CHARACTERISTICS, NEEDS, SERVICES, AND OUTCOMES OF YOUTHS IN JUVENILE TREATMENT DRUG COURTS AS COMPARED TO ADOLESCENT OUTPATIENT TREATMENT

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This study used comprehensive intake and follow-up assessment data to compare juvenile treatment drug courts (JTDCs) to adolescent outpatient treatment programs (AOP) on client characteristics, services received and treatment outcomes through 6 months post-intake. The groups were matched using propensity scores to be similar on baseline substance abuse problems, justice system involvement, psychiatric co-morbidity, rates of victimization and baseline outcome measures. JTDC clients received significantly more substance abuse treatment, family-based services, probation supervision and drug testing than AOP clients, and were significantly more satisfied with treatment. At follow-up, the JTDC clients showed significantly greater reductions in days of substance abuse problems and emotional problems, although the magnitude of these effects were small to moderate. These findings suggests that JTDCs can be effective at retaining youths in treatment and achieving relatively improved outcomes.

This paper was supported by the Center for Substance Abuse Treatment (CSAT) and the Substance Abuse and Mental Health Services Administration (SAMHSA) contract 270-07-0191 using data provided by a range of treatment enhancement grants and contracts from CSAT. Additional information about these grants and contracts is available online at:
http://www.chestnut.org/LI/downloads/training_memos/Acknowledgement.pdf.

CSAT has pooled data from these and other demonstration grants using the Global Appraisal of

Individual Needs (GAIN) and made these data available by permission for this article and for secondary analyses by other investigators. Information on accessing CSAT's GAIN dataset is available at: http://www.chestnut.org/LI/downloads/training_memos/Access.pdf.)

The authors thank these grantees and their study participants for agreeing to share their data, as well as the GAIN Coordinating Center Data Management team for creating the characteristics profile used to support this article. The authors also would like to thank Joan Unsicker and Rachael Bledsaw for their assistance preparing the manuscript. The opinions are those of the authors and do not reflect official positions of the contributing grantees' project directors or government.

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ARTICLE SUMMARIES

CHARACTERISTICS OF JUVENILE TREATMENT DRUG COURT CLIENTS

[1] Over two thirds of youths in JTDCs reported three or more major clinical problems related to addiction, mental health, crime, violence, victimization, homelessness, or HIV-risk behaviors.

SERVICES RECEIVED IN JUVENILE TREATMENT DRUG COURTS

[2] Youths in JTDCs were less likely than those in standard outpatient treatment to initiate treatment within two weeks of evaluation. However, they received more treatment and drug testing, and were more satisfied with treatment.

OUTCOMES IN JUVENILE TREATMENT DRUG COURTS

[3] Youths in JTDCs showed significantly greater reductions in substance use, and less pronounced reductions in emotional problems, than those in standard outpatient treatment after 6 months in treatment. However, limited improvements in family problems and illegal activity indicate a continued need to address these other areas of functioning.

INTRODUCTION

Juvenile substance abuse has been recognized as a significant problem for public health and safety for over a century. Even after treatment, there continues to be a high risk of relapse and recidivism (Dennis, Dawud-Noursi, Muck & McDermeit, 2003a). Juvenile justice systems are the leading source of referral among adolescents entering treatment for substance use problems (Dennis et al., 2003a; Dennis, White & Ives, 2009) and about half of the youth in the juvenile justice system have drug related problems (Office of Juvenile Justice and Delinquency Prevention (OJJDP), 2001; Teplin et al., 2002). Given that adult treatment drug courts have shown some promise in lowering the rates of relapse and recidivism (e.g., Goldkamp, 2003; Marlowe, Festinger, Lee, Dugosh & Benasutti, 2006) and have a 2 to 1 (or greater) financial return on investment (Bhati, Roman & Chalfin, 2008), there have been increasing calls to create and evaluate *juvenile* treatment drug courts (Belenko & Logan, 2003; Henggeler et al., 2006).

Since their inception in the mid-1990s, juvenile treatment drug courts (JTDCs) have received considerable public support to reduce the cycle of relapse and recidivism within a judicially monitored system (Belenko & Logan, 2003; Henggeler et al., 2006). The main features of JTDCs are early identification and referral of eligible youths; an interdisciplinary team-developed treatment plan to address the youths' substance use, school, behavioral and family needs; weekly monitoring and urine screens; judicial feedback during regular court hearings; and rewards or sanctions based on performance (NADCP, 1997; Henggeler, 2007). By late 2004, there were 357 JTDCs and the number of programs has continued to grow at a rate of 30-50% per year to more than 500 in 2009 (Henggeler, 2007; American University, 2009).

In spite of this national expansion, to date there have been only a few studies evaluating who was served by JTDCs, what services they received, and the effectiveness of the programs relative to traditional community-based substance abuse treatment. Consistent with most adolescents in community-based treatment, those presenting to JTDCs are likely to be white, male, from a single parent family, marijuana users, and to report having co-occurring psychiatric disorders, multiple family issues and problems in school (Cooper, 2002; Hiller et al., 2008; Office of Justice Program (OJP), 2000). Using a randomized controlled study, Henggeler and colleagues (2006) found that a JTDC was more effective than traditional justice and community-based treatment services in reducing adolescent substance abuse and criminal involvement during treatment. Moreover, the effects were even larger when the drug court used evidenced-based practices. However, this decrease of substance abuse and criminal behaviors did not subsequently translate into a reduction in re-arrest rates. Using a quasi-experimental design, Rodriguez and Webb (2004) reported greater reductions in marijuana use and criminal behavior, but not cocaine use, for adolescents treated in drug courts than for those in standard probation services.

A retrospective outcome study showed that youths in drug court treatment were no more likely to recidivate over a two-year post-release period than youths being treated in an adolescent substance abuse treatment program (Sloan, Smykla & Rush, 2004). Instead, the authors reported that age, race, sex, prior history of offending, and successful program completion had higher predictive values for future recidivism. Unfortunately, the low level of successful program completion among youths in drug courts was noticeable in several prior studies (Applegate & Santana, 2000; Miller, Scocas & O'Connell, 1998; Rodriguez & Webb, 2004) and concerns have been raised that juvenile drug court treatment might not be as effective as community-based treatment. A concern with such anecdotal comparisons is that the case mix

(i.e., severity of the problems) of adolescents showing up to community-based treatment and juvenile treatment drug courts may not be the same.

The need to understand the ability of JTDCs to get youth into treatment is related to two key points. First, of the 8.9% of youth in the U.S. with past-year dependence or abuse, less than 5% (1 in 17) went to treatment in the past year (OAS, 2006). The failure to get them into treatment has large personal and social costs. Second, relative to adolescents who are abstinent, those who report weekly or more frequent use are more likely to have a wide range of problems that have implications for public safety, including dropping out of school (6% vs. 25%), getting into physical fights (11% vs. 47%), conduct disorder (CD; 13% vs. 57%), any illegal activity (17% vs. 69%), any arrest (1% vs. 23%) and any emergency room admissions (17% vs. 33%) (Dennis, White & Ives, 2009).

In 2005 and 2006, the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT) funded juvenile treatment drug courts as part of their Services Grants portfolio (SAMHSA, 2005). SAMHSA's Services Grants provide funds to expand and strengthen effective, culturally appropriate substance abuse and mental health services at the state and local levels. Specifically, the JTDC grants were intended for "treatment providers and the courts to provide alcohol and drug treatment, wrap-around services supporting substance abuse treatment, assessment, case management, and program coordination to those in need of treatment drug court services… [and] to combine the sanctioning power of courts with effective treatment services to break the cycle of child abuse/neglect or criminal behavior, alcohol and/or drug use, and incarceration or other penalties" (SAMHSA, 2005).

As part of this funding, CSAT recommended use of the Global Appraisal of Individual Needs (GAIN; Dennis,

Titus, White, Unsicker & Hodgkins, 2003b) and an evidence-based treatment from the Cannabis Youth Treatment experiment (CYT, Dennis et al., 2002, 2004), Adolescent Treatment Models (ATM, Stevens & Morral, 2003), or Assertive Continuing Care (ACC, Godley, Godley, Dennis, Funk & Passetti, 2002, 2007; Godley, Godley, Karvinen, Slown & Wright, 2006).

The National Research Advisory Committee (NRAC) recommends examining the long-term effects of adult drug courts on common outcomes and how those might differ from traditional community-based substance abuse treatment programs (Marlowe, Heck, Huddleston & Casebolt, 2006). We expect that this recommendation will also be part of the research agenda for JTDCs. While both outpatient treatment and juvenile treatment drug courts are large public programs for adolescents with a substance use problem, there has been little information on the extent of the differences between these programs regarding who was served, what services they received, and the outcomes for clients related to substance use, psychological comorbidity, and justice involvement. The Office of Justice Programs (OJP, 2009) notes that one key challenge in evaluating drug courts is the lack of a common assessment or even drug court information systems, which makes it difficult to pool data across JTDCs or demonstrate their equivalence with available comparison groups.

Using standardized, comprehensive intake and follow-up assessments administered to each client from a large number of CSAT-funded grants, as well as research techniques designed to produce an equivalent comparison group, this study provides a comparison of clients treated in juvenile treatment drug courts (JTDC) and a matched cohort of adolescent outpatient (AOP) treatment programs in terms of the services received and their relative effects on five basic treatment outcomes. Our goal is to determine whether, after controlling for differences in case mix, juvenile treatment drug courts can successively get youth into treatment, get

them to participate at similar or better levels than other outpatient treatment programs, and achieve similar or better outcomes. The results provide a foundation for further inquiry to inform the development and delivery of services in current justice systems for adolescents with substance use problems.

METHOD

Juvenile Treatment Drug Courts

In 2005, CSAT funded 16 JTDC sites under its TI-05-005 grant program, with six of these sites choosing the GAIN for assessment (Laredo, TX; San Antonio, TX; Belmont, CA; Tarzana, CA; Pontiac, MI; and Birmingham, AL). An additional seven JTDC sites were funded in 2006, with all seven choosing the GAIN for assessment (San Jose, CA; Austin, TX; Peabody, MA; Providence, RI; Detroit, MI; Philadelphia, PA; and Basin, WY). Awardees from the 13 sites who elected to use the GAIN administered it to collect information from youth at intake, and at 3 and 6 months post-intake (9 and 12-month follow-ups were optional), including the collection of CSAT Core Client Outcomes (SAMHSA, 2005). The majority (86%) of clients in the 13 sites also received an evidence-based treatment (SAMHSA, 2010) as recommended, including Adolescent Community Reinforcement Approach (A-CRA; Godley, et al., 2001), Assertive Continuing Care (ACC; Godley et al., 2006), Family Support Network (FSN; Hamilton, Brantley, Tims, Angelovich & McDougall, 2001), Motivational Enhancement Therapy/Cognitive Behavior Therapy (MET/CBT; Sampl & Kadden, 2001), Motivational Interviewing (MI; Miller, Moyers, Ernst & Amrhein, 2003), Multidimensional Family Therapy (MDFT, Liddle, 2002), Multi-systemic therapy (MST; Henggeler & Shoenwald, 1998), or Seven Challenges (Schwebel, 2004).

Intake data from these 13 sites (N=1,786) were collected from January 2006 through March 31, 2009. At that

time, five sites had completed data collection and eight were still in the field. The records were limited to those with outpatient treatment records (N=1,445). Records for 180 clients who had not yet attained 6 months post-intake were dropped. Of the remaining 1,265 records passing all inclusion criteria, only those with at least one follow-up assessment record were retained, leaving 1,120 (89% follow-up rate for the sample) that were used for this analysis.

Adolescent Outpatient (AOP) Comparison Group Sites

Intake data from CSAT-funded AOP sites, including 75 grantees across 29 states from five grant programs (Strengthening Communities for Youth [SCY], Effective Adolescent Treatment [(EAT] Assertive Adolescent & Family Treatment [AAFT], Adolescent Residential Treatment [ART], and other targeted capacity expansion [TCE] grants) were collected between September 2002 and August 2008. All participating AOP sites used the GAIN (Dennis et al., 2003b, 2006) to collect information at intake and at 3, 6 and 12 months post-intake (some also did 9-month follow-ups), including the collection of CSAT Core Client Outcomes. The majority of AOP projects had completed data collection (ART, SCY, EAT, some TCE), while AAFT and recently funded TCE grants were still in the field.

Starting with 10,037 CSAT clients in outpatient treatment with data collected using GAIN version 5, we limited our sample to 8,604 who had attained 6 months post-intake. Of those, 7,560 had at least one follow-up (88% follow-up rate for the sample) and were used for this analysis. The majority (93%) of this subset received an evidence-based treatment as defined for the JTDC sites above.

Measures

All client characteristic measures were based on client self-report to in-person interviewers using the GAIN

(Dennis et al., 2003b). The GAIN is a standardized bio-psychosocial and outcome assessment tool that has been widely used in several studies of community-based adolescent treatment, including: CYT, ATM, ACC, as well as other demonstrations such as the Strengthening Communities for Youth (SCY; Dennis, Ives, White & Muck, 2008), Effective Adolescent Treatment (EAT; Dennis, Ives & Muck, 2008), and Adolescent Assertive Family Treatment (AAFT; Godley, Garner, Smith, Meyers & Godley, in press).

The GAIN integrates clinical and research measures into one comprehensive structured interview with eight main sections: background, substance use, physical health, risk behaviors, mental health, environment risk, legal involvement, and vocational correlates. The GAIN incorporates symptoms for common disorders as specified in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) of the American Psychiatric Association (APA, 2000), the American Society of Addiction Medicine's (ASAM, 1996, 2001) patient placement criteria for the treatment of substance-related disorders, the Joint Commission on Accreditation of Healthcare Organization's standards (JCAHO, 1995), and epidemiological questions from the National Household Survey on Drug Abuse (NHSDA; SAMHSA, 1996, now National Survey on Drug Use and Health [NSDUH]). A detailed list of validation studies using multiple methods (e.g. urine tests, collateral reports, Rasch measurement models, time-line follow-back), copies of the actual GAIN instruments and items, and detailed information about the scales and other calculated variables are publicly available at www.chestnut.org/li/gain.

We used 27 service measures including system involvement (treatment initiation, engagement, continuing care and positive discharge status), treatment satisfaction, and receipt of specific services. Detailed service data (e.g., number of days of treatment, service content, specific services received, and treatment satisfaction) came from the

3-month post-intake follow-up assessment using the GAIN (see Dennis, Ives, White & Muck, 2008 for more detailed descriptions of these process measures). Grantee staff provided information on involvement in the substance use treatment system (initiation, system engagement, continuing care, and discharge status) using the Treatment Transition Log (TTL; Dennis, Ives, White & Muck, 2008). The TTL is a separate Microsoft Excel© service log which documents a client's date of admission and discharge for each level of care (e.g., outpatient, intensive outpatient, short-term residential), including prior level of care/referral source, current level of care, the type of treatment received (e.g., A-CRA, MET/CBT5, specific manualized interventions), and discharge status. Although they are correlated, these four measures represent different aspects of treatment as indicated by the rank order correlation of the sum of the four TTL dichotomous measures (0-4) with total days of treatment (rho=.397, p<.001) and treatment content (rho=.393, p<.001) from self-report. While the significance of the correlations confirms that increases in these staff-reported measures are associated with increased self-reported treatment, correlations less than .4 show that they each have unique variance as well.

We selected five individual GAIN items to represent key outcomes that are highlighted in the drug court literature. The selected items, compared at intake and 6 months later (the maximum time available for both groups), included the number of days out of the past 90 days in which the client reported a) any substance use, b) any emotional problems, c) any trouble with family, d) being in a controlled environment, or e) any illegal activity. While other outcome measures were available, we selected these in order to provide a parsimonious understanding of a range of core outcomes.

All data were collected as part of general, clinical practice or specific research studies under each treatment site's respective voluntary consent procedures. Data pooled for secondary analysis are under the terms of data sharing

agreements and the supervision of Chestnut Health System's Institutional Review Board. All sites received standardized training and quality assurance on their GAIN data collection to facilitate comparison with other grantees collecting GAIN data.

Matching Procedures

In a preliminary unweighted analysis (available from the author), JTDC youth were significantly different than those in AOP on 36 out of 69 summary items that have been shown to be useful in characterizing client variations in demographics, justice system involvement, environment, substance use, and comorbidity (Dennis, Ives, White & Muck, 2008, Dennis, White & Ives, 2009). To control for these baseline differences and the unequal sizes of the two samples, we matched the AOP group by weighting their responses via propensity scores. The propensity score is a well-established and efficient form of matching (see Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983). For this analysis we used logistic regression to predict the likelihood (propensity) of each AOP client being a JTDC client based on the 69 intake characteristics presented in Table 1. The propensity score was set to one for JDTC clients. For AOP clients, the score is higher for clients who are more like JTDC clients and lower for those less like JTDC clients. The score was further weighted to result in a matched comparison group with similar characteristics and an equivalent cell size (n=1,120 each).

Handling of Missing Data

For the propensity score calculation, missing characteristics were replaced with their mean values to avoid any bias or significant loss in sample size due to listwise deletion (i.e., the entire record is dropped if one item is missing). The results shown in Table 1 used the original (unreplaced) characteristic values. For treatment satisfaction,

treatment received and its component items, missing data were replaced with the 6-month version of the item since the majority of clients missing 3-month data were admitted to treatment up to several months later, often resulting in their treatment being recorded on the 6-month follow-up. When these detailed service data were still missing, data were replaced via hot deck imputation (Dennis, Lennox, & Foss, 1997) using SPSS/PASW 17 (2008) Replace Missing Value (RMV) procedure. This more complex method was used to keep both the mean and the variance unbiased, and is one method of missing-data replacement that is generally recommended for key outcomes (Rubin, 1996, Little & Rubin, 1989). To create the hot deck, we sorted individual records by type of treatment (OP vs. IOP), treatment duration in days, and Global Individual Severity Scale (GISS)—a total symptom count across substance use disorders, internalizing disorders, externalizing disorders, and crime and violence. We then replaced each missing service value with the median of the four nearest valid answers (two above and two below current record) for that value in the ordered records (for detailed procedures used, see McDermeit, Funk & Dennis, 1999).

To retain the maximum number of records for the five outcome measures, if the 6-month record was missing (n=180), the next available record of 9-month (n=4), 12-month (n=18), or 3-month (n=158) was used instead. Selecting the follow-up records in this order means that missing 6-month outcomes ideally were replaced by the longer term follow-ups when available, and by a shorter follow-up if later data were not available.

Measures of Clinical or Policy Significance

Statistical significance is only a measure of whether the difference is reliably measured, not how important it is from a clinical or policy perspective. Because large sample sizes can make even trivial differences statistically

significant, we also report and focus on differences that are significant both statistically (i.e., reliably measured) *and* in terms of their effect size (i.e., important clinically or for policy). Odds ratios (OR) were used as effect sizes for dichotomous measures and were calculated for all client characteristics, systems involvement items (top portion of Table 2) and any self-help group involvement. Values greater than 1 indicate that JTDC was higher than AOP; conversely, values less than 1 indicate JTDC was lower than AOP. Cohen's *d*s were used as effect sizes for continuous measures including treatment means (lower portion of Table 2) and outcomes (Table 3). As a measure of effect size, Cohen's *d* scores simply standardize the between-groups difference on the variance (average distance from the mean), thus permitting comparisons across groups. Positive values indicate higher JTDC means relative to AOP, and negative values indicate lower JTDC means relative to AOP. Absolute values of effect sizes more than .2, .4, or .8 from zero (i.e., in either direction) are considered small, medium, and large effects, respectively.

RESULTS

Client Characteristics

[1] As shown in Table 1, the JTDC youth were predominately male (72%), Hispanic (53%), aged 15-17 years (77%), from single parent households (52%), in school (92%) but behind academically (58%), and involved in the justice system (100%). During the past year, most acknowledged some history of violence towards others (65%), illegal activity (64%), and having work, school or social peers who regularly used drugs (64-70%) or were intoxicated weekly (46-49%). Most of the youths (53%) reported a lifetime history of victimization, including 35% endorsing multiple traumatogenic factors (e.g., multiple trauma events, committed by multiple perpetrators, committed by someone trusted, or leading the youth to fear for his or her life).

Sixteen percent of the youths reported experiencing trauma events within the 90 days immediately preceding intake.

In terms of substance use, 85% of the youths reported first using drugs or alcohol under the age of 15 years, with weekly use in the 90 days before intake of tobacco (40%), alcohol (13%), marijuana (47%), or other drugs (6%). During their lifetime, 80% self reported criteria for dependence on one or more substances and 47% reported abuse of one or more additional substances. While 38% reported a lifetime history of experiencing withdrawal symptoms, only 23% did so in the week prior to intake and only 2% reported the more acute levels of withdrawal typically requiring formal detoxification programs. While only 17% perceived their substance use as a problem, 70% saw the need for treatment (in part due to pressure from the justice system or their family). About 21% reported high levels of health problems on the GAIN's health problem scale, and 7% were pregnant or had impregnated someone else during the past year. Most had one or more co-occurring psychiatric conditions (60%), including major depressive disorder (29%), generalized anxiety disorder (9%), homicidal or suicidal thoughts (16%), traumatic stress disorder (18%), conduct disorder (45%), or attention deficit hyperactivity disorder (ADHD; 41%). However, only 29% reported ever having received any mental health services. Most of the JTDC youth were sexually active in the 90 days before intake (65%), including 27% having sex with multiple partners or 31% having unprotected sex. Only 1% reported past 90-day needle use. Over 91% self reported experiencing one or more major clinical problems, with 64% reporting more than three (and as many as twelve) major clinical problems.

Table 1. Client Characteristics

			Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
Demographics	Female		28%	28%	1.05	(0.9 - 1.2)
	Race	Caucasian	27%	22%	0.77	(0.6 - 1)
		African American	16%	14%	0.86	(0.6 - 1.1)
		Hispanic	44%	53%	**1.41**	(1.2 - 1.6)
		Mixed/Other	13%	12%	0.86	(0.6 - 1.1)
	Age	0-14 years	21%	22%	1.08	(0.9 - 1.3)
		15-17 years	78%	77%	0.93	(0.7 - 1.1)
		18+	1%	1%	0.83	(0.0 - 1.6)
	Single parent		51%	52%	1.03	(0.9 - 1.2)
	In school[b]		91%	92%	1.08	(0.8 - 1.4)
	Behind < 1 year		57%	58%	1.04	(0.9 - 1.2)

Table 1 continues…

		Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
	Expelled or dropped out	35%	33%	0.92	(0.7 - 1.1)
	Employed[b]	20%	17%	0.83	(0.6 - 1.0)
Crime, Violence and Justice System Involvement	Lifetime justice system involvement	98%	100%	NA	
	Current justice system involvement	94%	100%	NA	
	In a controlled environment[b]	40%	43%	1.15	(1.0 - 1.3)
	13+ days in controlled environment[b]	21%	22%	1.11	(0.9 - 1.3)
	Any physical violence in past year	67%	65%	0.95	(0.8 - 1.1)
	Any illegal activity in past year	64%	64%	1.02	(0.8 - 1.2)
	Any property crime in past year	44%	43%	0.97	(0.8 - 1.1)
	Any interpersonal crime in past year	42%	42%	0.98	(0.8 - 1.1)
	Any drug crime in past year	47%	48%	1.07	(0.9 - 1.2)

Table 1 continues…

		Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
	Intensity of juvenile justice system involvement				
	In detention/jail 30+ days	10%	10%	1.05	(0.8 - 1.3)
	In detention/jail 14-29 days	5%	4%	0.89	(0.5 - 1.3)
	On prob/parole 14+ days w/ 1+ drug screens	28%	24%	0.82	(0.6 - 1.0)
	Other prob/parole/detention	37%	45%	**1.37**	(1.2 - 1.5)
	Other JJ/CJ status	18%	15%	0.83	(0.6 - 1.1)
	Past arrest/JJ/CJ status	0%	0%	0.33	(-1.9 - 2.6)
	Past year illegal activity/SA use	3%	2%	0.63	(0.1 - 1.2)
Environment	Weekly alcohol use in home[b]	22%	21%	0.94	(0.7 - 1.1)
	Weekly drug use in home[b]	8%	7%	0.91	(0.6 - 1.2)
	Work/school peers weekly intoxication	46%	46%	1.00	(0.8 - 1.2)
	Social peers weekly intoxication	50%	49%	0.97	(0.8 - 1.1)

Table 1 continues…

		Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
	Work/school peers regular drug use	63%	64%	1.05	(0.9 - 1.2)
	Social peers weekly regular drug use	70%	70%	1.01	(0.8 - 1.2)
	Ever homeless or runaway	28%	28%	0.99	(0.8 - 1.2)
	Lifetime victimization	54%	53%	0.94	(0.8 - 1.1)
	High severity victimization lifetime	36%	35%	0.95	(0.8 - 1.1)
	Victimization[b]	16%	16%	0.99	(0.8 - 1.2)
Substance Use	First use under age of 15	84%	85%	1.08	(0.8 - 1.3)
	Weekly tobacco use[b]	44%	40%	0.87	(0.7 - 1.0)
	Weekly alcohol use[b]	13%	13%	1.00	(0.8 - 1.3)
	Weekly marijuana use[b]	46%	47%	1.04	(0.9 - 1.2)
	Weekly other drug use (not tobacco, alcohol or marijuana)[b]	5%	6%	1.17	(0.8 - 1.5)

Table 1 continues…

	Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
Any lifetime substance dependence	80%	80%	0.99	(0.8 - 1.2)
Any lifetime substance abuse	48%	47%	0.98	(0.8 - 1.1)
Any past year dependence	36%	36%	1.02	(0.8 - 1.2)
Any past year abuse	42%	42%	0.99	(0.8 - 1.2)
Any lifetime withdrawal symptoms	38%	38%	1.03	(0.9 - 1.2)
Any past week withdrawal symptoms	24%	23%	0.96	(0.8 - 1.2)
Any past week acute withdrawal symptoms	2%	2%	0.97	(0.3 - 1.6)
Any prior substance abuse treatment	29%	31%	1.10	(0.9 - 1.3)
Self-perceived substance problem	18%	17%	0.97	(0.8 - 1.2)
Self-perceived need for treatment	68%	70%	1.10	(0.9 - 1.3)

Table 1 continues…

		Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
Physical & Mental Health	High health problems[c] in past 90 days	22%	21%	0.92	(0.7 - 1.1)
	Pregnant or got someone pregnant in past year	7%	7%	0.99	(0.7 - 1.3)
	Major Depressive Disorder	29%	29%	0.97	(0.8 - 1.2)
	Generalized Anxiety Disorder	9%	9%	0.94	(0.7 - 1.2)
	Any homicidal/suicidal thoughts	16%	16%	0.95	(0.7 - 1.2)
	Any Traumatic Stress Disorder	19%	18%	0.93	(0.7 - 1.1)
	Conduct Disorder	45%	45%	0.98	(0.8 - 1.1)
	AD/HD	41%	40%	0.98	(0.8 - 1.2)
	Any prior mental health treatment	29%	27%	0.89	(0.7 - 1.1)

Table 1 continues…

		Matched AOP (n=1120)	JTDC (n=1120)	Odds ratio[a]	O.R. 95% Confidence Interval
HIV Risk	Any sexual activity[b]	66%	65%	0.96	(0.8 - 1.1)
	Multiple sexual partners[b]	26%	27%	1.04	(0.9 - 1.2)
	Any unprotected sexual activity[b]	31%	30%	0.95	(0.8 - 1.1)
	Needle Risk[b]	1%	1%	1.29	(0.5 - 2.1)
Problem[d] Summary	No major problems	9%	10%	1.10	(0.8 - 1.4)
	1 problem	13%	14%	1.10	(0.9 - 1.3)
	2 problems	14%	14%	0.99	(0.7 - 1.2)
	3 to 12 problems	64%	62%	0.93	(0.8 - 1.1)

Underlined ORs indicate JTDC rates are significantly lower than AOP. **Bold ORs indicate JTDC rates are significantly higher than AOP.** [a]JTDC/AOP. [b]In the past 90 days. [c]Recent medical problems, being bothered by medical problems, that kept you from responsibilities. [d]Including: cannabis use disorder, alcohol use disorder, cocaine use disorder, amphetamine use disorder, other substance use disorder, any internalizing disorder, any externalizing disorder, physical sexual or emotional victimization, needle use risk, moderate/high sexual risk, moderate/high health problem. SOURCE: DC_CSAT_OP_V5_due6m_horiz_hasFU.sav.

In Table 1, we also show the comparison of JTDC youths with a matched cohort of youths in AOP. All but three of 36 (92%) significant differences were eliminated by this matching procedure (i.e., 3% more than would be expected by chance). The remaining differences were that, relative to the matched group, the JTDC youth were still more likely to be Hispanic (44% vs. 53%; OR=1.41), less likely to be Caucasian (27% vs. 22%; OR=0.77) and less likely to report their highest level of justice involvement as being on "other types of probation, parole, or detention" (37% vs 45%, OR=1.37).

Services Received

Table 2 compares the JTDC and matched AOP youth in terms of services received. **[2]** Relative to the matched AOP group, youth in JTDC were less likely to initiate treatment within two weeks (85% vs. 75%, OR=0.52), but were more likely to stay engaged at least 6 weeks (87% vs. 94%, OR=2.29), and to receive continuing care after more than 90 days (57% vs. 64%). Both groups had similar rates of positive system discharge status (i.e., were still in or had completed treatment; 59% vs. 54%, OR=0.81). The JTDC youth reported attending more than twice the number of days of intensive outpatient treatment as AOP (2.2 vs. 5.9; d=.26), more total days receiving any substance abuse treatment (14.7 vs. 9.9; d=.24) and were more likely to score higher on the GAIN's treatment satisfaction scale (12.8 vs. 13.4 on a scale of 1 to 14, d=0.31).

In terms of specific services received, youth in JTDC were more likely to score higher on scales related to family services (d=.30) and external services associated with case management (d=.29). Family services for JTDC clients most commonly (>50% endorsed) included meeting with family members multiple times and meeting with family about communication issues. External services included discussions with and about probation. For JTDC clients, these two were

among the top three service content items with over 70% of clients endorsing each.

Both groups had similar rates of receiving mental health services (8.2 vs. 7.7), with most of that limited to days of mental health medication. Not surprisingly, JTDC youth were also likely to receive more urine or breath testing (4.6 vs. 10.5, d=.53). While JTDC youth were more likely to go to "any" self help group meetings (13% vs. 25%, OR=1.48), the difference in days (2.6 vs. 3.5 days of 90) was statistically but not clinically significant.

Table 2. Treatment Received

		AOP Matched (n=1120)	JTDC (n=1120)	Odds ratio[a]	OR 95% CI
Systems Involvement	Initiation (admitted within 2 weeks of GAIN)	85%	75%	0.52	(0.3 - 0.7)
	System engagement (in treatment for 6 weeks across admits and transfers)	87%	94%	**2.29**	(2.0 - 2.6)
	Continuing care (treatment 90-180 days post admission)	57%	64%	**1.35**	(1.2 - 1.5)
	Positive system discharge status (still in or completed treatment)	59%	54%	0.81	(0.6 - 1.0)
		Mean (s.d.)	**Mean (s.d.)**	***d*[b]**	***d* 95% CI**
Substance Abuse Treatment	Treatment Satisfaction Scale 3m[c] (alpha=.87)	12.8 (2.5)	13.4 (1.6)	**0.31**	(0.2 - 0.4)
	Nights in SA Residential 3m[c] (r_s=.99)	2.4 (10.6)	2.6 (11.8)	0.02	(-0.1 - 0.1)
	Times in SA ER 3m[c] (r_s=.70)	0.0 (0.1)	0.0 (0.3)	0.04	(0.0 - 0.1)
	Days in SA IOP 3m[c]	2.2 (9.7)	5.9 (17.7)	**0.26**	(0.2 - 0.3)
	Times in SA OP 3m[c] (r_s=.51)	4.7 (7.0)	6.2 (11.0)	0.16	(0.1 - 0.2)

Table 2 continues…

	Days in other SA Tx 3m[c]	0.7 (5.8)	0.1 (1.9)	-0.13	(-0.2 - 0.0)
	Days on SA meds 3m[c] (r_s=.58)	0.1 (2.3)	0.0 (0.3)	-0.04	(-0.1 - 0.1)
	Days in any SA treatment[c] (r_s=.66)	9.9 (16.3)	14.7 (22.3)	**0.24**	(0.2 - 0.3)
SA Treatment Content	Direct services received 3m[c] (alpha=.95)	4.4 (2.8)	4.3 (3.0)	-0.02	(-0.1 - 0.1)
	Family services received 3m[c] (alpha=.81)	1.2 (1.3)	1.6 (1.5)	**0.30**	(0.2 - 0.4)
	External services received 3m[c] (alpha=.92)	3.0 (2.5)	3.8 (2.9)	**0.29**	(0.2 - 0.4)
	Treatment Received Scale 3m[c] (alpha=.97)	8.6 (5.9)	9.7 (6.9)	0.18	(0.1 - 0.3)
Mental Health Treatment	Nights in MH hospital 3m[c]	0.1 (1.4)	0.0 (0.5)	-0.04	(-0.1 - 0.1)
	Times in MH ER 3m[c]	0.0 (0.1)	0.0 (0.4)	0.03	(-0.1 - 0.1)
	Times in MH OP 3m[c] (r_s=.67)	0.7 (3.6)	0.3 (1.3)	-0.15	(-0.2 - -0.1)
	Days on MH meds 3m [c]	7.9 (24.1)	7.6 (23.5)	-0.01	(-0.1 - 0.1)
	Days of any mental health probs.[c] (r_s=.67)	8.2 (24.3)	7.7 (23.5)	-0.02	(-0.1 - 0.1)
Interventions across systems (SA, MH, JJ)	Times urine/breath analysis[c] (r_s=.78)	4.6 (7.4)	10.5 (12.8)	***0.53***	(0.4 - 0.6)
	Any self-help[cd]	13%	25%	**1.48**	(1.3 - 1.7)
	Days of self-help[c] (r_s=.95)	2.6 (11.1)	3.5 (9.6)	0.09	(0.0 - 0.2)

Table 2 continues…

Days of structured activity with no substance use[c] (r_s=.44)	14.2 (24.9)	17.2 (29.7)	0.11	(0.0 - 0.2)
Total days in a controlled environment[c] (r_s=.73)	8.9 (22.1)	8.2 (19.1)	-0.04	(-0.1 - 0.1)
Days incarcerated[c] (r_s=.40)	4.1 (14.5)	3.9 (11.5)	-0.02	(-0.1 - 0.1)

Underlined ORs indicate JTDC rates are lower than AOP. **Bold ORs indicate JTDC rates are higher than AOP.**
Bolded effect sizes indicate small effects*, italicized and bolded indicate moderate effects.*
r_s are test-retest Spearman Rho's.
[a]JTDC/AOP [b]Calculated as (Mean JTDC-Mean AOP)/Total SD [c]In the past 90 days. [d]OR reported instead of *d*.
SOURCE: DC_CSAT_OP_V5_due6m_horiz_hasFU.sav.

Outcomes

Table 3 presents the number of days that the youths reported experiencing problems in five key outcome domains at intake, at the 6-month follow-up, and the respective change in days. In each case, fewer days at follow-up was considered a better outcome. For each measure, we provide both the within-group (did this group get better over time?) and between-group (did one group get better than the other?) Cohen's *d* effect sizes. **[3]** As can be seen, the largest impact for both the JTDC group and the matched AOP group (moderate within-group effects) was in days of substance use. While both JTDC and AOP clients reported more than 32 days (out of the past 90 days) of use at intake, JTDC use decreased significantly more (18 fewer days) than AOP (14 fewer days). Thus, while substance use did not differ at intake, JTDC clients showed greater reductions in days of use at follow-up. This between-groups comparison, while statistically significant ($F=7.45$, $p<.05$), did not reach a level of clinical significance ($d=-.12$).

Both groups showed clinically significant reductions in days of emotional problems (small within-group effects). While the change in the days of emotional problems was statistically smaller ($F= 5.0$, $p<.05$) for JTDC clients (6.9 fewer days) than for AOP clients (10.1 fewer days), the difference (between-group effect) did not reach the level of clinical significance ($d=.09$).

Table 3 Outcomes

	AOP Matched (n=1120)	**JTDC (n=1120)**	F	Sig.	Between-Group Change Effect Size *d*[a]
Days of substance use (Intake)	32.4	32.2	0.03	0.874	
Days of substance use (6-month)	18.5	14.4	12.99	0.000	
Change: Days of substance use	*-13.8*	*-17.9*	*7.45*	*0.006*	-0.12
Within-Group Effect Size d[b]	***-0.45***	***-0.57***			
Days of emotional problems (Intake)	24.3	22.8	1.19	0.275	
Days of emotional problems (6-month)	14.1	15.9	2.32	0.128	
Change: Days of emotional problems	*-10.1*	*-6.9*	*5.01*	*0.025*	0.09
Within-Group Effect Size d[b]	**-0.32**	**-0.22**			
Days of family trouble (Intake)	12.5	12.0	0.34	0.558	

Table 3 continues…

Days of family trouble (6-month)	7.3	7.8	0.40	0.528	
Change: Days of family trouble	*-5.3*	*-4.4*	*0.71*	*0.400*	0.04
Within-Group Effect Size d[b]	**-0.23**	-0.18			
Days in controlled environment (Intake)	10.3	13.0	7.64	0.006	
Days in controlled environment (6-month)	10.0	11.0	0.95	0.330	
Change: Days in controlled environment	*-0.4*	*-2.1*	*2.07*	*0.150*	-0.06
Within-Group Effect Size d[b]	-0.02	-0.08			
Days of illegal activity (Intake)	5.5	5.6	0.06	0.804	
Days of illegal activity (6-month)	3.8	5.3	5.48	0.019	
Change: Days of illegal activity	*-1.7*	*-0.1*	*3.59*	*0.058*	0.04
Within-Group Effect Size d[b]	-0.11	-0.02			

Bolded effect sizes indicate small effects*, italicized and bolded indicate moderate effects.*

[a]Calculated as ((Mean_ChangeJTDC-Mean_ChangeAOP)/SD_ChangeTotal

[b]Calculated as ((MeanPost-MeanPre)/SDTotal Pre

SOURCE: DC_CSAT_OP_V5_due6m_horiz_hasFU.sav.

Of the remaining three outcome measures, both groups had small reductions within-group, but only one of the observed changes within groups reached the clinically significant level (e.g., d<-0.2). The comparisons of the amount of change between groups were not statistically or clinically significant. Both JTDC and AOP clients reduced days in trouble with family by a similar amount (from 12 days at intake to 7 days at follow-up). While both were statistically significant within-group reductions, the change for AOP clients showed a small effect, while the JTDC change did not. Neither group significantly changed their days of illegal activity (both reporting 4-5 days in the past 90). Not surprisingly, JTDC clients reported more days in a controlled environment at intake (10 vs. 13 days), but the rate at follow-up and the amount of change were not statistically or clinically different. Consistent with the literature, the GAIN data showed the number of rearrests in the first six months post-intake (not shown in Table 3) to be relatively low (.20 and .24 arrests respectively). While the number of arrests for both groups demonstrated moderate within-group change (-.30 vs. -.34 fewer arrests than the higher intake values; *d*=.4), between-group changes did not differ clinically or statistically.

DISCUSSION

To summarize, JTDC youth were likely to receive more substance abuse treatment, family therapy and external services than matched youths in AOP treatment, and to report self-help participation. They were more satisfied with treatment and were more intensely monitored with urine testing. However, they were less likely to initiate treatment within two weeks of their baseline evaluation. It is logical that JTDC clients received more family services (primarily meeting multiple times with the family and meeting with family about communication), wrap-around or external case management services, and urine tests since, while these are a priority for adolescent programs in general (Cooper, 2002)

and for several of the evidence-based practices they were using, they are of primary importance for JTDCs (Henggeler, 2007; NADCP, 1997). It is also logical that JTDC clients were more likely to stay engaged in treatment six or more weeks and to receive continuing care 90-180 days post-intake, as they are under the increased monitoring and pressure to comply that are principal features of drug courts. Similarly, self-help participation is a requirement of many drug court programs (Hiller et al., 2008) and has been shown to be effective in maintaining abstinence for both adults (Scott, Dennis & Foss, 2005; Scott, Foss & Dennis, 2005) and adolescents (Passetti & Godley, 2008). However, both the AOP and JTDC groups had relatively low rates of self-help group participation.

In the one area in which JTDC youth had lower rates of service provision, treatment initiation within two weeks, we believe that the delay is due to the more complex nature of screening within the drug court system and the need to be referred to treatment typically provided by a separate system of care. This is important because a recent study (Lennox, Dennis, & Modisette, under review) found that initiation of treatment within two weeks was a major protective factor against relapse and recidivism, and that delayed initiation was sometimes a source of health disparities by race or ethnicity. Enhanced coordination between the justice and substance abuse treatment systems could improve treatment initiation and, thereby, reduce the risk of relapse, recidivism, and health disparities.

Relative to a matched cohort of AOP youth, those in JTDC showed statistically significantly greater reductions in days of substance use and smaller reductions in emotional problems. The sizes of both within-group differences were greater than what would typically be considered clinically significant (i.e., d>.2). Adolescent drug court participants have shown greater reductions in substance use in other studies comparing JTDC with evidence-based practices vs.

standard probation (e.g. Rodriguez & Webb, 2004) or treatment as usual (Henggeler et al., 2006). Here, however, both the JTDC and the matched AOP sites used one of the evidence-based treatments listed earlier. Consistent with recommendations by Henggeler (2007), this again suggests the importance of emphasizing the use of evidence-based practices in JTDC.

At baseline, the JTDC youth had significantly more days in a controlled environment than the AOP youth both before (13 vs. 6 days) and after (13 vs. 10) the latter were matched. At follow-up, the weighted comparisons were no longer significantly different (11 vs. 10 days). JTDCs seem to be successful at diverting youth from detention to treatment, maintaining longer treatment duration, and achieving significant substance use and mental health outcomes. Compared to similar youth who enter such programs from usual community sources, however, there were no clinically significant differences between groups in the outcomes for both substance use and emotional problems. In addition, there are areas of unmet need (e.g. mental health, victimization, HIV risk, environment, vocational) as well as continued risk for relapse and recidivism that persist at six months and beyond. However, there is a continued need to better address the multitude of needs of JTDC clients, to extend the period of monitoring and the duration of continuing care.

Commentators often question whether drug courts can achieve similar outcomes with youth they pressure into treatment relative to those who present on their own to community-based treatment. In practice, however, youth in the community are also being pressured to go to treatment (by family, schools and in many cases the juvenile justice system). Both systems of care had relatively similar levels of service utilization and outcomes after controlling for small differences in the case mix of the youth they served. Contrary to concerns about “creaming” or “net widening”, this suggests that JTDC are, in fact, one of several ways of getting

significantly impaired youth into treatment and reliably achieving similar (and even slightly better) outcomes. Thus, they have the potential to help reduce the previously described gap in which fewer than 1 in 17 youth with abuse or dependence are receiving any kind of treatment (OAS, 2006) and the wide range of personal and public safety problems associated with continued use (Dennis, White & Ives, 2009).

Strengths and Limitations

This paper had several strengths, including a large sample size, standardized intake and follow-up measures, multiple sites, and multiple sources of data on service utilization (i.e., from staff records and self-report). However, we need to acknowledge some important limitations. First, in this study we have compared two groups receiving treatment (via JTDC or AOP) and did not have a no-treatment control group. While there are similar time effects (i.e., reduced use) that would be expected with substance abuse treatment, this study did not directly evaluate the question of the relative effectiveness of treatment over no treatment.

Second, the maximum required follow-up monitoring period was six month post-intake. Since the duration of drug court treatment is at least six months and often nine to 12 months, (Cooper, 2002; Hiller et al., 2008), the outcomes measured may not reflect post-treatment values. Third, the service utilization measures from staff were very limited (i.e., we did not have detailed data on sessions attended or content) and demographics, clinical characteristics, and outcomes were limited to client self report with no alternative measures (i.e., from clinicians, records, collaterals, biological testing). Fourth, four of the 11 JTDC sites were more than 50% Hispanic and two of these four were the largest JTDC sites (>200 clients each). As a result, Hispanics were over represented in the JTDC sites even after matching. While this might limit generalizability, it does present an opportunity for

further examination of Hispanic vs. non-Hispanic drug court clients. While this difference may be overcome with the expected addition of JTDC sites, the other remaining effect after matching (being on parole, probation or in short-term detention) may be a feature of being a drug court client and less easily addressed.

Future Directions

In this article, we have evaluated characteristic and process measure differences descriptively in a way designed to provide a foundation for future work. Additional research seems warranted to relate the needs, services, and outcomes in a more complex path model to see how they interrelate. The results described in this article present several beneficial directions for future study.

First, we suggest expanding the JTDC group to include sites that are more representative of the public adolescent outpatient treatment demographic, thereby improving generalizability. Recent CSAT funding of additional JTDC grants should make this possible in the next few years. In the meantime, we would recommend using the existing data to compare Hispanic and non-Hispanic JTDC clients. Following a group of youths participating in a drug court program and using GAIN data, Ruiz and colleagues (2009) reported positive reductions in substance-related issues, delinquency and sexual risk engagement, but differential effects by gender and minority status. Therefore, we also recommend more sophisticated examination of the relationships and interactions between drug court involvement and the significant intake characteristics found here, including gender, race, specific substance use, and specific criminal behavior/arrests. Lennox, Dennis and Modisette (under review) recently detailed one such path model on racial health disparities in relapse and recidivism.

Finally, we propose continued examination of JTDC and AOP or other equivalent comparison groups using an expanded list of services with more compelling outcomes including specific recidivism and substance relapse measures as well as specific treatment content, self-help participation and relevant costs to society.

Future analyses are currently underway to address two additional treatment triage related questions. The first addresses prioritization: are those with the highest need for services (intoxication, physical problems, emotional problems, HIV risk, residential treatment need, recovery environment risk, relapse potential) actually receiving services (detoxification services, medical treatment, mental health, HIV education, residential treatment, self-help, biometric tests)? The second addresses intentionality: are the services that are provided going primarily to those with the highest need?

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