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Availability and Capacity of Substance Abuse Programs in Correctional Settings: A Classification and Regression Tree Analysis

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Abstract

Objective to be addressed—The purpose of this study was to investigate the structural and organizational factors that contribute to the availability and increased capacity for substance abuse treatment programs in correctional settings. We used Classification and Regression Tree statistical procedures to identify how multi-level data can explain the variability in availability and capacity of substance abuse treatment programs in jails and probation/parole offices.

Methods—The data for this study combined the National Criminal Justice Treatment Practices survey (NCJTP) and the 2000 Census. The NCJTP survey was a nationally representative sample of correctional administrators for jails and probation/parole agencies. The sample size included 295 substance abuse treatment programs that were classified according to the intensity of their services: high, medium, and low. The independent variables included jurisdictional-level structural variables, attributes of the correctional administrators, and program and service delivery characteristics of the correctional agency.

Results—The two most important variables in predicting the availability of all three types of services were stronger working relationships with other organizations and the adoption of a standardized substance abuse screening tool by correctional agencies. For high and medium intensive programs, the capacity increased when an organizational learning strategy was used by administrators and the organization used a substance abuse screening tool. Implications on advancing treatment practices in correctional settings are discussed, including further work to test theories on how to better understand access to intensive treatment services. This study presents the first phase of understanding capacity-related issues regarding treatment programs offered in correctional settings.

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Keywords

capacity for substance abuse treatment; classification and regression trees; availability of substance abuse treatment programs; administrator factors; substance abuse tools

1. Introduction

The distribution of types of treatment services offered is an understudied issue. A related and equally understudied issue is the capacity of the available programs to provide adequate care for offenders with severe substance abuse disorders. A quick review of the field illustrates this pressing concern. Over 70 percent of substance abuse treatment facilities provide outpatient counseling and 28 percent provide residential type services (Substance Abuse and Mental Health Services Administration, 2006), services that are best suited for less serious substance users. The same is true for treatment services offered to offenders. A recent survey of correctional agencies (National Criminal Justice Treatment Practices Survey) found that alcohol and drug education programs were offered in 61% of jails, 74% of prisons, and 53% of community corrections agencies, making education the most widespread form of substance abuse treatment while more intensive services such as intensive outpatient counseling, therapeutic community, and other such programs are infrequently available (Taxman, Perdoni, & Harrison, 2007). This is contrast to the need for more intensive treatment services for offenders based on the severity of their disorders, as recently reported by Belenko and Peugh (2005). This study found that one third of male offenders and half of female offenders need intensive drug treatment services, and that offenders in prison are more likely to receive low intensity services which are not geared to deal with the severity of their substance abuse disorders (Belenko & Peugh, 2005). This paper explores the issues of the treatment gap to learn about organizational and structural factors that affect the availability of different treatment programs, and the size of these programs, as it pertains to their capacity to serve the needed population. The analysis pertains to services available to offenders, since this subpopulation has been clearly identified as having serious substance use disorders that are four times greater in number than the general population (Taxman, Perdoni, & Harrison, 2007) and there is a well-recognized scarcity of treatment programs targeted to address these needs (Chandler, Fletcher, & Volkow, 2009).

The National Criminal Justice Treatment Practices (NCJTP) survey, the primary data source for articles in this special edition, offers an opportunity to examine the two issues: the types of services available and the capacity of the programs to serve the offender population (access rates). With NCJTP data, this paper explores how the characteristics of jurisdictions, correctional agencies, and administrators affect the availability of and capacity to provide drug treatment services for offender populations. We investigate these research questions using Classification and Regression Trees (CART) (Breiman, Friedman, Olshen, & Stone, 1984), which constitutes a nonparametric data analysis tool. In recent years, CART has been utilized extensively in the fields of biology, medicine, and public health to develop hypotheses for further analysis, but it remains novel in the field of drug related treatment services. Several studies in these medical fields have found CART to be important in uncovering complex variable relationships and determining risk profiles for diseases and conditions in various populations (Kitsantas, Moore, & Sly, 2007; Smits et al., 2008). Furthermore, when there is no guiding theory to identify predictor variables that should be used in the analyses, CART can provide information on variable importance and variable relationships that could lead to the development of hypotheses to be tested in further work. These features of CART make this methodology well suited for this study in examining how organizational characteristics and structural variables (i.e. census data) can be used to better

understand the distribution of treatment services available. Two basic questions are explored in this paper: 1) what factors affect the availability of certain types of treatment programs; and 2) what factors affect the size of treatment programs. Obtaining a better understanding of the provision of intensive programs (i.e. therapeutic community programs) will be a particular focus. This study complements other research studies presented in this special edition by examining factors that affect the adoption of practices designed to improve the type and quality of services available to offenders. A number of studies in this special edition focus on more traditional analyses in order to examine the option of different innovations such as wrap-around services (Oser, Knudsen, Staton-Tindall, & Leukefeld, 2009a) and medications (Oser, Knudsen, Staton-Tindall, Taxman, & Leukefeld, 2009b) as well as the importance of state policy (Young, Farrell, Henderson, & Taxman, 2009), beliefs of correctional administrators (Henderson, Taxman, & Young, 2009), and interagency relationships (Fletcher et al., 2009). Collectively these studies offer an opportunity to understand how organizational factors affect service delivery across a variety of the treatment needs of offenders.

1.1 Background

Overall, the correctional system does not perceive its role as a service provider. Instead, substance abuse treatment and other services are a means to mitigate further criminal behavior. With a clear mandate to pursue public safety goals, the correctional system is trying to balance the need of safety goals and “rehabilitation-type” services (Listwan, Cullen, & Latessa, 2006). Historically, correctional agencies have relied upon a brokerage model of referring offenders to substance abuse treatment programs or allowing such programs to provide services in their facilities. To enhance treatment access, specialized programs for offenders have been established such as case management, drug courts, diversion programs for first time offenders into treatment in the community, and in-prison treatment programs. While recent efforts have been undertaken to advance the integration of public health and treatment services with offenders (Marlowe, 2003; Taxman & Bouffard, 2000), these efforts are often undermined by the culture of incarceration-based correctional practices and thus, experience a diminished ability to be effective (Farabee et al., 1999; Harrison & Martin, 2001; Taxman & Bouffard, 2000). There is also a growing body of research that examines the broader issue of the adoption of innovations in punishment-oriented agencies (Taxman & Belenko, 2008). First, we will review the literature on factors that affect adoption of innovations in substance abuse treatment settings and then the specialized settings where offenders may receive services. The remaining part of this paper will then explore the issues of availability of treatment programs using CART and the capacity of the programs.

1.2 Factors that Affect the Type of Treatment Services Provided in the Community

Responding to the study of the Institute of Medicine (IOM) on “Bridging the Gap Between Practice and Research” (Lamb, Greenlick, & McCarty, 1998), the last decade has spurred researchers to devote considerable attention to examining factors that affect the adoption of innovations in substance abuse treatment programs (D’Aunno, 2006; Roman, Ducharme, & Knudsen, 2006; Roman & Johnson, 2002; Simpson & Flynn, 2007). We begin by reviewing factors which are known to affect the adoption of innovations. One important factor pertains to staffing characteristics. For instance, Roman and Johnson (2002) found that private programs with more experienced administrators and a higher percentage of counselors with master’s degrees are more likely to adopt naltrexone (a medication innovation for opiate addicts). Knudsen and Roman (2004) also found that private treatment centers with a higher percentage of certified staff are more likely to accept new clinical strategies (i.e. motivational enhancement therapies, cognitive behavioral therapies, etc.) to use in their programs. McCarty and colleagues (2007) found that overall, staff with graduate degrees

have more positive opinions about evidence-based therapies than those with lesser credentials. Educational achievement of staff affects the willingness to adopt evidence-based therapies (Forman, Bovasso, & Woody, 2001; Oser & Roman, 2008).

In a series of longitudinal surveys of the treatment field, D'Aunno (2006) found that public and private treatment organizations are more likely to adopt new innovations when they form collaborative relationships with other agencies. This is especially true when the organizations seek funding, address diverse clients, and become more active in policy making. The type of innovations adopted varies by type of facilities, with private facilities being more likely to use pharmacological interventions and public facilities being more likely to use motivational enhancements (Roman et al., 2006).

The external environment is also a factor that affects the nature of treatment delivery systems. Prior research on substance abuse treatment programs has revealed geographic location to be associated with the type of services provided (Arfken & Kubiak, 2007; D'Aunno & Vaughn, 1995). Services in rural areas are fewer than in urban areas (D'Aunno & Vaughn, 1995) while the geographical distribution of services appears to reflect the socio-political environment. For instance, programs tailored for offenders convicted of drunk driving were more likely to be offered in non-metropolitan areas than in urban areas (Arfken & Kubiak, 2007).

In a series of studies using data from NCJTP, the analyses primarily replicated the analyses from research on adoption issues in the general substance abuse field. The dependent variable was the extent to which evidence-based practices (EBPs) associated with substance abuse treatment services and service delivery models (i.e. number of key elements that are considered innovation in the field, see Friedmann, Taxman, & Henderson, 2007) are used by correctional agencies. These analyses used an inventory approach of the number of EBPs adopted because it allows for easier comparability across organizations and provides more consistent findings than focusing on a single evidence-based practice (Damanpour, 1991; Knudson & Roman, 2004). The elements which were developed from a review of the literature and consensus approach included: (1) standardized risk assessment; (2) standardized substance abuse assessment and treatment matching; (3) use of techniques to engage and retain clients in treatment; (4) use of therapeutic community, cognitive-behavioral, or other standardized treatment orientation; (5) a comprehensive approach to treatment and ancillary needs; (6) addressing co-occurring disorders; (7) involvement of family in treatment; (8) a planned treatment duration of 90 days or longer; (9) integration of multiple systems to optimize care and outcomes; (10) continuing care or aftercare; (11) use of drug testing in treatment; (12) use of graduated sanctions; and (13) incentives to encourage progress. Findings for adult and juvenile correctional agencies found that adoption is enhanced when administrators have a background in human services, are more knowledgeable about evidence-based practices, support rehabilitation goals, create a performance driven culture, perceive the availability of resources, and place value on training staff (Friedmann et al., 2007; Henderson et al., 2007). Using Rasch modeling techniques, Henderson, Taxman & Young (2008) identified other variables that were important to the adoption process such as relationships with other agencies (both criminal justice and non-justice), creation of an organizational learning culture, emphasis on quality treatment, and perception of available resources.

Focusing on specific innovation, research has identified other important factors. Grella and colleagues (2007) examined the factors that affect use of evidence-based treatments in prison and community correctional programs. The study found that prisons tended to use therapeutic community programming while community based programs used cognitive behavioral therapy. None of the climate organizational variables (e.g. performance driven

culture, organizational learning) predicted therapeutic orientation. Oser and colleagues (2007) found that adoption of HIV testing in correctional agencies was likely to occur when the organizational power was decentralized, the administrators valued the provision of training and professional development activities for staff, and when the administrators perceived greater financial and staff resources.

1.3 Understanding Capacity of Treatment Programs

The existing literature has started to garner a better understanding of adoption behaviors for substance abuse treatment programs in correctional program settings. The literature points to the importance of organizational and administrator characteristics and their impact on whether or not the agency uses innovations. With the exception of a recent evaluation on the Fighting Back initiative (a demonstration project to empower communities to deal with drug-related issues), we are unaware of any study that has devoted attention to understanding the capacity of treatment programs to serve the needs of an individual community. Tighe and Saxe (2006) assessed the gap between treatment need and availability of services during the Fighting Back initiative and found that the overall initiative did not improve the capacity of substance abuse programs to serve the addict population in the targeted communities. They found that treatment capacity stayed the same due to the community's negative attitude towards methadone maintenance programs. In other words, capacity was affected by external stakeholder factors rather than attention to the needs of the addicted population.

The general health services literature has examined access to services from a client utilization model. Leukefeld and colleagues (1998) recognizes that individual characteristics of the offender such as criminal history, type and severity of crime, and type of drug use/charge are important factors in understanding access to needed treatment services in the justice system. But, this model does not include the issues regarding availability of specific types of services in communities or the capacity level of the services. Beginning to understand factors that affect the availability of services in communities, coupled with a client utilization factors could advance our understanding of how best to meet the needs of the substance abusing populations.

2.0 Methods

2.1 Data and Subjects

The National Criminal Justice Treatment Practices (NCJTP) survey gathered information on, among other topics, the availability and makeup of substance abuse treatment across various correctional settings, organizational and administrative practices in these settings and the implementation of evidence-based practices (see Taxman, Young, Wiersema, Mitchell, & Rhodes, 2007 for a detailed description of the survey). Given that there was not a complete listing of community-correctional programs, the study team created a frame for surveying community correctional agencies. Using a two-stage stratified cluster (Kish, 1965), the frame was developed by selecting counties and by then surveying all correctional agencies that operate within those 72 jurisdictions. The first stage was the selection of counties, which were all categorized based on population size (small = less than 250,000, medium = 250,000–750,000, and large = more than 750,000), and by region using the same eight-category classification. This resulted in 24 strata from which counties were drawn, and all counties with a population of 3 million or more were sampled with certainty. Seventy-two (72) of the 3,141 counties or county equivalents in the U.S. were selected via this method. The second stage was a census of all probation and parole agencies, jails, community-based treatment programs, etc. in these counties. This paper examines the survey findings for community correctional and jail administrators.

A 32-page survey was mailed to facility administrators (chief probation officers, agency heads, jail administrators, etc.). Respondents were asked various questions about their agency on topics such as population size, financing, types of programs and services that are offered, and opinion-based questions on attitudes toward treatment and punishment and their agency's work with other institutions in their locality. The response rate was 71% for community corrections and jails in the surveyed jurisdictions.

2.2 Variables Used in the models

The variables for this study came from two sources: the National Criminal Justice Treatment Practice Survey and the 2000 U.S. Census. The predictor variables used in the analyses are presented in Table 1 and detailed below.

2.2.1 Dependent Variables—The outcome variables included high, medium, and low intensity substance abuse treatment programs and capacity of the programs to serve the offenders. High intensity programs (n = 78) included therapeutic community in a segregated residence and therapeutic community in a non-segregated residence programs. Medium intensity programs (n = 87) included substance abuse counseling that is at least three times a week. Low intensity programs (n = 130) were comprised of substance abuse counseling (maximum of four hours a week) and methadone maintenance. Items on the survey evaluated the average daily percentage of individuals (0 to 100%) who could participate in a substance abuse program (defined as the program capacity). To be precise, capacity reflects the size of the program (i.e., how many offenders participate in the program) relative to the size of the overall population (number of offenders that are currently in a given facility).

2.2.2 Independent Variables—The following variables were used in the study. They were selected based on a review of the literature discussed above. Refer to Taxman, Young, Rhodes, and Zinsser (2008) for a copy of the organizational variables available in the study.

County level variables: From the 2000 Census, the following variables are used to describe the communities and differentiate characteristics of the programs: county median income, percentage distribution by gender, race and ethnicity, median age of the county residents, percentage of county residents that have limited spoken English, poverty rate, and county population size.

Administrator's demographic variables: The key variables are age, race, level of education, and gender.

Program level variables: The survey queried administrators about their existing practices in their agencies. Three measures were used: the use of a standardized risk screening tool to measure propensity to commit crimes, the use of a standardized substance abuse screening tool to measure substance abuse, and the use of active practices to refer offenders to substance abuse agencies in the community.

Administrative perspective variables: The following are the measures in this category.

Organizational learning: A 12-item scale assessed the overall philosophy and condition at their organization (Cameron & Quinn, 1999; Denison & Mishra, 1995). This measure is the degree to which the administrators view their organization as open to change and supportive of new ideas. Included are measures of performance, vision, openness, and risk taking strategies. These items were assessed on a 5-item likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". A total score of organizational learning was created to

indicate the degree to which the administrator is open to change and supportive ideas (reliability: .72).

Organizational culture: This 10-item scale was used to measure perception of their organization's ability to be supportive of new ideas and openness to change (Scott & Bruce, 1994; Orthner, Cook, Sabah, & Rosenfeld, 2004). A total score of organizational learning was created to indicate the degree to which the administrator supports a climate of continuous acquisition of information to alter practice (reliability: .77).

Attitudes Toward Rehabilitation and Punishment: A 12-item scale was used to measure perceptions of how best to reduce crime (Applegate, Cullen, & Fisher, 1997; Cullen, Fisher, & Applegate, 2000; Cullen, Latessa, Burton, & Lombardo, 1993). From this 12-item scale, the following subscales were calculated: (1) Crime reduction using punishment/deterrence (subscale reliability: 0.90); and (2) crime reduction using rehabilitation (subscale reliability: 0.79). These items were assessed on a 5-item likert scale ranging from 1 "strongly disagree" to 5 "strongly agree".

Leadership: The survey included 17 items that assessed administrator leadership style and the extent to which they were transformational or transactional leaders (Arnold, Rhoades, & Drasgow, 2000; Bass & Avolio, 1995; Podsakoff, MacKenzie, & Fetter, 1990). A transformational leader is one who emphasizes bringing about change and vision in the organization through a focus on higher purposes and goals. A transactional leader focuses on individual relationships between administration and employees by providing feedback and inspiring loyalty to the organization. These items were assessed on a 5-item likert scale ranging from 1 "strongly disagree" to 5 "strongly agree."

Organizational Needs Assessment: A 22-item scale assessed the overall functioning and needs at their organization (adapted from Lehman, Greener, & Simpson, 2002). This scale formed the following seven subscales: (1) Perceived funding for new programs (subscale reliability: 0.63); (2) community support-needs assessment (subscale reliability: 0.58); (3) perceived availability of resources (subscale reliability: 0.74); (4) training needs assessment (subscale reliability: 0.78); and (5) staffing needs assessment (subscale reliability: 0.58). These items were assessed on a 5-item likert scale ranging from 1 "strongly disagree" to 5 "strongly agree."

Rank of importance of substance abuse treatments: The administrators ranked the importance of substance abuse treatment programs in prison and in the community on a scale of 1 to 10. A higher rank reveals that the administrator has greater support for the value of treatment.

System Integration: The National Criminal Justice Treatment Practices Survey created a scale to measure integration of services between correctional and other agencies. Included in this 11-item measure are sharing basic information through formal or informal networking or information systems; policies and procedures to identify eligible clients; sharing resources (including space, funds, training, and staff); and modifying services for better coordination across multiple agencies. This scale measured the extent to which the organization worked with other related agencies such as the judiciary, community treatment programs, and institutional and community correctional agencies. Factor analyses were conducted to determine the validity of the measure (see Fletcher et al., 2009 in this edition).

2.3 Statistical Approach

Despite the widespread use of traditional regression techniques, such as ordinary least squares regression or logistic regression, the limitation of these techniques make them less than ideal for this study. Parametric regression techniques do not deal effectively with multicollinearity among independent variables, require the specification of interactions between independent variables and the use of a functional relationship between dependent and independent variables, and do not handle missing data well. Classification and regression trees (CART) offer an alternative for predicting categorical (classification trees) or continuous (regression trees) response variables where the relationships among the components are unspecified and existing theory is not available to guide the models.

CART, which was formalized by Breiman et al. (1984), constitutes a nonparametric tool for uncovering complex variable relationships that cannot be detected by traditional statistical techniques such as ordinary least squares regression. It can also handle a large number of variables, and it is well suited for research questions, like the ones proposed in this study, where there is no guiding theory in determining in advance what predictor variables should be included in the analyses. Furthermore, in CART the graphical display of the results can assist individuals working in the criminal justice field in visualizing how predictors interact and understand the relative importance of each variable in predicting the modeled response (i.e., access rates or availability of substance abuse treatments). The accuracy of CART is comparable with linear and logistic regression and it can be more accurate when the relationship between the dependent and independent variables is non-linear (Breiman et al., 1984).

CART, however, cannot be used to measure the effect of a set of independent variables on the response variable since it is not a probabilistic model. The tree-structured predictors can become very complex (contain a large number of nodes) and often affect their interpretability. Despite these limitations, CART as an exploratory procedure can assist us in understanding which factors influence the availability and capacity of substance abuse treatment programs.

A CART tree can be populated by splitting of the data into binary subsamples that lead to the formation of daughter nodes (a node that can be split further) and terminal nodes (a node that cannot be divided any further). The main aspects of building a tree-structured predictor include (1) the selection of a variable split at every daughter node by applying an impurity measure or a splitting rule to each variable and (2) a pruning procedure which produces a sequence of subtrees from which an optimal tree is selected. Specifically, the best variable split is chosen based on how well it separates the classes of the dependent variable producing homogenous subsamples, whenever possible. For instance, a relatively homogenous node (subsample) would contain 80% diseased cases and 20% non-diseased cases. Although the original tree, whether it is a classification or regression tree, is very accurate, it is complex and difficult to interpret. For this reason, the CART technique includes a pruning procedure which reduces the size of the tree. Cross-validation or an independent test sample is used to measure the goodness of fit of the final tree. For the classification trees, we used the cross validation method. In cross-validation, the data set is randomly split into N subsets. One of these subsets of data is used as an independent test sample, while the other N-1 subsets are used as learning data in the tree-building procedure. The learning data sets are used to build the trees while the test sample is utilized in validating them. The entire tree-building procedure is replicated numerous times. For instance, in a 10-fold cross validation, the data are divided into 10 equal subsets. In each cross-validation replication, nine of the subsets are used as learning data and one is used as a test sample. In regression trees, the least squares method measures the accuracy of the predictor based on the mean squared error. CART computes the mean and standard

deviation of the dependent variable and these measures are assigned to each node. The mean value becomes the predicted value of the dependent variable in regression trees.

CART handles missing values by using “surrogate splitter variables,” which are back-up variables that contain similar information to what would be found in the primary splitters. By using surrogates to stand in for missing values, CART generates robust and reliable predictive models. Furthermore, this recursive binary partitioning technique is capable of “teasing out” hierarchical or nested data structures and non-linear interactions between predictor variables (Quinlan, 1992). In this study, we used the CART software (Salford Systems, 2006) to build separate tree models for high, medium and low intense programs. These separate analyses allowed us to evaluate the relative importance of a large number of variables in predicting the availability and capacity across different types of substance abuse programs.

3.0 Results

3.1 Characteristics of the Sample

Table 1 provides descriptive information on the variables used in both classification and regression tree analyses. These variables were classified into four categories from the combined data set: county and program level variables, administrators’ characteristics, and administrative perspective variables. The jurisdictions had 295 substance abuse treatment programs in the 72 counties of which 78 (26.4%) were classified as high, 87 (29.5%) medium, and 130 (44.0%) low intensive programs. The average program per jurisdiction was 1.3 and no jurisdictions had more than one per category.

The average county population size was 1,382,040 ($SD = 2,016,584$) with a median age of residents of 36.3 ($SD = 3.7$) (Table 1). The median household income was \$49,803 ($SD = 11,513$) and the poverty rate was on average 12.8 percent ($SD = 5.2$). The average percent distribution of African Americans and Hispanics in the county was 11.8 and 19.1%, respectively. The county’s population was 51.1% female and 48.9% male. The average number of citizens who reported limited spoken English was 247.6 per thousand ($SD = 504.8$).

The correctional administrator’s average age was 49.8 years ($SD = 7.2$) and most administrators were Caucasian (83.7%). More of the administrators were male (63.6%) than female (35.7%). Over two-thirds indicated at least a college degree (BA/BS degrees) and 36.7% had completed postgraduate studies at the master’s level. Most correctional facilities with substance abuse treatment programs did not use a risk screening tool (75.6%), while 73.9% reported active referral (i.e. phone calls, setting appointments, etc.) strategies to substance abuse programs. Approximately, 42.0% reported that their agency used a standardized substance abuse screening tool.

Administrators reported their perspective on the organization and their priorities. The mean response for working relationships with other organizations was 9.6 (out of 33). Administrators reported that they tend to pursue open environments to promote change (organization learning) with a mean of 3.8, have a low belief in punishment (mean=2.4), express concern over low support for funding for new programs (mean = 2.3), have modest support from the community (mean = 3.4), and believe that available resources are modest (mean = 3.4).

3.2 Availability of Treatment Programs in Community Correctional Agencies

The first inquiry entailed the availability of treatment programs in community correctional agencies in the 72 jurisdictions. We examined the programs based on the degree of intensity of the program, as previously discussed: low, medium, and high.

3.2.1 Predicting the Availability of High Intensity Programs—Figure 1 depicts a classification tree for high intensive programs. The root node (first node of the tree) contains the entire sample and lists the frequency distribution of high intensive programs (class 1) and all other programs (class 2). As shown in this root node, 26.4 percent of the community correctional agencies offered high intensive programs. The two most important variables in predicting the availability of high intensive programs included the degree of working relationships with other organizations and the adoption of a standardized substance abuse screening tool. Facilities with stronger working relationships with other organizations (a scaled item with scores greater than 12.5 with a group mean of 9.6, as shown in Table 1) were the most likely to offer these programs. For these facilities, the availability of high intensity programs increased to 46.2%, (terminal node 5). Among facilities with more limited working relationships with other organizations (≤ 12.5), the existence of a standardized substance abuse screening tool improved the availability of intensive treatment programs to 36.5%. This subgroup was further split by the administrator's support of the use of punishment which was associated with high intensity programs (38.6%, terminal node 4). Facilities that did not have a standardized substance abuse screening tool in place and were located in counties where the non-English speaking population was 125.1 per thousand or less were one of the least likely to offer high intensity programs (6.0%, terminal node 1).

3.2.2 Predicting the Availability of Medium Intensity Programs—Working relationships with other organizations and the use of a standardized substance abuse screening tool were also important in predicting the availability of medium intensity programs (Figure 2). Favorable working relationships with other organizations and high perception of adequacy of staffing were associated with medium intensity programs, increasing their availability from 29.5% (root node) to 61.2% (terminal node 5). Facilities that had limited working relationships with other organizations, used a standardized substance abuse screening tool, and were in counties with a population of a median age greater than 31.2 years were also more likely to offer medium intensity programs (40.0%, terminal node 3). Limited working relationships with other organizations and the absence of a standardized substance abuse screening tool decreased the likelihood of a facility having medium intensity programs (16.6%, terminal node 1).

3.2.3 Predicting the Availability of Low Intensity Programs—The classification tree in Figure 3 shows that a low intensity program is likely to be offered under the following conditions: a standardized substance abuse screening tool exists and the median age of the county's population is less than or equal to 43.3 years of age (60.3%, terminal node 4). Facilities that do not use a standardized substance abuse screening tool are likely to offer a low intensive program if they are located in a county with a median population age of less than or equal to 38.2 years old and have strong working relationships with other organizations (57.1%, terminal node 2). Facilities which did not have a standardized substance abuse screening tool in place and were located in counties with a median age greater than 38.2 years old were less likely to offer a low intensive program (15.2%, terminal node 3).

3.3 Predicting Capacity of Substance Abuse Programs

The second question had to do with the capacity of the correctional agencies to meet the needs of offenders. While the optimal capacity for any given program is unknown, the

underlying premise in this analysis was that increased capacity is preferred given the high percentage of offenders with substance abuse disorders. In this study, the average capacity rate was 0.18 (SD= 0.27) for high, 0.18 (SD=0.27) for medium, and 0.19 (SD=0.28) for low intensive programs. Below are the findings on the regression trees to understand the circumstances that affect these capacity levels.

3.3.1 Predicting Capacity of High Intensity Programs—Figure 4 presents a regression tree built to predict capacity rates to high intensity programs. The root node (top node of the tree) contains the entire sample size of facilities offering these programs ($n = 78$) with a mean capacity rate of 0.18 and a standard deviation of 0.3. This regression tree, with the selected variables, explains 32.0% of the variation in capacity rates of high intensity programs. It has four terminal nodes and each presents information about the predicted mean capacity rate and associated standard deviation.

The most important variable in predicting capacity of high intensity programs is the degree to which the administrator subscribes to an organizational learning environment. Specifically, facilities with administrators who highly subscribe to an organizational learning environment have a capacity of 0.99 (terminal node 4). Lower capacity rates are influenced by other factors such as when the administrators do not pursue organizational learning strategies and the county's population has fewer than 48.6% males (0.27 access rates, terminal node 1). Slightly higher capacity rates are observed in counties where the population tends to have a higher distribution of males and the administrator of the correctional agency is younger (0.35 access rate, terminal node 2). If the administrator is older, however, the access rate drops to 0.07 (terminal node 3).

3.3.2 Predicting Capacity of Medium Intensity Programs—The overall mean capacity rate of medium intensity programs was 0.18 with a standard deviation of 0.3, as shown in Figure 5. This regression tree explains 43% of the variation in capacity rates of medium intensity programs. The majority of the correctional facilities ($n = 74$) has low average capacity rates (0.14, terminal node 1), and this is associated with administrators who do not promote an organizational learning environment. Capacity rates improve when the administrators supports organizational learning and the size of the county's population is greater than 1.3 million (100% capacity rate, terminal node 3). Capacity rates are less in smaller size jurisdictions (mean = 0.26, terminal node 2).

3.3.3 Predicting Capacity of Low Intensity Programs—As expected, the majority of substance abuse services offered are low intensity programs ($n = 130$), as shown in Figure 6. The regression tree built for these programs explains 44% of the variation in capacity rates of low intensity programs. The mean capacity rate is 0.19, but the capacity increases to 0.83% when the administrator is younger than 34 years of age. The highest capacity rate occurred in one jurisdiction where the administrator was older than 34 years and had higher scores on organizational learning (1.00, terminal node 4). In facilities where administrators do not tend to promote organizational learning, but have an advanced degree, capacity rates increase to 0.44 (in six jurisdictions, terminal node 3). Otherwise, the capacity rates tend to be lower in facilities where administrators have less educational achievements (0.14, terminal node 2).

4.0 Discussion

Two understudied issues are the distribution of treatment services available, given the needs of substance abusers, and the capacity of these programs to provide adequate service for offenders. Advances have occurred in an understanding of the factors that affect the adoption of innovations or programs that are designed to improve outcomes. Yet, these

studies have not looked at one of the critical issues facing the field of substance abuse treatment which is the plethora of low intensity programs when the population needs more intensive care. While program improvements such as adding specific therapies (i.e. cognitive behavioral therapy, motivational enhancements, etc.), assessment tools, or medications are lauded as important, if program dosage is inadequate, then it is unlikely that long-term gains can occur in achieving better outcomes. A better understanding of the factors that affect the adoption of intensive services that include adequate dosage units can then serve as foundation to advancing the components of the treatment program.

This study was designed to be exploratory in terms of the first step in advancing an understanding of the factors that affect the availability of treatment programs for a subgroup of the addict populations—substance abusers in correctional settings and the capacity of the programs. The emphasis is on programs for offenders that are in jail or that are offered to offenders supervised by probation or parole offices (collectively this is nearly 90 percent of the offenders under correctional control). The importance of this exploratory work is to begin to review the factors that affect capacity levels, particularly for intensive treatment programs. A need exists to expand the number of intensive treatment programs that are available for offenders given the severity of their substance abuse disorder (Belenko & Peugh, 2005; Chandler et al., 2009).

The findings indicate that structural county-specific variables have a limited impact on the availability of certain types of treatment programs as well as on the capacity of the programs as they were found on the lower branches of the tree predictors. For the most part, whenever these variables were important they tended to have a secondary or tertiary impact compared to advances in correctional agency practices (i.e. the adoption of a standardized substance abuse tool), and the organizational climate that focuses on an organizational learning environment, and the emphasis on working relationships (connections) with other agencies. The general perception is that availability and capacity are a function of the jurisdiction's commitment to substance abuse treatment as evidenced by available resources. However, the classification and regression trees did not find that perception of resource availability by administrators associated with levels of service availability or capacity. Together, this suggests that theories about adoption and implementation may be more advanced by focusing on institutional theories rather than resource-dependency theories. The notion that organizations can create environments that are supportive of innovation through the enhancement of relationships with external agencies and development of internal supports have been found to be important in other studies (see D'Annunzio, 2006). Further work may examine theories to understand how these attributes affect absorptive capacity (Knudsen & Roman, 2004).

This exploratory analysis also contributes to a better understanding of the factors that contribute to utilization of intensive programs for offender populations. Three key variables—organizational learning, working relationships, and use of substance abuse tool—when appearing together are more likely to operate in concert to provide a fruitful environment to support intensive programs in terms of availability and capacity. These three variables are unlikely to achieve the same gains for low or medium intensive programs, suggesting that the combination of these contextual factors warrant further investigation. Furthermore, it appears that these intensive programs that address the substance abuse and criminal lifestyles of offenders (i.e. therapeutic communities) are consistent with the values of many correctional administrators in their belief in punishment. This is evidenced by the models for intensive treatment where the availability is influenced by the counterintuitive support for punishment. Given the culture of correctional agencies where punishment-oriented policies have dominated the landscape for the last thirty years, it is likely that administrators are

more supportive of strong social control therapeutic programs which serve to both punish and treat the offender.

The CART methodology can be useful in considering the social context in which treatment programs for offenders can be offered. It is apparent that communication and social networks are important in the adoption of treatment programs with an emphasis on working relationship with other agencies and an organizational learning environment. Future studies may therefore consider different processes that serve to improve the social environment such as the Availability/Responsiveness/Continuity (ARC) model which focuses on policy and evidence-based treatments in social welfare and juvenile justice settings (Glisson & Schoenwald, 2005). In the ARC model, the change strategies involved agents that were focused on communicating key messages to staff regarding the value and importance of these innovations. Little scholarly work has focused on these communication strategies in correctional settings, particularly the means to mix public safety and treatment messages as part of a change strategy.

The last decade has seen a focus on correctional agencies establishing partnerships with other organizations (e.g. substance abuse, mental health, police, housing; see Reentry Policy Council, 2006) as a means to expand the services provided to offenders. Additionally, the literature has emphasized the need to assist correctional agencies in transforming from paramilitary organizations into learning organizations, thus expanding correctional options (including treatment programs). The socio-political environment has provided support for the advancements in the three variables that were detected as being important to the availability of substance abuse treatment programs and to build the capacity of these programs. Building upon these trends in the field, absorptive capacity theories can be developed to test how an organization's ability to seek and utilize information impacts adoption patterns (see Knudsen & Roman, 2004). Little is available in the literature on how these patterns can truly affect the issues of availability of appropriate programs, as well as the capacity of such programs. Given the results from the Fighting Back demonstration initiative where the emphasis on the resolution of drug problems did not contribute to improved capacity of appropriate treatments in the community, it would be valuable to study these issues.

A few comments about the CART methodology are warranted. The methodology allows us to isolate how these variables interact to explain availability and capacity for certain programs in correctional settings. The main challenge is that the CART technique splits variables to create homogeneous subgroups. This provides some challenges to interpretation, since one often results in small cell sizes (as small as one) for a "winning" combination. Other challenges to the CART methodology is that the decisions about pruning, and the size of the tree, are generally left to the researcher regarding the number of branches and the decision rules regarding the size of each branch. The visual display is appealing but that depends on the number of branches.

This study, as well as the other papers in this special edition, use self-report administrator data from the National Criminal Justice Treatment Practices Survey (NCJTP). The nature of the data is therefore self-report and reflect the perspectives of the administrators of the surveyed agencies. The survey findings outline organizational and structural characteristics from the lens of that administrators which is a strength but also a limitation. Further work should be done to validate key measures such as working relationships by surveying other stakeholders to understand how their perspective on the correctional agency and the working relationships with that organizations as well as the perspective of the staff on the issues of the culture of the agencies.

The key to improving treatment capacity of the system, particularly for intensive programs that are more expensive, has yet to be answered. Our review of the literature found very little on this topic overall. In the correctional literature there is a small body of research studies that address the microlevel factors that affect service delivery such as correctional officer attitudes and participation (Farabee et al., 1999; Taxman & Bouffard, 2000) and prosecutor policy (Terry-McElrath & McBride, 2004). Although most of these studies have shown how these policies affect offender's participation in treatment programs, little has focused on policies that affect capacity of programs. A health service utilization model that integrates program capacity is warranted as another area of research development.

4.1 Conclusions

Criminal justice policy is at a crossroads between continuing with the incarceration-based policies of the last thirty years and incorporating a balanced approach that integrates substance abuse treatment programs within the fabric of correctional agencies. The staggering ratio of incarcerated offenders to general population (1 to 99 according to Pew Charitable Trusts, 2008) has brought a great deal of criticism to incarceration-based policy. However, the integrated treatment-corrections model has struck a difficult nerve due to the policy and programmatic efforts to provide drug treatment to offenders during the same period of time that incarceration-based policies blossomed. Many of these policies were the result of the perceived failure of the correctional system to reduce recidivism and the recognition that it is difficult to provide treatment services in correctional agencies. This study begins to identify two issues—availability of treatment programs and capacity of the programs—that need attention as other efforts mount to provide a more balanced approach by looking at the systemic factors that affect the availability of core treatment programs and capacity within those systems. More work on these issues is needed as the question changes from “should we provide substance abuse treatment services” to “how best to provide these services” to drug-involved offenders. This study suggests that structural variables appear to be less important than culture and climate in affecting the program capacity in community correctional agencies. More work is needed to test some of the hypotheses generated from this study concerning communication and social networks practices that can assist correctional agencies in achieving balance between safety and rehabilitation goals.

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Figure 1.

Classification tree predicting availability of high intensity programs. The single asterisk indicates the class name, while the double asterisk indicates the terminal node (a node that cannot be subdivided any further).

Figure 2.

Classification tree predicting availability of medium intensity programs. The single asterisk indicates the class name, while the double asterisk indicates the terminal node (a node that cannot be subdivided any further).

Figure 3.

Classification tree predicting availability of low intensity programs. The single asterisk indicates the class name, while the double asterisk indicates the terminal node (a node that cannot be subdivided any further).

Figure 4.
A regression tree predicting capacity for high intensity substance abuse treatment programs.

Figure 5.

A regression tree predicting capacity for medium intensity substance abuse treatment programs.

Figure 6.
A regression tree predicting capacity for low intensity substance abuse programs.

Table 1**County and Administrative Level Characteristics**

	Percent	Mean(SD)
County level variables		
County population size		1,383,040(2,016,584)
County median age		36.3(3.7)
County % distribution of African Americans		11.8(9.7)
County % distribution of Hispanics		19.1(18.2)
County distribution of people with limited spoken English		247.6(504.8)
County % distribution of females		51.1(0.9)
County % distribution of males		48.9(0.9)
Median household income		49,803(11,513)
Poverty rate		12.8(5.2)
Administrator's demographic variables		
Administrator's age		49.8(7.2)
Administrator's race		
Caucasian	83.7	
African American	13.4	
Asian/Pacific Islander	0.7	
Native American	0.4	
Other	1.1	
Administrator's level of education		
High school	3.9	
Associate degree	4.6	
BA/BS	30.0	
Some graduate studies	17.3	
MBA/Masters	36.7	
JD	2.8	
PhD/EdD/MD	1.1	
Other	2.5	
Administrator's gender		
Female	35.7	
Male	63.6	
Program level variables		
Use a risk screening tool		
No	75.6	
Yes	24.4	
Type of referral to substance abuse agency		
Active	0.7	
Passive	9.1	
Neither	16.3	
Both	73.9	

	Percent	Mean(SD)
Standardized substance abuse screening tool		
No	57.6	
Yes	42.4	
Administrative perspective variables		
<i>Organizational learning</i>		3.8(0.5)
<i>Organizational culture</i>		3.6(0.5)
<i>Attitudes Toward Rehabilitation and Punishment.</i>		
1. Crime reduction using punishment/deterrence		2.4(0.7)
2. Crime reduction using rehabilitation		4.5(0.5)
<i>Leadership</i>		
1. Transformational type of leadership		3.7(0.7)
2. Transactional type of leadership		3.6(0.7)
<i>Organizational Needs Assessment</i>		
1. Perceived funding for new programs		2.4(0.7)
2. Community support-needs assessment		3.4(0.7)
3. Perceived availability of resources		3.4(0.8)
4. Training needs assessment		3.6(0.6)
5. Staffing needs assessment		2.8(0.8)
<i>Rank of importance of substance abuse treatments</i>		3.9(3.4)
<i>System Integration</i>		
1. Integrated with substance abuse treatment programs		3.9(3.4)
2. Integrated with other correctional agencies		3.6(3.4)
3. Integrated with judiciary		1.9(2.5)
4. Working relationship with other organizations		9.6(6.6)