals) saw a change in their screening results the second time they were screened.

Of those administered the BJMHS, 79% (4,317 individuals) identify as male and 21% (1,181 individuals) identify as female. Of the individuals who received the BJMHS, 1,059 males and 485 females screened in. Females have a 20% higher screen-in rate compared to males (see Fig. 2). Of those administered the BJMHS, 60% (3,273 individuals) identify as white and 40% (2,175 individuals) identify as black. The remaining 51 individuals who did not racially identify as black or white made up less than 1% of the screened population. Of the population who identify as black, 22% screened in, and 32% of those who identify as white screened in.

Further analysis identified patterns between the results of the COMPAS and the BJMHS. To begin, a stepwise logistic regression and a correlation matrix were created using sets of COMPAS data to identify COMPAS questions correlated with the "screened-in" population. Once variables were identified, each variable was analyzed to determine the statistical significance of the differences between the screened-in and screened-out populations. For those who completed the Substance Abuse COMPAS questionnaire, individuals who associate their current legal trouble with drugs/alcohol use have a 13% higher screening-in rate than those who do not (see Fig. 3). Additionally, individuals currently receiving treatment for drugs/alcohol have a 10% higher screening-in rate than individuals not receiving treatment. Among individuals not currently receiving treatment, those actively seeking treatment for alcohol abuse have a 10% higher screening-in rate than individuals who do not.

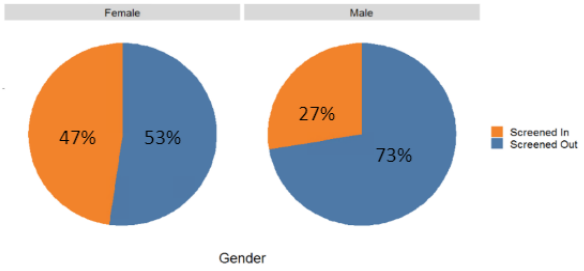

Fig. 2. Screening in rate by gender: Females have a 20% higher screening in rate than males.

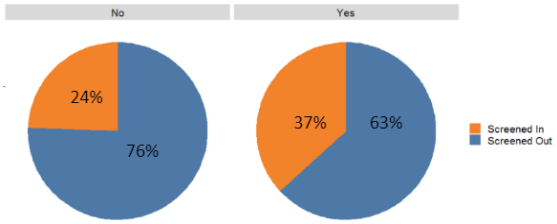

Fig. 3. Screening in Rate by association of legal trouble with substance use: Those who associate their current legal trouble with drug use have a 13% higher screening in rate than those who do not.

Financial and housing instability are also correlated with screening-in rate. Individuals who often struggle to pay bills have a 59% higher screening-in rate than those who sometimes or never struggle to pay bills. Additionally, individuals who do not have a permanent address have a 68% higher screening-in rate than those who do have an address. Finally, individuals who have lived in Charlottesville 6 months or less have a 36% higher screening-in rate than those who have lived in Charlottesville longer than 6 months.

B. *Region Ten*

Fig. 4 shows the relationship between the ACRJ population and the R10 population. Of the 8,332 individuals in the ACRJ database, 2,781 individuals were also found in the R10 database. This indicates that 33% of the individuals at ACRJ also received services at R10 during the July 2015-July 2019 time frame. Of those who received services at R10, 77% were administered the BJMHS, and of those who were administered the screener, 39% screened in. Looking at the ACRJ population that was not linked to R10 services, 60% were administered the BJMHS. Out of the individuals administered the screener, 21% screened in.

Further analysis shows the individuals who screened in but did not receive R10 services and were actually available for treatment at R10. *Release reason* in the ACRJ dataset indicates the disposition of individuals following incarceration, and the following release reasons were considered available for linkage to R10 treatment: to probation, time served, court ordered release, bonded, not guilty/innocent, charge dismissed, to parole, sentence balance suspended, fine and costs, sentence served, serving weekend sentence, work release sentence served, diverted-supervised work experience, to pretrial services, to Home Electric Monitoring (HEM), and released no reason applicable. Out of the individuals who screened in but were not matched to R10 treatment, 69% were available to be linked to treatment. Overall, 63% of individuals in ACRJ who screened-in and were available for treatment were linked to R10 services.

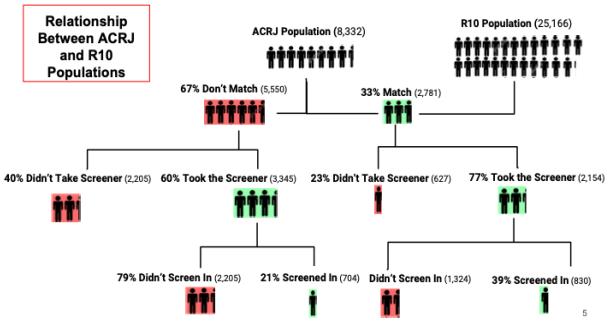

Fig. 4. Relationship between ACRJ and R10 population

Two different cohorts are shown in Fig. 5: the individuals from ACRJ who screened in and received R10 services and those who were screened in and did not receive R10 services. These two cohorts were analyzed based on the zip code they reported when they were booked into ACRJ. These two cohorts were analyzed to investigate whether an individual's proximity to services affected their linkage to treatment. In Fig. 5 the differences in the location of these two cohorts are displayed. The lower image indicates that those who screened in and did not receive R10 services were much more widely distributed throughout the Commonwealth of Virginia than those who received R10 services. This indicates that proximity to treatment may impact their linkage to treatment, meaning individuals who were successfully linked to treatment were located closer to the treatment center.

Another analysis identified the dynamic path of individuals throughout the local criminal justice system. This analysis identified the sequence of events for individuals who were in both the ACRJ and R10 databases. Figure 6 shows that of the 2,781 individuals matched to both ACRJ and R10, about 70% were first seen at ACRJ.

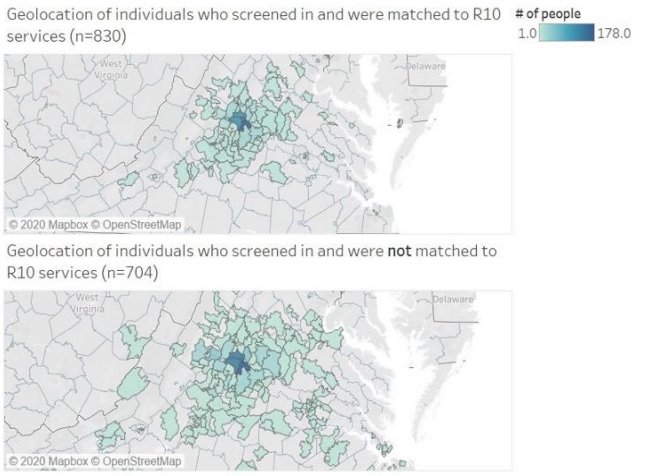

Fig. 5. Geolocation of individuals at ACRJ who screened-in: Individuals successfully linked to R10 services were located closer to the treatment center.

This result suggests that ACRJ is, in some respect, the diagnostic tool for these individuals and the screener may direct them to R10 after their release. It is important to note that this is based on the 4-year time period of data collected, thus encounters with either ACRJ or R10 that fall outside this range may have occurred, but are not in the data used in this analysis.

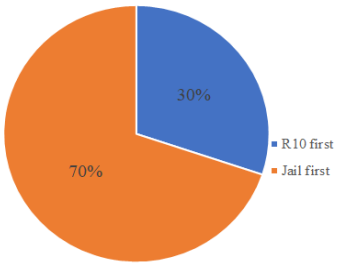

Fig. 6. Where individuals linked to ACRJ and R10 and appeared first: Individuals matched between R10 and ACRJ were more often seen first at ACRJ.

C. *Thomas Jefferson Area Coalition for the Homeless*

The primary analysis of the TJACH data was done on individuals linked to both TJACH and ACRJ. Of the 2,117 clients in the TJACH database, 371 (15%) were also found in the ACRJ database. Among this cohort of inmates, 68% of the 371 individuals considered were registered first in the TJACH database and then later in the ACRJ database; that is, they self-identify as homeless prior to being booked into ACRJ within the study period. This appears to indicate that, while there is flow in both directions, the majority of individuals in the cohort are first homeless. Further research on this observation with a larger sample is warranted. Additionally, of the group that was administered the BJMHS, 43% screened-in for referral for further mental health evaluation, compared to 28% of the entire screened ACRJ population. That is, the homeless screen in at a higher rate than the general jail census.

Finally, an analysis of homelessness in the Charlottesville area considered depth of homelessness (see Fig. 7), defined as the comparison between the cumulative length of an individual's time spent homeless over the four-year period and the total number of incidents of homelessness reported throughout that time.

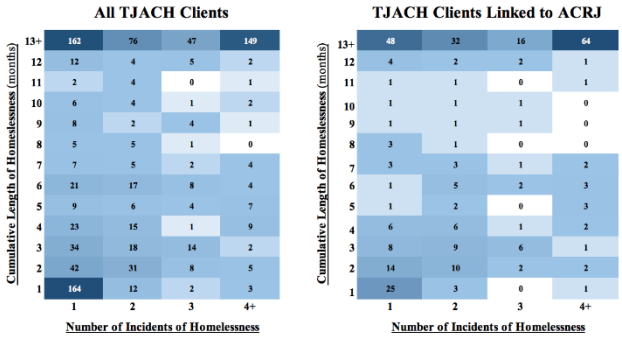

Fig. 7. Depth of Homelessness Analysis (2016-2019): A side by side comparison of the full TJACH client population and the sub-group within it linked to ACRJ shows minimal differences in patterns of homelessness..

This analysis concluded that of homeless individuals both linked to ACRJ and not, the patterns of homelessness depth remain relatively consistent. The most prominent three categories in either group are 1) individuals reporting one incident of homelessness lasting one month or less (a brief and singular incidence), 2) those reporting 1 incident of homelessness of 13 or more months (chronic homelessness), and 3) those reporting four or more incidents of homelessness and 13 or more total months of homelessness (brief but repeated instances).

D. *Offender Aid Restoration*

Albemarle-Charlottesville Regional Jail and Offender Aid and Restoration, prior to investigation, were believed to be highly correlated institutions with large overlaps in their population. The first portion of results communicates the findings of a first, middle, and last name match used between OAR and ACRJ. In 2019 alone, OAR had 3,569 unique individuals supervised on probation. Of these unique individuals, detailed analysis indicated that approximately 21%, or 754 individuals, were also found in the ACRJ database.

The second portion of analysis focused on matching the OAR local probation population to that of the population that had taken the BJMHS. Of the 3,569 individuals in the OAR database in 2019, 535 of them had taken the brief jail mental health screener. Of those 535 individuals, approximately 33% (176 individuals) of them met the screening criteria for serious mental illness.

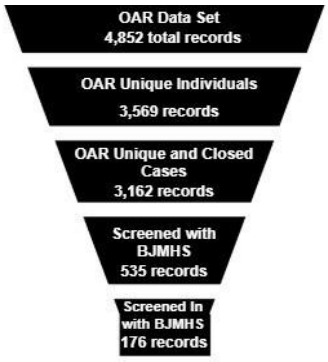

Fig. 8. Visualization of the predictors used to predict a successful probation at OAR for both screened in and screened out populations

Finally, the last portion of analysis focused on comparing these two matched populations to see if they had differing factors that could lead to a successful probation outcome. Thus, two general linear models were created. The first consisted of matching OAR, ACRJ, and those that screened out while the second consists of OAR, ACRJ, and those that met the screening criteria for serious mental illness. In both models, OAR data from 2019 was initially treated such that only closed cases were examined. Any probation case that was open at the time of analysis was removed because it was neither successful or unsuccessful, leaving 3,162 individuals with closed cases.

The first model, testing indicators of probationary success among *those that did not screen in* for having a serious mental illness, used the predictors gender, age, MOST recidivism risk score, race and category of charge. The general linear model indicated that MOST score was the only significant predictor of probationary success. An increase in categorical MOST score from LOW to MEDIUM decreased the likelihood of completing probation by 230%. All other factors were found to be insignificant for the screened out population. The second model, testing indicators of probationary success among *those that screened in* on the BJMHS, used the same predictors of gender, age, MOST score, race, and category of charge. This linear model produced vastly different results. Not only did the model indicate that MOST was no longer a statistically significant predictor, but it also found that age and assault charges were statistically significant factors for individuals meeting SMI screening criteria in successfully completing probation. For an individual meeting the SMI criteria, a one year increase in age was found to increase the likelihood of a successful probation outcome by 3%, holding all other variables constant. Additionally, under the same conditions, a charge under the category of assault was found to increase likelihood of successfully completing probation by 217%.

IV. Implications And Conclusion

In summary, of the 5,499 individuals in the ACRJ cohort that were administered the BJMHS, 28% of those individuals met the screening criteria for serious mental illness. In addition, of those administered the screener, 36% were administered the screener a second time within the four-year time frame, and of those who were administered the screener twice in the four-year time frame, 19% saw a change in their BJMHS screening results. Of those administered the BJMHS, 79% identified as male and 21% identified as female. Those who identified as female had a 20% higher rate for screen-in compared to males, which is consistent with past findings.

The ACRJ cohort was also linked to the R10 database, which indicated that 33% of the individuals at ACRJ also received services at R10 during the July 2015-July 2019 time frame. Out of those who received services at R10, 77% were administered the BJMHS, and of those who were administered the screener, 39% screened in. Sixty percent of the individuals not linked to R10 services were administered the BJMHS, and out of those individuals administered the screener, 21% screened in. Based on the geographical analysis done on the ACRJ cohort linked to R10 services versus those that were not, proximity to treatment appears to impact their linkage to treatment, meaning individuals who were successfully linked to treatment were located closer to R10 services. This observation deserves further research. Of the 2,781 individuals matched in both ACRJ and R10 databases, 70% were first seen at ACRJ.

The ACRJ cohort was also linked to TJACH data to investigate whether homelessness more often occurred before or after someone appeared in jail. Among the individuals linked to both ACRJ and TJACH, 68% of the 371 individuals considered were registered first in the TJACH database and then later in the ACRJ database, indicating homelessness more often occurs before an individual is booked at the jail.

ACRJ cohort data were linked to OAR data and these combined data were used to build a model to determine the effects of various indicators on their ability to predict whether an individual would successfully complete probation. The two indicators found to have a statistically significant ability in predicting successful probation were age and MOST score. This affirms the value OAR places on the MOST score, indicating it can be a useful variable to predict probation success.

Over the past five years, this research effort has characterized the screened in population at ACRJ to help inform decision makers so they can better understand how to serve individuals suffering from severe mental illness. The evidence-based analysis of this population plays an important role in helping the EBDM team make informed decisions. The research findings reported here emphasize the geolocation data and the individual's dynamic path through the community resources. Though the findings presented here are limited to the greater Charlottesville area, the hope is that they emphasize the effort that should be placed on researching the mentally ill population in jails and prisons at large. Future work includes creating a more comprehensive database that can be used to collect and maintain all of the data from various community resources in order to streamline the data acquisition and analysis process in upcoming years.

Acknowledgment

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