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Examining the Effects of Juvenile Drug Treatment Courts:  
A Systematic Review and Meta-analysis

Final Evaluation Report

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### Abstract

**Objectives:** To conduct a systematic review and meta-analysis examining the effects of juvenile drug treatment courts (JDTCs) on youth's recidivism and drug use; program graduation rates among JDTC participants; differences in recidivism rates for JDTC program graduates versus dropouts; and variability in effects across characteristics of participating youth and courts.

**Methods:** We conducted a comprehensive literature search to update our synthesis of randomized and controlled quasi-experimental studies that reported the effects of JDTCs in the United States. Mixed-effects meta-regression models with robust variance estimates were used to examine average effect sizes and explore moderators of effects.

**Results:** The literature search identified 55 eligible study samples providing data from 12,310 individual participants. JDTC participants had significantly lower levels of general recidivism during the program period, relative to traditional court processing ( $LOR = 0.32$ , 95% CI [0.03, 0.61]). There was no evidence that JDTC participation was associated with general recidivism after the program period, drug recidivism, or drug use. The average program graduation rate among JDTC participants was 54.74% (95% CI [0.50, 0.59]) and JDTC graduates had significantly lower odds of recidivism relative to JDTC program dropouts ( $LOR = 1.04$ , 95% CI [0.69, 1.39]). Moderator analyses identified several features of the drug courts that may be associated with larger program effects and higher graduation rates. However, the overall quality of evidence was either or low or very low (due largely to risks of bias associated with selection bias in non-randomized designs).

**Conclusions:** Overall, JDTCs may have modest beneficial effects on reducing participants' recidivism, particularly for those youth who successfully complete and graduate from the program. To maximize JDTC effectiveness, courts may want to focus efforts on improving

retention and graduation and referring youth to community treatment programs that are appropriate for their level of care and unique needs.

**Keywords:** Drug courts, Juvenile justice, Meta-analysis, Recidivism, Substance use, Therapeutic jurisprudence

## **Examining the Effects of Juvenile Drug Treatment Courts:**

### **A Systematic Review and Meta-analysis**

#### **Introduction**

The developmental transition from childhood to adulthood can be marked by an increase in the frequency of risky behavior, particularly the consumption of illicit substances (Degenhardt et al., 2016). Although developmentally normative, increased substance use during adolescence may be associated with increased aggression, delinquency, and the corresponding risk of contact with the juvenile justice system (Chassin, 2008; Doran et al., 2012; National Center for Juvenile Justice, 2021; Young et al., 2012). Many justice-involved youth suffer from substance use disorders and addiction, which are correlated with the risk of recidivism (van der Put et al., 2014). Rehabilitative measures that target and treat justice-involved youth's substance-related issues may therefore be effective in reducing their risk of recidivism. Juvenile drug treatment courts (JDTCs), defined here as problem-solving courts that aim to reduce recidivism by explicitly treating youth's substance-related problems in a therapeutic and supportive manner, offer one such approach. Typical elements of JDTCs include assessments of youth's unique criminogenic risks and needs, frequent interactions between the youth and a judge or other court staff, intensive monitoring by court staff, use of behavior-shaping through incentives and sanctions, and referral to community-based substance abuse treatment services (Belenko and Dembo, 2003). In contrast to traditional juvenile courts, which are often guided by punitive deterrent policies, JDTCs are intended to be rehabilitative and responsive to the individual criminogenic needs of drug-involved juvenile offenders (Office of Juvenile Justice and Delinquency Prevention, 2016). The goal of JDTC programs is therefore to reduce the risk of recidivism by providing tailored and supportive treatment; such benefits, however, may not be conferred to youth who fail to complete the full JDTC program.

The first drug treatment court program opened in 1989 in Miami-Dade County, Florida; in 2020 there were an estimated 3,848 drug courts in the United States, with 618 of those classified as JDTCs (NDCRC, 2021). Prior reviews of research suggest that adult drug courts are effective in reducing recidivism when compared to traditional judicial interventions (Mitchell et al., 2012; Rossman et al., 2011). Despite promising evidence supporting the effectiveness of adult drug courts for reducing recidivism, the evidence base on the effectiveness of JDTCs has been inconsistent and inconclusive (Tanner-Smith et al., 2016). The current systematic review and meta-analysis therefore seeks to synthesize the current available evidence regarding the effects of JDTCs on recidivism and drug use, with specific emphasis on understanding whether and how JDTC completion (graduation) may play a role in this effectiveness.

### ***Juvenile Drug Treatment Court Model***

Whereas traditional criminal courts have historically used punitive approaches to deter criminal behavior (Loughran et al., 2015), problem-solving courts use a rehabilitative orientation wherein criminogenic needs are treated to reduce reoffending (Butts and Roman, 2004; Inciardi et al., 1996). Drug treatment courts are one type of problem-solving court, which aim to treat harmful substance use behaviors that may contribute to criminal offending (van der Put et al., 2014). Further, JDTCs are specifically designed to use developmentally appropriate services to address the unique treatment needs of justice-involved youth (Belenko and Dembo, 2003). Services provided by JDTCs typically include status hearings with the court's presiding judge, coordination between the court and the youth's family, random drug screenings, community supervision, referrals to community-based substance abuse treatment services, and the use of incentives and sanctions to monitor compliance with program mandates. Most JDTCs are intended to take 12-18 months to complete, although the length of time required to complete these programs can vary widely. Youth who fail to graduate from

JDTCs are typically expelled due to violations of program requirements such as failing urinalysis tests, failing to appear in court, or failing to attend mandated treatment services, although some youth may choose to discontinue participation the program due to personal or family reasons (Polakowski et al., 2008; Sloan et al., 2004).

In 2003, the National Drug Court Institute and National Council of Juvenile and Family Court Judges convened a workgroup of experts that outlined 16 strategies and recommendations for JDTC implementation (U.S. Bureau of Justice Assistance, 2003). Recognizing that these 16 strategies were not intended to be research-based benchmarks, in 2016, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) collaborated with juvenile justice researchers, stakeholders, and other federal agencies to develop updated evidence-based guidelines for JDTCs based on existing research, including several systematic reviews and meta-analyses (Office of Juvenile Justice and Delinquency Prevention, 2016). These OJJDP JDTC Guidelines include 28 evidence-based guidelines that JDTCs are recommended to follow, which fall under seven key objectives: (1) Focus the JDTC philosophy and practice on effectively addressing substance use and criminogenic needs to decrease future offending, decrease substance use, and increase positive outcomes; (2) Ensure equitable treatment for all youth by adhering to eligibility criteria and conducting an initial screening; (3) Provide a JDTC process that engages the full team and follows procedures fairly; (4) Conduct comprehensive needs assessments that inform individualized case management; (5) Implement contingency management, case management, and community supervision strategies effectively; (6) Refer participants to evidence-based substance use treatment, to other services, and for prosocial connections ; and (7) Monitor and track program completion and termination. Adherence to these guidelines is intended to help JDTCs improve the lives of participating youth by reducing their risk of recidivism and substance use, improving their mental and physical health, and promoting their healthy



development.

### ***Prior Reviews of Juvenile Drug Treatment Court Research***

Several prior reviews have examined the research evidence on the effectiveness of JDTCs, but the findings from these reviews have been inconsistent. Early narrative reviews of JDTC research concluded there is limited evidence of their effectiveness for reducing recidivism, in part due to methodological limitations and weaknesses in the primary evaluation literature (Belenko, 2001; Roman and DeStefano, 2004). Later narrative reviews suggested JDTCs may be effective for reducing recidivism but noted that their effectiveness might be contingent upon their ability to integrate theory-grounded and evidence-based practices into their operations (Henggeler, 2007; Van Wormer and Lutze, 2011). More recent systematic reviews and meta-analyses have concluded that JDTCs are associated with reductions in recidivism, but note that these benefits are less than those conferred by adult drug courts (Mitchell et al., 2012; Shaffer, 2006) or are modest “at best” (Stein et al., 2015). In the most recent and comprehensive meta-analysis to date, results indicated that JDTCs are no more (or less) effective than traditional juvenile court processing for reducing recidivism or drug use (Tanner-Smith et al., 2016), replicating null findings from other reviews (Hickert et al., 2010; Latimer et al., 2006). All of these prior meta-analytic reviews, however, used reductionist techniques to handle dependent effect sizes reported in the literature; these reductionist techniques result in a loss of data that is no longer necessary given recent methodological innovations in integrative techniques for handling dependent effect sizes (López-López et al., 2018).

Given the inconsistent conclusions from prior reviews, an updated and comprehensive systematic review of the empirical evidence is needed to better understand the overall effects of JDTCs on youth offender recidivism and substance use, and to explore the potential reasons why JDTCs may have null effects on these outcomes. One consideration that has not

been fully explored in prior meta-analytic reviews is whether and how JDTC completion (graduation) may play a role in JDTC effects. The successful implementation and delivery of the full range of therapeutic components intended to be provided in a JDTC, and participants' subsequent graduation from the program, may play an important role in whether the program yields beneficial effects. Graduation from JDTCs has been shown to be associated with improved socioemotional functioning among youth (Applegate and Santana, 2000; Thompson, 2006). Prior reviews and outcome evaluations have found that JDTCs provide program graduates with comparable benefits (Applegate and Santana, 2000; Sloan et al., 2004; Stein et al., 2013), some of which have been found to persist into adulthood (Carter and Baker, 2011). Further, research from the adult drug court literature suggests that adult offenders who successfully complete a drug court program are less likely to recidivate and, those who do recidivate take longer to do so than offenders who are prematurely terminated (Fielding et al., 2002; Gallagher, 2014; Taxman and Bouffard, 2005). Thus, the null JDTC effects reported in prior reviews could be due in part to low levels of JDTC program completion, particularly when synthesizing intention-to-treat effects that represent outcome data from a heterogeneous group of youth, many of whom may not have received the full JDTC program as intended (Gupta, 2011).

In summary, prior reviews of JDTCs have not exhaustively identified the features of these courts that may enhance (or inhibit) their effectiveness, nor have they systematically investigated the relationship between JDTC graduation and reductions in reoffending. The current systematic review and meta-analysis addresses these gaps in the literature by reviewing the most current evidence base and assessing whether the benefits of JDTCs are more consistently conferred to those who graduate from these programs.

### ***Objectives***

This meta-analysis synthesizes findings from the most current evidence base of JDTC research. Specifically, this meta-analysis sought to examine (1) the effects of JDTCs versus traditional court processing on youth's recidivism and drug use outcomes, (2) program graduation rates among JDTC participants, (3) differences in recidivism rates for JDTC program graduates versus dropouts, and (4) variability in these effect sizes across key characteristics of the participants and JDTCs.

### **Methods**

#### ***Protocol and Registration***

The current study presents findings from an update to a prior meta-analysis examining the effects of JDTCs (Tanner-Smith et al., 2016). This updated meta-analysis used the same literature search and data collection procedures as the prior meta-analysis. The protocol and analysis plan for this updated meta-analysis were pre-registered on OSF at <https://osf.io/cjwnq/>.

#### ***Inclusion and Exclusion Criteria***

To be eligible for inclusion in the review, studies had to (1) evaluate the effects of a JDTC program, defined here as a specialized court designed to handle juvenile drug-involved cases, where the court refers youth to community treatment services, conducts regular drug screens, and involves a judge who actively monitors the juvenile's progress and implements sanctions and rewards; (2) include a business as usual comparison condition (e.g., traditional court processing such as probation with or without referral to treatment services); (3) measure at least one criminal recidivism outcome after the start of the program; (4) report findings on a juvenile sample of youth age 18 or under; (5) be published during or after 1989; (6) be conducted in the United States; and (7) use an eligible controlled research design.

Eligible controlled research designs included randomized controlled trial designs,

controlled quasi-experimental designs where participants were matched on at least one baseline measure of criminal offending or substance use, controlled quasi-experimental designs that used statistical controls to adjust for baseline differences in participants' offending or substance use, and controlled quasi-experimental designs that provided enough information to permit calculation of effect sizes indexing baseline differences in participants' offending or substance use. There were no other restrictions on eligibility.

### ***Search Strategy***

A comprehensive literature search strategy was used to identify studies that met all inclusion criteria. We included all studies that were originally reviewed in the prior meta-analysis on JDTC effectiveness (Tanner-Smith et al., 2016), which contained literature released between 1989 and December 2014. An updated literature search was thus used to identify any additional eligible studies reported between January 2015 and June 29, 2021. The following electronic databases were searched using the ProQuest host: ERIC, International Bibliography of Social Sciences, ProQuest Criminal Justice, ProQuest Education, ProQuest Social Science, ProQuest Sociology, ProQuest Dissertations & Theses (United States, United Kingdom, and Ireland), and Sociological Abstracts. We searched the following databases using the American Psychological Association PsycNET host: PsycINFO, PsycARTICLES, and PsycTESTS. We also conducted extensive supplementary searches of the following databases, research registers, and websites: Campbell Collaboration Library, Cochrane Collaboration Library, CrimeSolutions.gov repository, International Clinical Trials Registry, National Criminal Justice Reference Services, Center for Court Innovation website, Chestnut Health Systems website, National Drug Court Institute website, National Council of Juvenile and Family Court Judges website, NPC Research website, RAND Drug Policy Research Center website, Reclaiming Futures website, JJ Trials website, and the Urban Institute website. We also conducted hand-searches of 2015–2021 conference

proceedings from the American Society of Criminology, as well as manuscripts published between 2015-2021 in the *Drug Court Review* and *Juvenile & Family Court Journal*. Finally, we checked the bibliographies of all screened and eligible studies, as well as the bibliographies of narrative reviews and meta-analyses identified in the search.

### ***Screening and Coding Procedures***

Under the supervision of the first author, a team of bachelor's and master's level research assistants conducted screening and coding in three stages. First, all titles and abstracts were screened independently by two reviewers; we retrieved the full text for any report deemed potentially eligible by at least one reviewer. Second, all resulting full text reports were independently screened for eligibility by two reviewers; the first author resolved any disagreements at this stage. Third, studies deemed eligible for inclusion were independently coded by two reviewers; again, the first author resolved any coding disagreements at this stage. All data extraction followed a standardized coding protocol, with data entered directly into a FileMaker Pro database. The coding protocol provided detailed instructions for extracting data related to study characteristics, participants, drug treatment court conditions, comparison conditions, outcome measures, and statistical data necessary for effect size calculations (see coding protocol on OSF project record at <https://osf.io/cjwnq/>).

### ***Statistical Procedures***

*Effect size metrics.* We used a log odds ratio (*LOR*) effect size to quantify JDTC versus comparison group effects for the binary outcomes of recidivism and substance use. These *LORs* were coded with values  $> 0$  indicating beneficial effects for the JDTC group (i.e., lower recidivism, lower substance use) relative to comparison. We also used an *LOR* effect size to quantify differences in recidivism rates for JDTC graduates versus JDTC dropouts. These *LORs* were coded with values  $> 0$  indicating beneficial effects for JDTC graduates (i.e., lower recidivism) relative to JDTC dropouts. Some studies ( $k = 11$ ) measured

recidivism or substance use outcomes on a continuous scale (e.g., mean number of new arrests); for these studies we first computed a small-sample corrected standardized mean difference effect size (Hedges'  $g$ ) and then used the Cox transformation to convert those to  $LORs$  (Sanchez-Meca et al., 2003). We used a proportion ( $p$ ) effect size to quantify JDTC graduation rates. All analyses for graduation outcomes were conducted using the logit transformed proportion, with results translated back into proportions for ease of interpretation. We examined the distributions of all effect sizes; 25 outliers were identified and Winsorized to values at  $1.5 \times IQR$  above/below the upper/lower hinges of the distribution. Sensitivity analyses using the original un-Winsorized outlying values yielded substantively similar findings (see Appendix F).

*Study methods, quality, and risk of bias indicators.* We collected data on several measures related to study methods, quality, and risk of bias. This included measures of study design (randomized experiment vs. quasi-experiment), whether there appeared to be possible implementation problems in the implementation of JDTC program elements (yes, no/unclear), overall attrition from baseline to first follow-up, and differential attrition between the JDTC and comparison groups. We also measured baseline equivalence effect sizes indexing the differences between JDTC and comparison group participants at baseline in terms of age (Hedges'  $g$ ), and criminogenic risk, race, and sex ( $ORs$ ). All baseline equivalence effect sizes were coded such that positive values ( $g > 0$ ,  $OR > 1$ ) indicated the youth in the JDTCs were at lower risk of recidivism than those in the comparison group.

*Moderator variables.* We collected data on a wide range of study characteristics to examine as potential moderators or predictors of effect size magnitude. In addition to the study methods variables noted above, other general study characteristics included publication type (journal article vs. other), publication year, country (U.S. vs. Canada), and U.S. Census region (Midwest, Northeast, West vs. South).

Characteristics of the participating youth included the sex composition of the sample (percent male), racial/ethnic composition of the sample (percent Black, Hispanic, White), average age of participants, average number of arrests prior to program entry, average number of drug related arrests prior to program entry, and average number of prior convictions prior to program entry.

Measured characteristics of the JDTCs included year first opened, number of youth served per year, number of youth served in the most recent year, number of court phases, number of drug tests per week in the first phase, number of status hearings per month in the first phase, and length of court (in months). We also measured general adherence to the OJJDP JDTC Guidelines with several proxy measures based on information reported in the studies. Proxy indicators for the Guidelines Objective 1 (Focus the JDTC philosophy and practice on effectively addressing substance use and criminogenic needs to decrease future offending and substance use and to increase positive outcomes) were whether studies reported establishing collaborative relationships with community partners and whether studies reported establishing linkages with local educational system partners. Indicators for the Guidelines Objective 2 (Ensure equitable treatment for all youth by adhering to eligibility criteria and conducting an initial screening) were whether studies courts reported using clearly defined eligibility criteria for program participation and whether they reported using a standardized risk assessment tool for determining program eligibility. Indicators for the Guidelines Objective 3 (Provide a JDTC process that engages the full team and follows procedures fairly) were whether the study reported actively engaging families in the process whether they ensured the court team was collaborative and interdisciplinary, and whether the court had dedicated staffing to support the JDTC. Indicators for the Guidelines Objective 4 (Conduct comprehensive needs assessments that inform individualized case management) were whether the studies reported using tailored and individualized treatment planning to

meet the unique needs of participants, referred youth to community-based substance use treatment programs with multiple levels of care, and whether they referred youth to multiple modalities of substance use treatment programs. Indicators for the Guidelines Objective 5 (Implement contingency management, case management, and community supervision strategies effectively) were whether studies reported using consistent goal-oriented incentives and sanctions with participants, and the aforementioned measure of whether courts reported any possible implementation problems. Indicators for the Guidelines Objective 6 (Refer participants to evidence-based substance use treatment, to other services, and for prosocial connections) were whether studies reported referring participants to evidence-based substance use treatment services in the community. Finally, indicators for the Guidelines Objective 7 (Monitor and track program completion and termination to facilitate equitable outcomes for program participants) were whether the studies reported using developmentally appropriate program approaches, or gender-tailored/appropriate services.

*Missing data.* If primary studies failed to include sufficient statistical information needed to estimate effect sizes, we contacted the study authors for that information. Some studies also failed to provide information on the moderator variables of interest. Because missing data on effect size moderators was limited and a missing at random assumption could not be reasonably justified, imputation was not used to recover missing values. Rather, we used pairwise deletion for all analyses and only present descriptive or inferential information for those studies with available data.

*Analytic strategies.* All analyses were conducted using random effects meta-analysis models (Hedges and Olkin, 1985; Lipsey and Wilson, 2001). Because many studies reported multiple, dependent effect sizes from the same study sample, all meta-analyses were conducted using meta-regression models with robust variance estimates (Hedges, Tipton and Johnson, 2010; Tanner-Smith and Tipton, 2014). Random-effects meta-regression models



were used to obtain overall mean effect size estimates and heterogeneity statistics; mixed-effects meta-regression models were used to investigate variability in effects associated with moderator variables. Given the relatively small sample size, it was not possible to estimate multivariable meta-regression models that adjusted for potential confounders. Thus, each meta-regression examined the bivariate relationship between a given moderator and effect size for the respective outcome. All models assumed a within-study correlation between effect sizes ( $\rho$ ) of .70; sensitivity analyses assuming different values of  $\rho$  yielded similar results (see Appendix F). Standard errors, p-values, and confidence intervals are only presented for those coefficients with adequate degrees of freedom after accounting for small sample adjustments to the robust variance estimates (Tipton, 2015).

All main effects meta-analyses were conducted separately by outcome type (general recidivism, drug recidivism, drug use, graduation) and follow-up period (during program, post-program). To maximize analytic sample sizes, the moderator meta-analyses pooled across follow-up periods but included a dummy indicator control for the follow-up period. Heterogeneity was assessed using the method of moments based estimator for  $\tau^2$  appropriate for meta-regression models with robust variance estimates. Publication/small study bias was assessed using contour-enhanced funnel plot (Peters et al., 2008) and Egger regression tests for funnel plot asymmetry.

*Assessing quality of the evidence.* The quality of evidence for each of the main meta-analysis findings (i.e., mean effect size estimates) was assessed using the Cochrane Collaboration's Grading of Recommendations Assessment, Development, and Evaluation Working Group (GRADE) criteria (Schünemann et al., 2013). The GRADE approach specifies four levels to rate the quality of a body of research evidence that reflects the credibility of that evidence. These ratings consider within-study risk of bias, precision of estimates, consistency in effects, directness of evidence, and risk of publication bias. The four

possible ratings are: High (we are very confident that the true effect lies close to that of the estimate of the effect), Moderate (we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different), Low (our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect), and Very Low (we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect).

## **Results**

### ***Literature Search***

We identified 3,054 candidate reports in the updated literature search (3,013 through database/register searching; 41 through other sources); 756 were duplicates that were dropped from consideration and 2,090 were screened as ineligible at the abstract level (see Figure 1). Of the 212 articles retrieved in full text, 180 were deemed ineligible. There were 44 studies (with 55 study samples) eligible for inclusion that comprised the analytic sample in the meta-analysis. These 55 study samples represent data from 12,310 individual participants (Appendix A includes references to all studies included in the meta-analysis; see Appendix B for detailed descriptions of all included studies).

### ***Description of Included Studies***

Table 1 presents descriptive statistics for the key features of the study methods/quality, participants, and drug treatment courts in the 55 included samples. Only a few (16%) were published in journal articles, and all (100%) were conducted in the United States (13% Midwest, 15% Northeast, 35% South, 33% West, 4% multiple regions). The methodological quality of the studies was low—only 4 studies (7%) randomly assigned participants to conditions, 1 study (2%) used a regression discontinuity design, almost half (43%) reported program implementation problems, the average overall attrition rate was 0.30

( $SD = 0.23$ ) and the average differential attrition between drug court and comparison groups was 0.07 ( $SD = 0.08$ ). Although the JDTC and comparison groups in the studies were matched well in terms of age, groups were non-equivalent at baseline in terms of risk level, racial composition, and sex composition; JDTC participants tended to be at significantly lower risk, more likely to be White, and more likely to be female than comparison group participants. Thus, this set of studies may suffer from selection bias and there is a risk of bias in effect estimates from these evaluations.

The study samples were predominantly male ( $M = 78\%$ ) and White ( $M = 63\%$ ), with an average age of 16.03 ( $SD = 0.70$ ). Few studies reported arrest/conviction history for participants; among those studies, JDTC participants had an average of 4.12 prior arrests ( $SD = 2.71$ ;  $k = 23$ ), 1.54 prior drug arrests ( $SD = 0.72$ ;  $k = 6$ ), and 3.28 prior convictions ( $SD = 4.73$ ;  $k = 3$ ) upon entry into the court.

On average, the JDTCs first opened in the year 2000, served 33.31 youth per year ( $SD = 21.23$ ), involved 3.43 phases ( $SD = 0.85$ ), conducted urinalysis screens around 2.09 times per week in the first phase ( $SD = 1.08$ ), had 3.32 status hearings per month in the first phase ( $SD = 1.18$ ), and lasted 10.52 months ( $SD = 2.73$ ). Over half of the JDTCs explicitly excluded violent offenders (53%) and very few (9%) required juveniles to have a drug offense to be eligible for participation in the JDTC.

The last section of Table 1 shows the JDTCs' adherence to indirect proxy measures for the OJJDP JDTC Guidelines, which were collected based on information reported in the studies. Related to the Guidelines Objective 1 (Focus the JDTC philosophy and practice on effectively addressing substance use and criminogenic needs to decrease future offending and substance use and to increase positive outcomes), many courts reported establishing collaborative relationships with community partners (57%) as well as collaborations/linkages with local educational system partners (66%).

Related to the Guidelines Objective 2 (Ensure equitable treatment for all youth by adhering to eligibility criteria and conducting an initial screening), most courts reported using clearly defined eligibility criteria for program participation (86%) and just over half reported using a standardized risk assessment tool for determining program eligibility (56%).

Related to the Guidelines Objective 3 (Provide a JDTC process that engages the full team and follows procedures fairly), the majority of courts reported actively engaging families in the process (84%), ensuring the court team was collaborative and interdisciplinary (76%), and ensuring the court had dedicated staffing to support the JDTC (79%).

Related to the Guidelines Objective 4 (Conduct comprehensive needs assessments that inform individualized case management), many of the courts reported using tailored and individualized treatment planning to meet the unique needs of participants (71%), referred youth to community-based substance use treatment programs with multiple levels of care (66%) and referred youth to multiple modalities of substance use treatment programs (50%).

Related to the Guidelines Objective 5 (Implement contingency management, case management, and community supervision strategies effectively), most courts reported using consistent goal-oriented incentives and sanctions with participants (78%), but many also indicated potential implementation problems in delivering the JDTC services as originally intended (43%).

Related to the Guidelines Objective 6 (Refer participants to evidence-based substance use treatment, to other services, and for prosocial connections), very few courts reported whether they referred participants to branded evidence-based substance use treatment services in the community (17%).

Finally, related to the Guidelines Objective 7 (Monitor and track program completion and termination to facilitate equitable outcomes for program participants), the minority of courts reported using developmentally appropriate (24%) or gender-tailored/appropriate

services (20%) for participating juveniles.

### ***JDTC Versus Comparison Effects on Recidivism and Drug Use Outcomes***

Table 2 presents the results of all main effects meta-analyses. The first section shows the results from the meta-analyses synthesizing the JDTC versus comparison group effects on recidivism and drug use outcomes, also shown separately by outcome type and outcome timing (see Appendix C for corresponding Galbraith plots).

In the meta-analysis synthesizing 46 effect sizes from 14 studies with general recidivism measured during the JDTC program, JDTC participants had significantly lower odds of recidivism relative to the comparison group participants ( $LOR = 0.32$ , 95%  $CI_{LOR}$  [0.03, 0.61],  $\tau^2 = 0.11$ ,  $OR = 1.38$ , 95%  $CI_{OR}$  [1.03, 1.84]). Namely, the odds of success among JDTC participants—defined as no recidivism during the program period—were 1.38 times higher than the odds of success in the comparison group. Or stated another way, the odds of recidivism among JDTC participants were 0.72 times lower than those of participants in traditional court processing comparison conditions. This mean effect, although statistically significant, is nonetheless relatively small in substantive magnitude: it translates to a risk ratio of 1.10, a risk difference of 1%, and a number needed to treat of 100. When subdividing the data into more specific types of recidivism measures (arrests, charges, convictions, general illegal activity, offenses), the mean effect sizes were no longer statistically significant, which might be attributable to the lower statistical power in these models given the smaller number of included effect sizes/studies.

In the meta-analysis synthesizing 254 effect sizes from 50 study samples with general recidivism measured after the JDTC program, the mean effect size was not statistically significant ( $LOR = 0.09$ , 95%  $CI$  [-0.10, 0.29],  $\tau^2 = 0.31$ ,  $OR = 1.10$ ). When subdividing the data into more specific types of recidivism measures (arrests, charges, convictions, general illegal activity, offenses), there was again no evidence of a significant (positive or negative)

effect of JDTCs. One study provided an effect size estimate of self-reported illegal activity recidivism after the program, indicating that JDTC participants had worse outcomes than comparison participants in terms of illegal activity ( $LOR = -0.16$ , 95% CI [-0.30, -0.03],  $OR = 0.85$ ); this result should be interpreted cautiously, however, given that it only reflects evidence from a single study.

There was no evidence of a significant (positive or negative) effect of JDTCs on drug recidivism during the JDTC program; however, these results should be interpreted cautiously because the meta-analyses did not have adequate degrees of freedom after applying the small sample adjustment in the robust variance estimation model. There was also no evidence of a significant effect of JDTCs on drug recidivism after the program ( $LOR = 0.27$ , 95% CI [-0.12, 0.67],  $\tau^2 = 0.56$ ,  $OR = 1.31$ ,  $k = 15$ ).

Results provided no evidence of a significant effect of JDTCs on drug use during the program ( $LOR = -0.27$ , 95% CI [-0.70, 0.15],  $\tau^2 = 0.10$ ,  $OR = 0.76$ ,  $k = 9$ ). There was also no evidence of a significant (positive or negative) effect of JDTCs on drug use after the JDTC program, but again these results should be interpreted cautiously because the meta-analysis did not have adequate degrees of freedom after applying the small sample adjustment in the robust variance estimation modes.

### ***JDTC Graduation Rates***

A total of 50 studies provided sufficient data to estimate JDTC graduation rates among program participants. In the meta-analysis synthesizing 68 effect sizes from those 50 studies, the average graduation rate was 54.74% (95% CI [0.50, 0.59],  $\tau^2 = 0.57$ ). Thus, many youth who initially enrolled in JDTCs did not fully complete the requirements of the programs and thus never formally graduated from the JDTC.

### ***JDTC Graduate Versus Dropout Differences in Recidivism***

A total of 15 studies provided recidivism outcome data for both JDTC graduates and JDTC dropouts, permitting estimation of effect sizes measuring differences in recidivism for program graduates versus dropouts at first follow-up. In the meta-analysis synthesizing 15 effect sizes from those 15 studies, JDTC graduates had significantly lower odds of recidivism relative to program dropouts ( $LOR = 1.04$ , 95%  $CI_{LOR} [0.69, 1.39]$ ,  $\tau^2 = 0.13$ ,  $OR = 2.83$ , 95%  $CI_{OR} [1.99, 4.02]$ ). More specifically, the odds of success among JDTC program graduates – defined as no recidivism by the first follow-up—were 2.83 times higher than the odds of success among JDTC program dropouts. Stated another way, the odds of recidivism were 0.35 times lower among JDTC graduates relative to program dropouts. This mean effect was statistically significant and moderate in substantive magnitude: it translates to a risk ratio of 1.81, a risk difference of 3%, and a number needed to treat of 33. This result suggests that the null findings for the JDTC versus comparison group contrasts could be partly a function of the low graduation rates in courts, given that JDTC program dropouts are more likely to recidivate than program graduates.

### ***Moderator Analyses***

The main effects meta-analyses presented in Table 2 provided mean effect size estimates for the three effect types of interest: JDTC versus comparison effects, JDTC graduation rates, and differences in recidivism for JDTC graduates versus dropouts. As evidenced by the  $\tau^2$  estimates from these analyses, however, there was considerable heterogeneity in effects across studies (see also Appendix C for Galbraith plots). This suggests there was variability in effects across studies –some JDTCs may yield beneficial effects on recidivism whereas others may yield null/negative effects—so it is important to examine whether some of this heterogeneity may be explained by features of the study methods, participants, and drug courts represented in the review. Table 3 presents the results

of the meta-regression models with robust variance estimation used to predict bivariate associations between study characteristics and the three effect types of interest.<sup>1</sup>

*Predicting JDTC versus comparison effects on recidivism.* The results provided no evidence that publication type or publication year were associated with JDTC effects on recidivism. Effects did vary significantly by region: courts in the Midwest reported significantly smaller effects than those in the South/multiple regions (reference category) ( $b = -0.74$ , 95% CI [-1.18, -0.30]) but all other region contrasts were non-significant. As shown in Figure 2, however, despite this statistically significant association, overall the JDTC versus comparison effects on recidivism were still consistently null across regions. There was also evidence that studies reporting JDTC implementation problems had significantly smaller effects than those without such implementation problems ( $b = -0.55$ , 95% CI [-0.91, -0.19]). But again, as show in Figure 3, despite this statistically significant association, the JDTC versus comparison effects on recidivism were on average null regardless of the presence of implementation problems. Given the small number of studies using randomized designs ( $k = 4$ ) and the small number of studies for which attrition estimates could be calculated ( $k = 9$ ), it was not possible to reliably estimate the standard error of the coefficients for these predictors.

There was no evidence that the measured participant characteristics or drug court characteristics were associated with JDTC effects on recidivism. The only statistically significant predictor was whether courts required drug offenses as an eligibility criterion for program participation, such that JDTC versus comparison effects on recidivism were significantly larger in studies with this eligibility requirement ( $b = 0.67$ , 95% CI 0.21, 1.12]). As shown in Figure 4, among the courts where drug offenses were required for eligibility,

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<sup>1</sup> Given the small number of effect sizes available for JDTC vs. comparison effects on drug use outcomes, moderator analyses were only conducted for the JDTC vs comparison effects on recidivism outcomes.



there was much less variability in effects and those effects were slightly higher on average. And indeed, the predicted mean effect size for courts requiring drug offenses for eligibility indicated significant beneficial JDTC effects ( $LOR = 0.70$ , 95%  $CI_{LOR} [0.28, 1.11]$ ,  $\tau_{res}^2 = 0.25$ ,  $OR = 2.00$ , 95%  $CI_{OR} [1.32, 3.04]$ ) but was non-significant among courts that did not require drug offenses for eligibility ( $LOR = 0.03$ , 95%  $CI_{LOR} [-0.20, 0.26]$ ,  $OR = 1.03$ , 95%  $CI_{OR} [0.82, 1.29]$ ).

*Predicting JDTC graduation rates.* The moderator analyses provided no evidence that any study features or participant characteristics were associated with graduation rates among JDTC participants. However, several characteristics of the drug courts themselves were significantly associated with graduation rates. The results indicated that JDTC graduation rates were significantly lower in courts with more frequent status hearings in the first phase of the drug court ( $b = -0.29$ , 95%  $CI [-0.46, -0.12]$ , see Figure 5). The predicted mean graduation rate for courts that had an average of one status hearing per month in the first phase was 70%, versus 64% for courts with two hearings per month, and 50% for courts with four status hearings per month.

Results also indicated that JDTC graduation rates were significantly higher in those courts that referred youth to community-based substance use treatment at multiple levels of care ( $b = 0.36$ , 95%  $CI [0.04, 0.68]$ , see Figure 6) and to multiple treatment modalities ( $b = 0.46$ , 95%  $CI [0.10, 0.81]$ , see Figure 7) depending on the unique needs of the youth. The predicted mean graduation rate for courts referring youth to multiple levels of care and multiple treatment modalities were 58% and 61%, respectively. Conversely, graduation rates were much lower among those courts referring youth to only a single level of care or a single treatment modality, at 49% and 50%, respectively.

*Predicting differences in recidivism for JDTC graduates versus dropouts.* The moderator analyses provided no evidence that any of the measured study characteristics were

associated with differences in recidivism for JDTC graduates versus dropouts. However, effects did vary significantly by the racial composition of the sample: samples with a higher percentage of White participants reported significantly smaller differences in recidivism between program graduates and dropouts ( $b = -1.16$ , 95% CI [-2.22, -0.09]). As shown in Figure 8, despite this statistically significant association, this result should be interpreted cautiously given that most studies were comprised of predominantly White samples. Further, given that this measure of race was measured at the aggregate sample level, rather than the individual participant, it is important to recognize the ecological fallacy risk in this analysis—namely, this correlation only provides evidence that studies with a greater proportion of White participants reported smaller effects, but provides no evidence as to whether these effects varied significantly by the race of individual juveniles.

Results also indicated that the difference in recidivism between JDTC graduates and dropouts was significantly larger in JDTCs that were longer in program duration ( $b = 0.11$ , 95% CI [0.05, 0.17], see Figure 9). Thus, the longer the length of the JDTC program, larger beneficial effects on recidivism are observed when comparing those program participants who graduated versus those who dropped out of the program. The difference in recidivism for JDTC graduates versus dropouts was also significantly smaller in those courts that reported using a risk assessment tool to screen participants for eligibility ( $b = -0.65$ , 95% CI [-1.23, -0.07], see Figure 10). The predicted mean effect size for courts that used risk assessments to screen participants for eligibility was indeed smaller ( $LOR = 0.72$ , 95%  $CI_{LOR}$  [0.31, 1.13],  $\tau_{res}^2 = 0.10$ ,  $OR = 2.05$ , 95%  $CI_{OR}$  [1.37, 3.08]) than the predicted effect for courts that did not use risk assessment screenings ( $LOR = 1.37$ , 95%  $CI_{LOR}$  [0.96, 1.78],  $OR = 3.93$ , 95%  $CI_{OR}$  [2.62, 5.92]).

Finally, results suggested that the difference in recidivism between JDTC graduates and dropouts was significantly smaller in JDTCs with a dedicated drug court staff ( $b = -0.63$ ,

95% CI [-1.06, -0.19], see Figure 11). The predicted mean effect size was indeed smaller for courts that had a dedicated drug court staff ( $LOR = 0.86$ , 95%  $CI_{LOR}$  [0.62, 1.10],  $\tau_{res}^2 = 0.00$ ,  $OR = 2.36$ , 95%  $CI_{OR}$  [1.86, 3.00]) versus those that did not ( $LOR = 1.49$ , 95%  $CI_{LOR}$  [1.12, 1.85],  $OR = 4.43$ , 95%  $CI_{OR}$  [3.07, 6.39]).

### ***Publication Bias and Sensitivity Analyses***

As shown in the appendices, results from the planned publication bias and sensitivity analyses suggested that the findings of the meta-analysis were robust to analytic decisions. First, there was no evidence of publication or small study bias when examining the contour-enhanced funnel plots (Appendix D) and regression tests for funnel plot asymmetry (Appendix E). Although there was a significant association between the general recidivism (during program) effect sizes and their corresponding standard errors (Egger test  $b = -1.55$ , 95% CI [-2.61, -0.49]), this result did not provide evidence of small study bias. Quite the contrary, there were numerous small sample size studies included in the meta-analysis reporting null or negative effects; rather, there was a noticeable absence of smaller sample size studies that reported beneficial JDTC effects. So overall there was no indication that the findings of the meta-analysis might be upwardly biased due to publication or small study bias. Second and finally, the magnitude and statistical significance of all estimated mean effect sizes were robust across the range of model specification choices (Appendix F).

## **Discussion**

This meta-analysis synthesized findings from 55 controlled evaluation samples to examine the effectiveness of JDTCs in reducing recidivism and drug use when compared to traditional juvenile court processing. We examined the graduation rates of JDTC programs and assessed for differences in recidivism between program graduates and dropouts. Overall, the results indicated that on average, JDTCs demonstrate some effectiveness in reducing general recidivism while offenders are under the supervision of the court. Beyond this, there

is no consistent evidence suggesting that JDTCs are more (or less) effective than traditional court processing for reducing a justice-involved youth's odds of recidivating after being dismissed from JDTC treatment. On average, in those studies that reported sufficient information to calculate JDTC graduation rates, 55% of juvenile offenders who were enrolled in a JDTC completed the program. This modest graduation rate is noteworthy because we also found that youth who successfully completed a JDTC program were less likely to reoffend immediately after the program than youth who failed to complete the JDTC program. Taken together, these findings suggest that low graduation and program completion rates may contribute to the null effects observed when comparing JDTC participants to justice-involved youth who received traditional court processing.

Although JDTCs appear to be associated with only modest reductions in recidivism compared to traditional juvenile processing, our findings suggest that JDTC programs may be able to maximize their effectiveness by ensuring that youth who are chosen for these programs are provided with the supports and resources needed to graduate. For example, JDTCs that refer youth to multiple levels of care and multiple treatment modalities may achieve higher graduation rates because they provide youth with the most appropriate services that are individually tailored to their criminogenic needs. Conversely, JDTCs that refer youth to a single treatment provider or single treatment modality could suffer from lower graduation rates if youth feel that the provided treatment modality is not compatible with their needs. This responsiveness to the unique needs of each youth is believed to be a cornerstone of effective therapeutic jurisprudence (Bonta and Andrews, 2007), but may nonetheless be challenging for JDTCs operating in rural areas or other areas with few options for community-based substance abuse treatment services.

The differential risk of recidivism between JDTC program graduates and dropouts also suggests that JDTCs are likely more effective when they successfully deliver their full

range of intended therapeutic components. Moreover, the benefits conferred by successful treatment may be hampered by the intensive time commitment required of participants during the first phase of the program. Strategic judicial supervision with frequent status hearings could be used in the first phase of the program to swiftly identify youth who would likely not benefit from JDTC treatment, so that they could be diverted to a more appropriate form of care. Nonstrategic judicial supervision during the first phase of the program, wherein status hearings are scheduled more frequently than what would be necessary to facilitate rehabilitation, could result in iatrogenic effects for youths and families who may be unable to meet these expectations due to other contextual factors (e.g., inflexible employment schedules, lack of transportation). Related to this, we found that the longer a JDTC program takes to complete, the greater the difference in recidivism risk between graduates and dropouts. This divergent trajectory for program graduates and dropouts may be partly function of pre-treatment decisions made by the court, namely, which youth a JDTC deems to be eligible for the program. Such decisions may result in JDTC populations with heterogeneous levels of fit with the intervention model. Ideally courts would use a standardized risk assessment tool to determine eligibility for program participation and would require all participating youth to meet criteria for a substance use disorder, to ensure that youth without substance use disorders are not being enrolled in a program that is mismatched to their level of need.

The findings from this review must be interpreted cautiously, however, given that the GRADE certainty of evidence from all syntheses was low or very low (see Table 4). This low certainty of evidence is because most studies included in our review used quasi-experimental research designs without random assignment to conditions. Further, there were substantial baseline differences between JDTC and comparison participants in terms of baseline risk, sex, and race; as such, there is a high risk of selection bias in the included sample of studies.

Finally, although the evidence reported in this literature provided a high level of directness (i.e., the studied participants, interventions, and outcome measures are similar to those of interest in the population) and there was minimal evidence of publication bias, there was substantial heterogeneity in the meta-analyses that could not be explained with the observed study features. Thus, results from future evaluations of JDTCs could vary widely. Future evaluations are needed to carefully attend to this heterogeneity in effects, paying particular attention to the role of implementation factors in JDTCs that may promote or inhibit program completion, and youth's well-being and healthy development.

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## **Compliance with Ethical Standards**

*Conflicts of interest:* The authors declare that they have no conflicts of interest.

*Informed consent:* For this type of study formal consent is not required.

*Ethical approval:* This article does not contain any studies with human participants or animals performed by any of the authors.

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**TABLES AND FIGURES**

Table 1. Characteristics of the Methods, Participants, and Drug Courts in the Included Studies (*k* = 55)

	Descriptive Statistics for All Studies		
	<i>N</i> (%)	<i>M</i> ( <i>SD</i> )	Range
<b>Study Methods and Quality</b>			
Randomized experiment <sup>c</sup>	4 (7%)		0 - 1
Quasi-experiment/regression discontinuity design <sup>c</sup>	51 (93%)		0 - 1
Possible implementation problems <sup>b</sup>	33 (43%)		0 - 1
Overall attrition <sup>a</sup>		0.30 (0.23)	0 - 0.91
Differential attrition <sup>a</sup>		0.07 (0.08)	0 - 0.39
Baseline differences in age ( <i>g</i> ) <sup>a</sup>		-0.08 (0.26)	-0.75 - 0.89
Baseline differences in risk level ( <i>OR</i> ) <sup>a</sup>		1.60 (1.70)	0.06 - 12.07
Baseline differences in race ( <i>OR</i> ) <sup>a</sup>		1.92 (1.87)	0.01- 9.07
Baseline differences in sex ( <i>OR</i> ) <sup>a</sup>		2.32 (13.59)	0.16 - 145.16
<b>Participant Characteristics <sup>b</sup></b>			
Percent male		0.78 (0.09)	.56 - 1.0
Percent Black		0.23 (0.25)	0 - .97
Percent Hispanic		0.22 (0.26)	0 - .80
Percent White		0.63 (0.28)	.02 - 1.0
Average age		16.03 (0.70)	14.6 -18.6
Average number of prior arrests (any)		4.12 (2.71)	0 - 12.27
Average number of prior drug arrests		1.54 (0.72)	0.64 – 2.80
Average number of prior convictions (any)		3.28 (4.73)	0 – 8.70
<b>Drug Court Characteristics <sup>b</sup></b>			
Year first opened		2000 (2.76)	1995 – 2008
Average number of youth served per year		33.31 (21.23)	9.25 – 100
Number of youth served in most recent year		57.46 (118.50)	11 - 687
Number of phases		3.43 (0.85)	0 - 4
Number of drug tests/week in first phase		2.09 (1.08)	0.25 - 7
Number of status hearings/month in first phase		3.32 (1.18)	0.5 - 4.3
Length of drug court (months)		10.52 (2.73)	6 - 17.5
Collaborative community partnerships	43 (57%)		0-1
Collaboration with educational system	50 (66%)		0-1
Clearly defined eligibility criteria	65 (86%)		0-1
Use of standardized risk assessment tool	40 (56%)		0-1
Active family engagement	64 (84%)		0-1
Collaborative, interdisciplinary court team	58 (76%)		0-1
Dedicated drug court staff	60 (79%)		0-1
Individualized treatment planning	54 (71%)		0-1
Referrals to multiple levels of care	50 (66%)		0-1
Referrals to multiple treatment modalities	38 (50%)		0-1
Use of goal-oriented incentives & sanctions	59 (78%)		0-1
Drug offenses required for eligibility	7 (9%)		0-1
Referrals to brand name treatment services	13 (17%)		0-1
Developmentally appropriate services	18 (24%)		0-1
Gender appropriate services	15 (20%)		0-1

Notes. Means and standard deviations shown for continuous measures; frequencies and percentages shown for dichotomous measures. <sup>a</sup>Estimates calculated at effect size level (*n* = 408). <sup>b</sup>Estimates calculated at JDTC condition level (*n* = 76). <sup>c</sup>Estimates calculated at study sample level (*k* = 55).

Table 2. Mean Effect Sizes and Heterogeneity Estimates for All Meta-Analyses, by Outcome Type and Measurement Timing

	Mean Effect Size		95% CI	$\tau^2$	$n_{es}$	$n_k$
<b>JDTC vs. Comparison Effects (LOR)</b>						
General recidivism (all), during program	0.32 *		[0.03, 0.61]	0.11	46	14
Arrests/referrals	0.40		[-0.01, 0.81]	0.09	12	9
Charges/filings/petitions	0.29		[-0.13, 0.71]	0.03	7	6
Convictions/adjudications	-0.18		[-1.03, 0.67]	--	1	1
Illegal activity	0.31		--	--	12	1
Offenses	-0.48		--	0.65	14	5
General recidivism (all), after program	0.09		[-0.10, 0.29]	0.31	254	50
Admissions	0.22		--	--	2	1
Arrests/referrals	0.08		[-0.13, 0.28]	0.38	139	45
Charges/filings/petitions	0.27		[-0.45, 0.99]	0.46	32	10
Convictions/adjudications	-0.22		[-0.50, 0.07]	0.15	72	17
Illegal activity	-0.16 *		[-0.30, -0.03]	--	1	1
Offenses	-0.08		--	--	8	3
Drug recidivism (all), during program	-0.54		--	--	11	4
Charges/filings/petitions	0.38		--	--	8	1
Offenses	-0.56		--	--	3	3
Drug recidivism (all), after program	0.27		[-0.12, 0.67]	0.56	56	15
Arrests/referrals	0.60		[-0.11, 1.31]	0.40	7	7
Charges/filings/petitions	-0.48		--	--	9	4
Convictions/adjudications	-0.12		--	--	7	3
Offenses	0.11		--	--	33	4
Drug use (all), during program	-0.27		[-0.70, 0.15]	0.10	34	9
Drug use (all), after program	0.00		--	--	7	3
<b>JDTC Graduation Rates (<math>p</math>)</b>						
Graduation rate	0.55 *		[0.50, 0.59]	0.57	68	50
<b>JDTC Graduate vs. Dropout Difference in Recidivism (LOR)</b>						
Recidivism at first follow-up	1.04 *		[0.69, 1.39]	0.13	15	15

Notes: All mean effect sizes estimated using robust variance estimation with an assumed within-study correlation of effect sizes ( $\rho$ ) of .70. LOR = log odds ratio. All LOR effect sizes coded so that values > 0 indicate a beneficial JDTC effect or beneficial JDTC graduate effect.

\*  $p < .05$ .



Table 3. Bivariate Associations between Study Characteristics and Effect Sizes

	JDTC vs. Comparison Effects on Recidivism	JDTC Graduation Rates	JDTC Graduate vs. Dropout Effects on Recidivism
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
<b>Study Features and Quality</b>			
Journal article publication	-0.43 (0.22)	0.01 (0.22)	0.50 (0.32)
Publication year	-0.00 (0.02)	0.02 (0.02)	0.04 (0.03)
Northwest region	-0.32 (0.19)	-0.28 (0.33)	0.33 (0.45)
Midwest region	-0.74 (0.19) *	-0.24 (0.25)	0.21 (0.44)
West region	-0.35 (0.23)	-0.10 (0.21)	0.80 (0.43)
Randomized experiment	0.59 ( -- )	-0.31 ( -- )	--
Possible implementation problems	-0.55 (0.18) *	0.15 (0.20)	-0.00 (0.35)
Overall attrition	0.37 ( -- )	-0.03 (0.89)	1.11 (2.82)
Differential attrition	1.71 ( -- )	-0.29 ( -- )	6.00 (3.17)
<b>Participant Characteristics</b>			
Percent male	1.97 (1.18)	-0.89 (1.02)	-0.03 (2.09)
Percent Black	0.58 (0.61)	-0.71 (0.49)	0.72 (0.91)
Percent Hispanic	-0.23 (0.68)	-0.13 (0.38)	-0.59 (3.54)
Percent White	-0.20 (0.44)	0.34 (0.32)	-1.16 (0.54) *
Average age	-0.28 (0.20)	-0.10 (0.13)	-0.31 (0.29)
Average prior arrests	0.02 ( -- )	-0.09 ( -- )	-0.08 (0.25)
<b>Drug Court Characteristics</b>			
Year first opened	0.02 (0.05)	0.01 (0.05)	0.02 (0.12)
Average number of youth served per year	-0.00 (0.00)	0.01 (0.00)	0.01 (0.01)
Number of youth served in most recent year	-0.00 ( -- )	0.00 ( -- )	0.00 (0.00)
Number of phases	-0.08 (0.12)	-0.09 ( -- )	-0.01 (0.09)
Number drug tests/week in first phase	-0.00 ( -- )	-0.06 ( -- )	0.08 (0.14)
Number status hearings/month in first phase	-0.17 (0.08)	-0.29 (0.08) *	0.01 (0.18)
Length of drug court (months)	-0.01 (0.03)	-0.06 (0.04)	0.11 (0.03) *
Collaborative community partnerships	0.19 (0.20)	-0.28 (0.18)	-0.40 (0.32)
Collaboration with educational system	0.09 (0.23)	0.04 (0.18)	-0.44 (0.30)
Clearly defined eligibility criteria	-0.04 (0.35)	0.42 (0.21)	-0.36 (0.48)
Use of standardized risk assessment tool	-0.19 (0.19)	0.01 (0.18)	-0.65 (0.29) *
Active family engagement	-0.17 (0.32)	0.12 (0.15)	-0.09 (0.45)
Collaborative, interdisciplinary court team	-0.01 (0.22)	-0.20 (0.23)	-0.05 (0.37)
Dedicated drug court staff	-0.08 (0.19)	-0.13 (0.14)	-0.63 (0.22) *
Individualized treatment planning	0.15 (0.22)	0.07 (0.18)	-0.05 (0.37)
Referrals to multiple levels of care	-0.05 (0.21)	0.36 (0.16) *	-0.47 (0.29)
Referrals to multiple treatment modalities	-0.06 (0.20)	0.46 (0.18) *	0.14 (0.36)
Use of goal-oriented incentives & sanctions	-0.14 (0.27)	-0.07 (0.22)	0.00 (0.39)
Drug offenses required for eligibility	0.67 (0.20) *	0.32 (0.36)	-0.07 (0.39)
Referrals to brand name treatment services	0.11 (0.24)	0.13 (0.25)	-0.14 (0.52)
Developmentally appropriate services	0.33 (0.23)	0.03 (0.35)	0.32 (0.95)
Gender appropriate services	0.21 (0.21)	0.26 (0.20)	-0.25 (0.56)

Notes: All meta-regression models estimated using robust variance estimation with an assumed within-study correlation of effect sizes ( $\rho$ ) of .70. All JDTC vs. comparison models were additionally adjusted for indicators for the type of recidivism type (general vs. drug) and measurement timing (during vs. after program). \*  $p < .05$ .

Table 4. Summary of Findings Table for Effects on Risk of Recidivism and Drug Use

Outcomes	Anticipated absolute effects (95% CI)		Relative effect (95% CI)	No of participants (studies)	Certainty of evidence (GRADE)
	Risk with traditional court processing	Risk with JDTC			

JDTC vs. Comparison Effects

General recidivism, during program	307 per 1,000	<b>242 per 1,000</b> (193 to 301)	<b>OR 0.72</b> (0.54 to 0.97)	951 (11 observational studies; 3 randomized studies)	⊕⊕○○ LOW
General recidivism, after program	347 per 1,000	<b>326 per 1,000</b> (285 to 371)	<b>OR 0.91</b> (0.75 to 1.11)	9,647 (48 observational studies; 2 randomized study)	⊕○○○ VERY LOW
Drug recidivism, during program	83 per 1,000	<b>135 per 1,000</b> (-- to --)	<b>OR 1.71</b> (-- to --)	39 (3 observational studies; 1 randomized study)	⊕○○○ VERY LOW
Drug recidivism, after program	257 per 1,000	<b>208 per 1,000</b> (150 to 279)	<b>OR 0.76</b> (0.51 to 1.12)	1776 (15 observational studies)	⊕○○○ VERY LOW
Drug use, during program	398 per 1,000	<b>464 per 1,000</b> (362 to 571)	<b>OR 1.31</b> (0.85 to 2.01)	221 (6 observational studies; 3 randomized study)	⊕○○○ VERY LOW
Drug use, after program	680 per 1,000	<b>678 per 1,000</b> (-- to --)	<b>OR 0.99</b> (-- to --)	2,240 (2 observational studies; 1 randomized study)	⊕○○○ VERY LOW

JDTC Graduate vs. Dropout Difference in Recidivism

Recidivism at first follow-up	537 per 1,000	<b>766 per 1,000</b> (705 to 817)	<b>OR 2.82</b> (2.06 to 3.86)	3,280 (15 observational studies)	⊕○○○ VERY LOW
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\*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

CI: Confidence interval; OR: Odds ratio reflecting the odds of recidivism in the JDTC treatment group vs. comparison, or JDTC graduates vs. dropouts.

GRADE Working Group grades of evidence

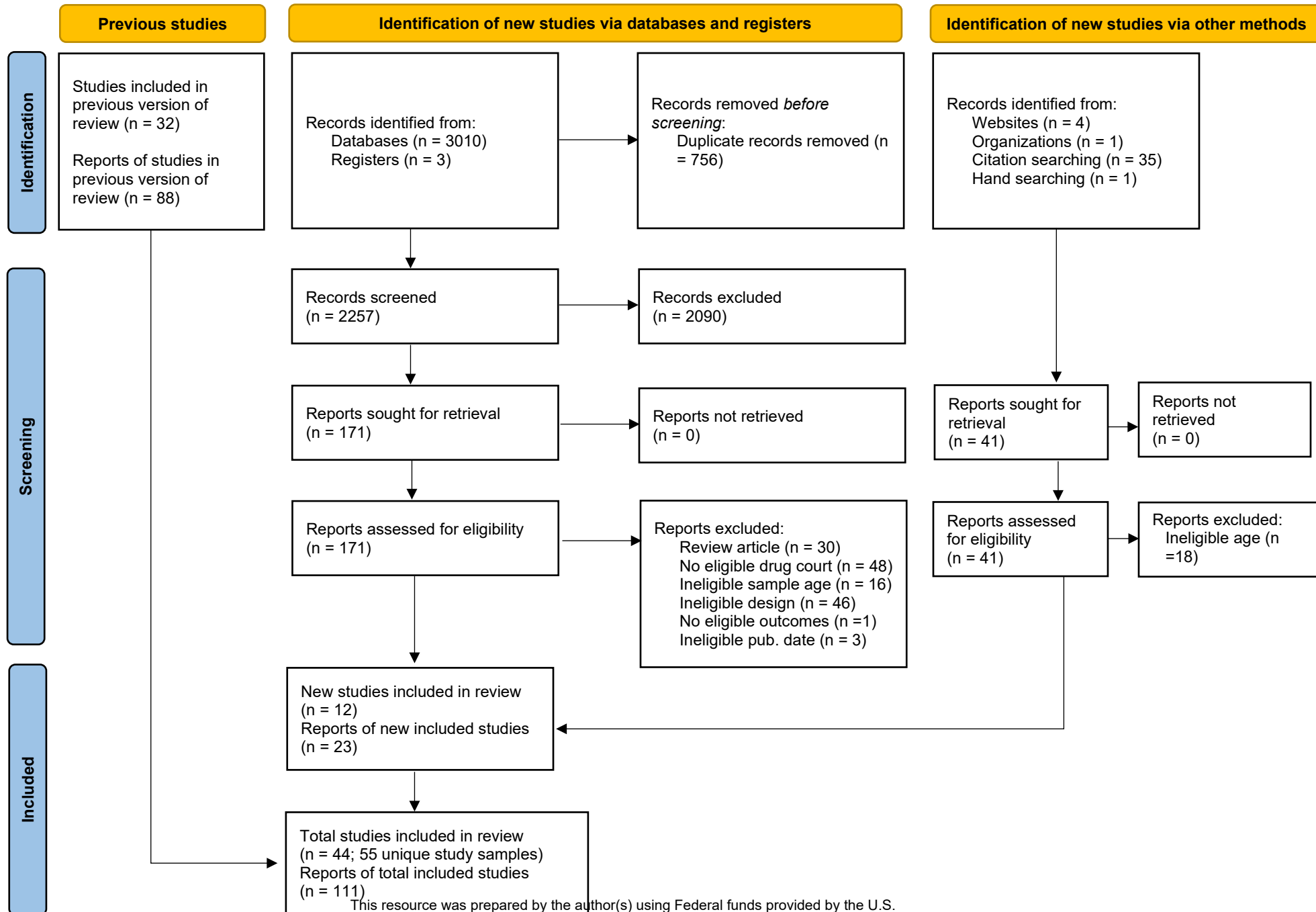
**High certainty:** We are very confident that the true effect lies close to that of the estimate of the effect

**Moderate certainty:** We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different

**Low certainty:** Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

**Very low certainty:** We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Figure 1. PRISMA Flow Diagram for Identification of Studies Included in the Updated Review



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Figure 2. Distributions of JDTC vs. Comparison Effects on Recidivism, by U.S. Region of Court

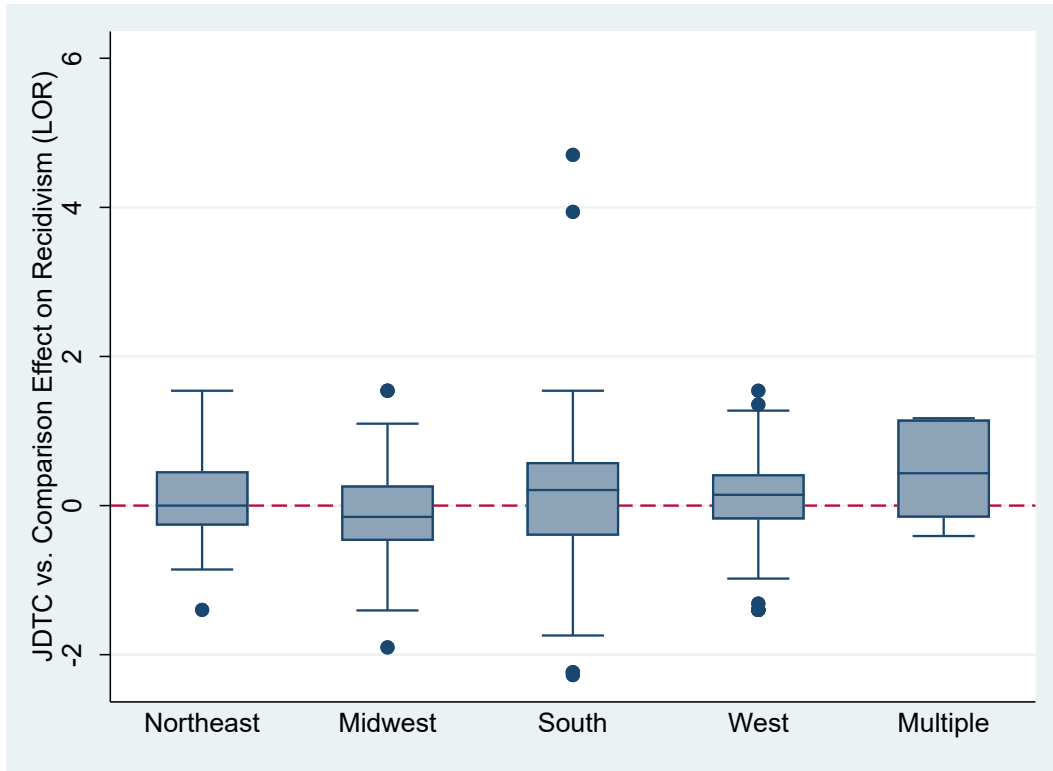


Figure 3. Distributions of JDTC vs. Comparison Effects on Recidivism, by JDTC Implementation

Quality

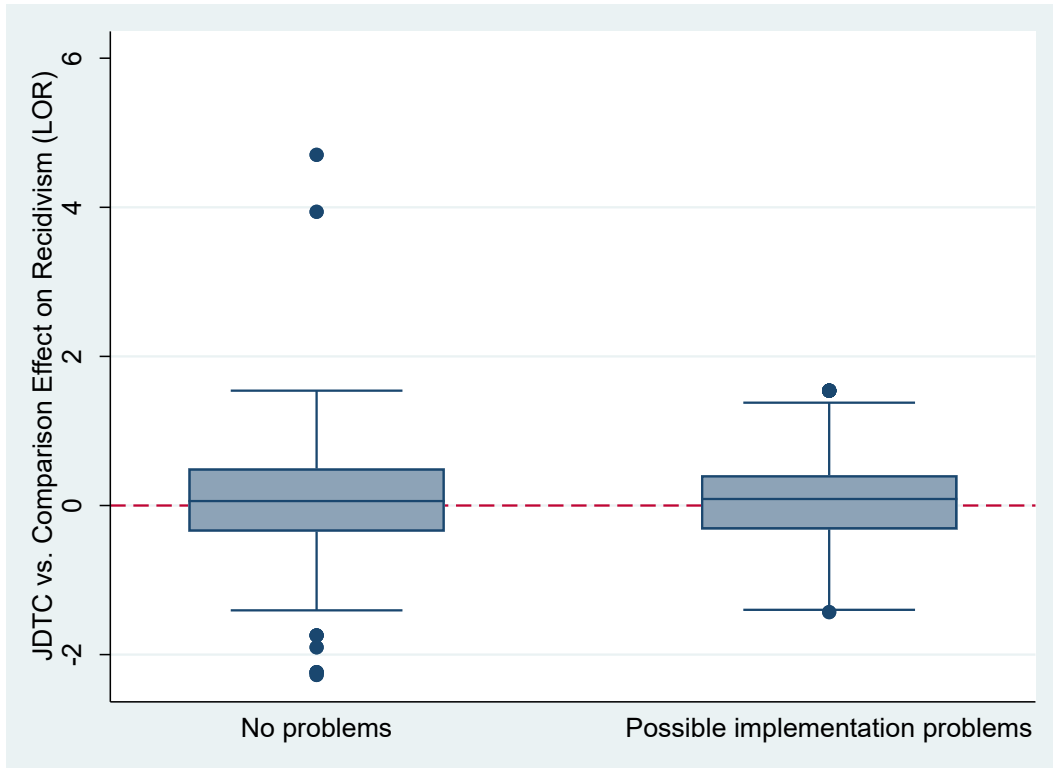


Figure 4. Distributions of JDTC vs. Comparison Effects on Recidivism, by Whether Drug Offenses are Required for JDTC Program Eligibility

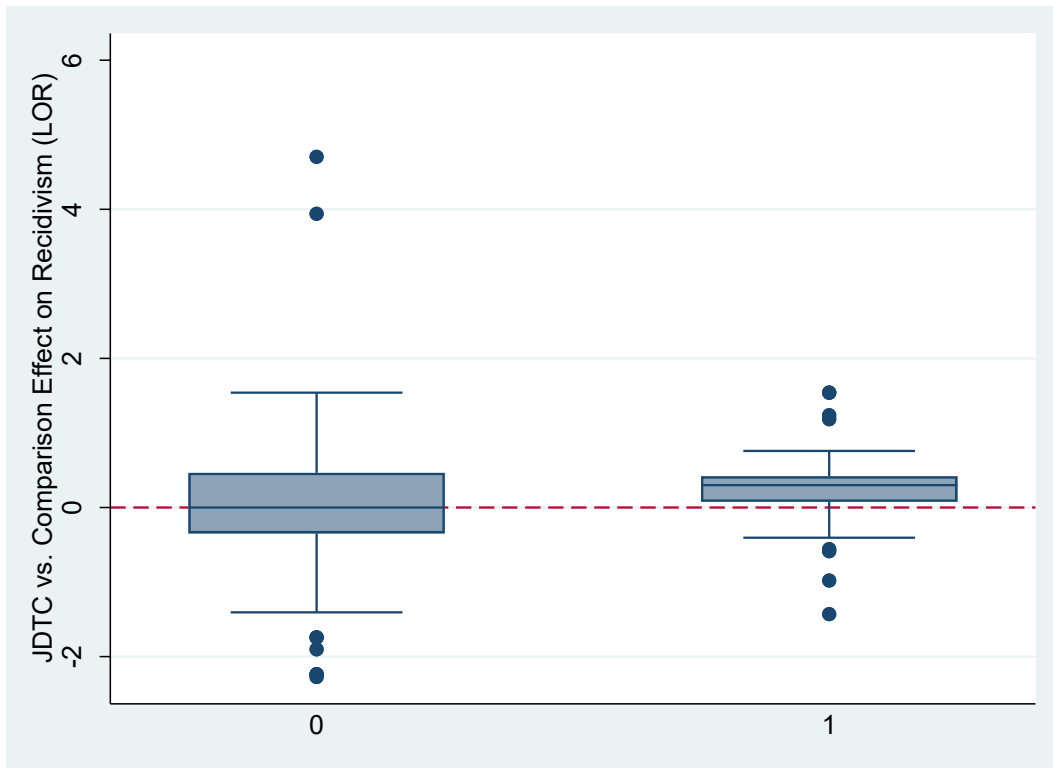


Figure 5. Distributions of JDTC Graduation Rates, by Number of Status Hearings per Month in First JDTC Phase

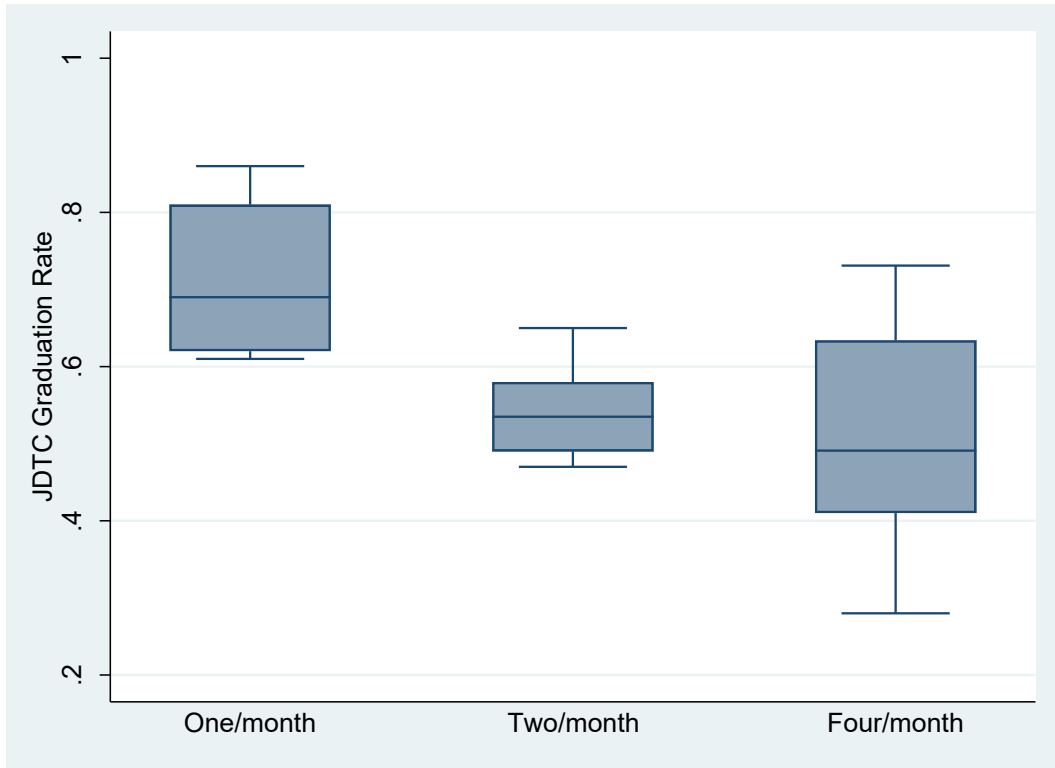


Figure 6. Distributions of JDTC Graduation Rates, by JDTC Referrals to Different Levels of Substance Use Treatment Care

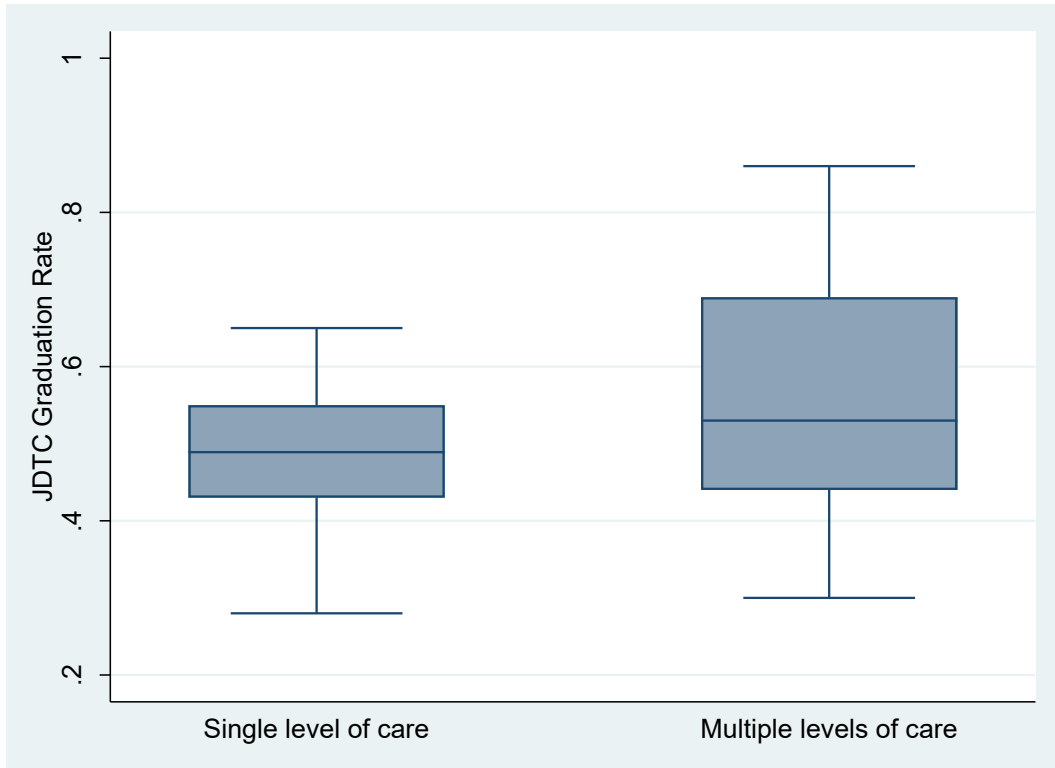




Figure 7. Distributions of JDTC Graduation Rates, by JDTC Referrals to Different Modalities of Substance Use Treatment

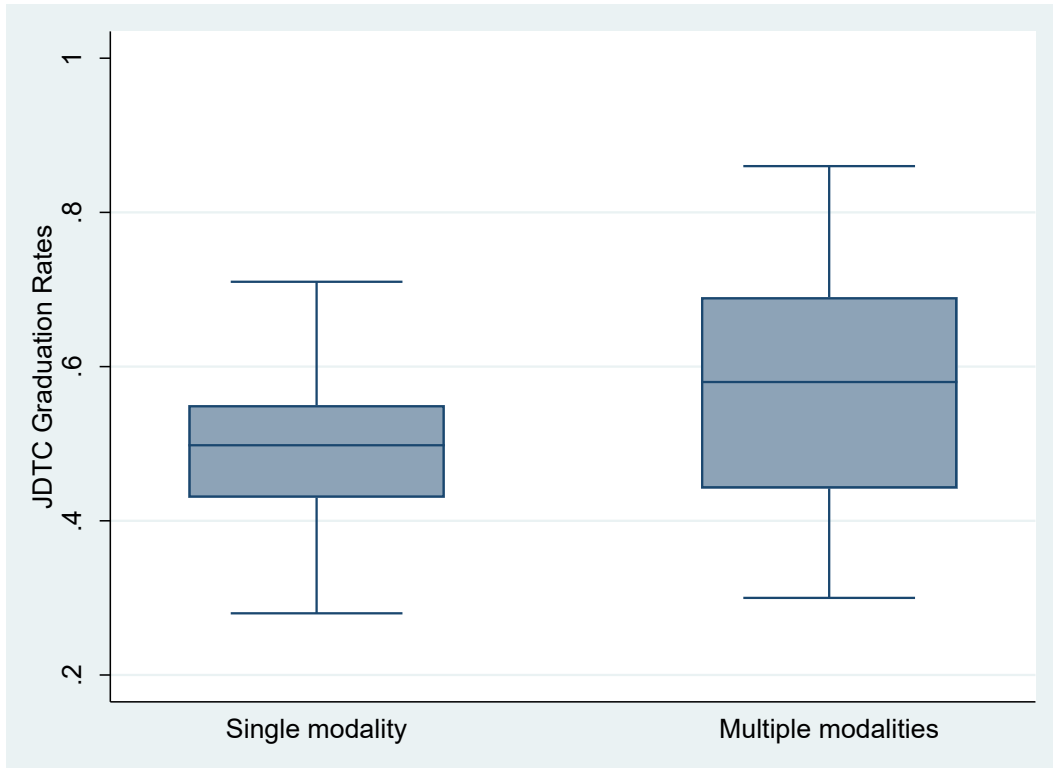


Figure 8. Association Between Percentage of White Participants in Sample and Differences in Recidivism for JDTC Graduates vs. Dropouts

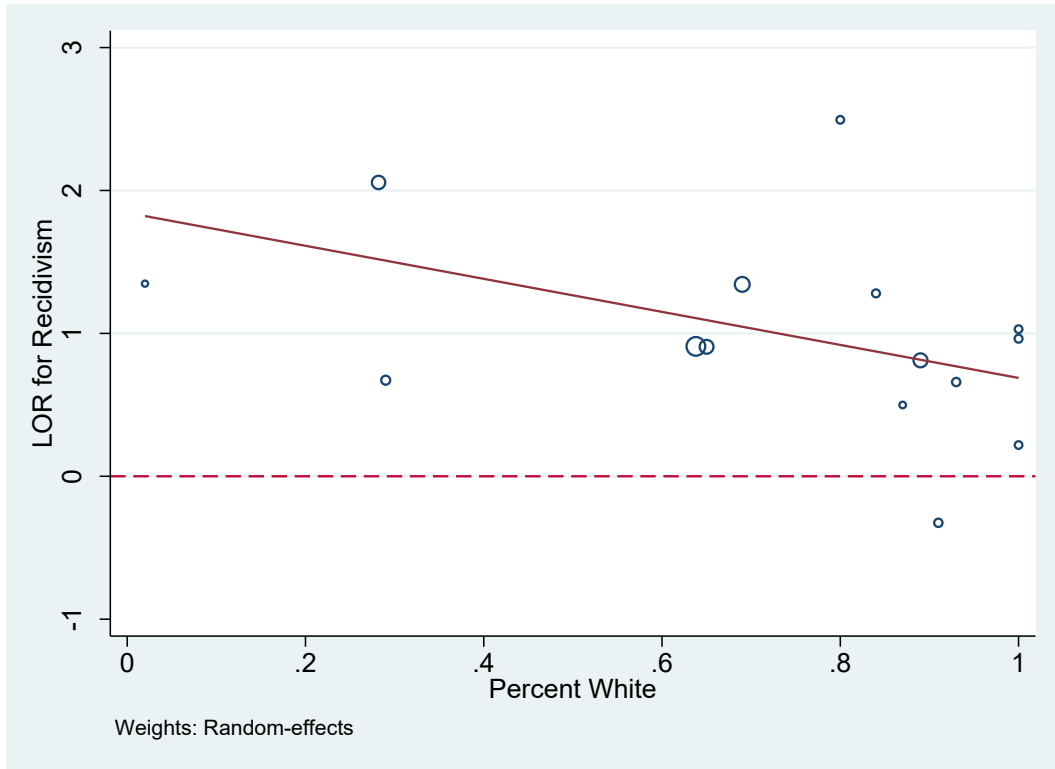


Figure 9. Association Between Length of JDTC and Differences in Recidivism for JDTC Graduates vs. Dropouts

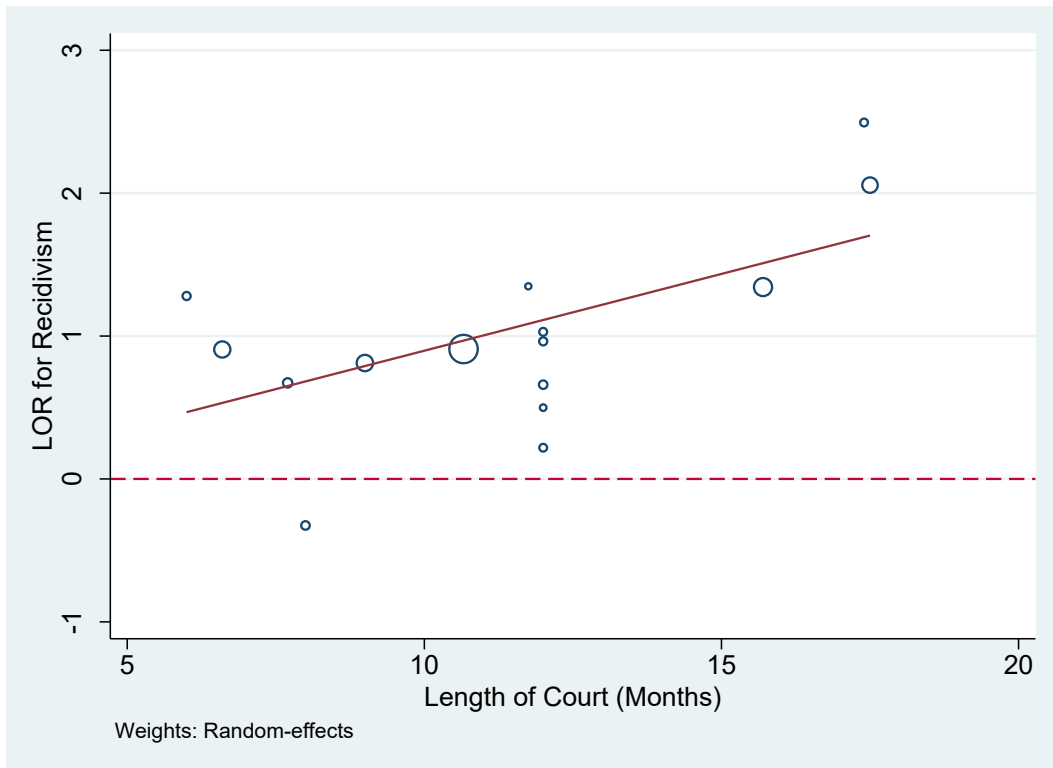


Figure 10. Distributions of Differences in Recidivism for JDTC Graduates vs. Dropouts, by JDTC Use of Risk Assessment Tools for Screening

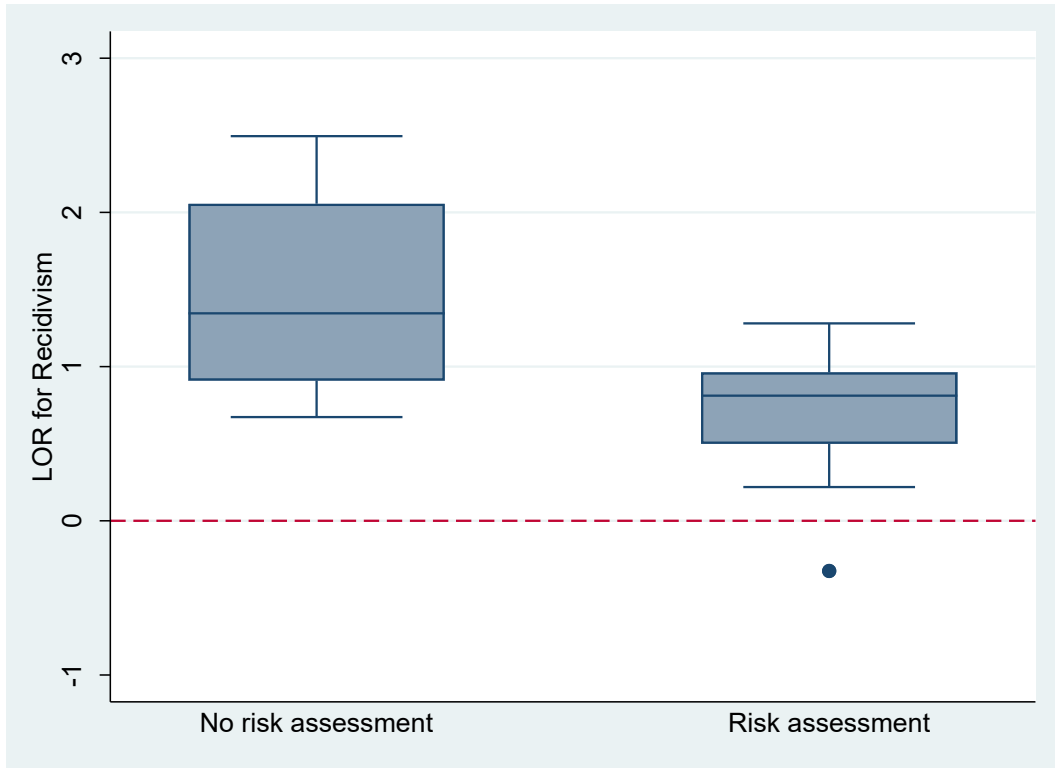
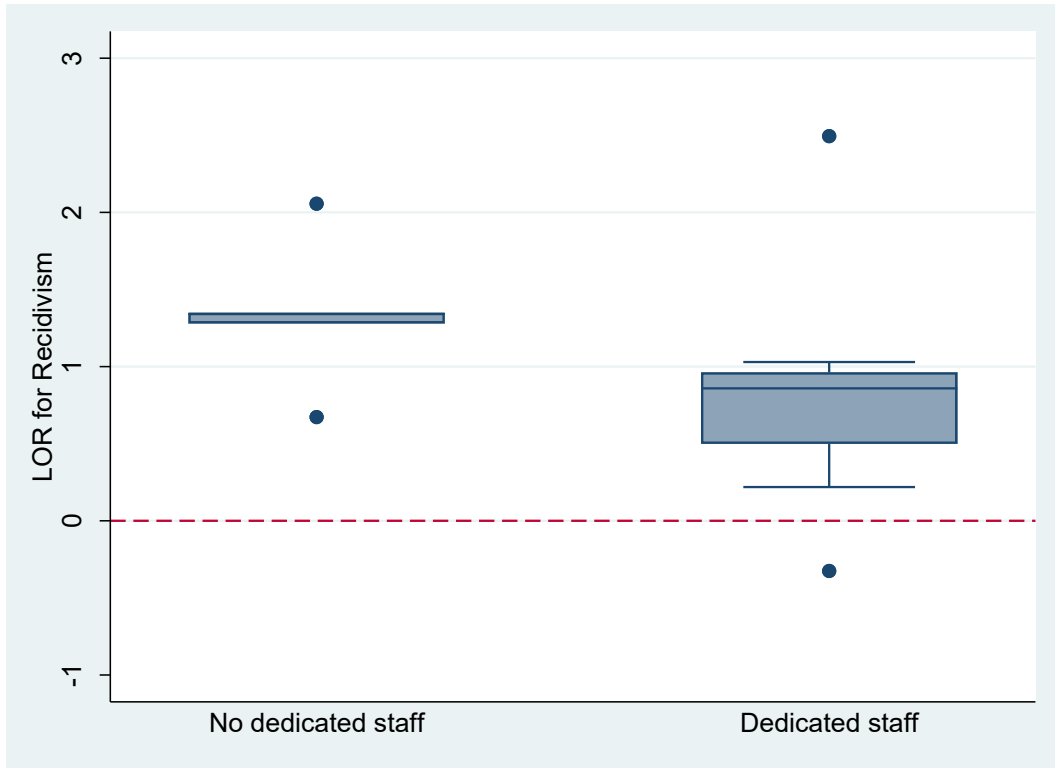


Figure 11. Distributions of Differences in Recidivism for JDTC Graduates vs. Dropouts, by Presence of Dedicated JDTC Staff



**APPENDICES**

## Appendix A

### References to Studies Included in the Meta-analysis

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## Appendix B

### Characteristics of Included Studies

Study Authors	Drug Court Location(s)	Drug Court Description	Comparison Condition(s)
Adkins et al. (2011)	Polk, Marshall, Woodbury Counties, IA	The Polk County Juvenile Drug Court was designed for delinquent juveniles who had a history of substance abuse, had family support, and were not sexual offenders, drug-dealers, or considered dangerous. The court structure involved three phases, with a fourth aftercare phase to help youths reintegrate into their communities upon completion of the program. Phases entailed close supervision, graduated sanctions, interventions and incentives, regular drug testing, attendance at court hearings, counseling, AA/NA meetings, completion of community service, and enrollment in school or employment. Each phase was expected to last 3-4 months, although program completion time varied by participant.	A matched comparison group was constructed through case files. The comparison group was comparable to the drug court participants on demographic characteristics, drug abuse, and criminal history. There is no information about the type of treatment and services received by comparison group youth.
Administrative Office of the Courts (2015)	Canyon, Minidoka, Cassia, Twin Falls, Bannock, Bingham, Bonneville, and Ada Counties, ID	The Idaho Juvenile Drug Court system was comprised of six county courts. Court structures, key components, and program lengths were not reported.	A matched comparison group of juvenile probationers was constructed from historical data. The comparison group was comparable to the drug court participants on demographic characteristics, substance abuse, and initial risk status. There is no information about the type of treatment and services received by comparison group youth.
Belenko (2022)	Multiple sites	JDTC: The Juvenile Drug Treatment Court was comprised of a cohort of 1 site (from the random assignment portion of the study) and 3 sites (from the regression discontinuity design portion of the study). All participating sites were provided training and technical assistance on the JDTC Guidelines. There is no further information about the participating court structures, components, or lengths.	The comparison group was comprised of a cohort from 1 site that was randomly allocated to traditional juvenile court (TJC) services, and a cohort from 3 sites that were allocated to TJC using a regression discontinuity design based on baseline recidivism risk and substance use severity scores. Instead of drug court services, TJC participants received traditional juvenile court services.

Brown & Latessa (2002)	Dearborn and Ohio Counties, IN	The Dearborn and Ohio Counties Juvenile Drug Court Program, also known as REDIRECT, was designed for first time and repeat non-violent juvenile offenders. The court structure involved three phases, with a 6 month aftercare component. Phases entailed drug testing, attendance at status review hearings, and the use of sanctions and incentives. The average length of the program was 13.5 months, although it varied from 9-18 months.	A historical comparison group was selected from a pool of juveniles who met eligibility criteria for the drug court. There is no information about the type of treatment and services received by comparison group youth.
Byrnes & Hickert (2004)	Third District, Dona Ana County, NM	The Third District Juvenile Drug Court was designed for juvenile offenders referred by the juvenile court judge, probation department, or diversion program. The court structure involved four phases, which entailed random drug screens, curfew checks, appearances in drug court, group counseling, therapy, community service, and engagement in 12-Step programs. The length the program was 9 months, with the average participant taking 250 days to graduate.	The comparison group was comprised of juvenile probationers with an alcohol or drug offense. There was no further information provided regarding types of treatment received. In order for a juvenile to be included in the comparison group, they had to be referred to the juvenile court prior to their probation disposition.
Carey et al. (2006)	Clackamas County, OR	The Clackamas County Juvenile Drug Court was designed for 14-17 year old non-violent juvenile offenders. The court structure involved four phases and included an aftercare component. The court entailed random urinalyses, attendance at drug court, and completion of specified treatment objectives at each phase. Sanctions and goal-oriented incentives were imposed when deemed necessary. The minimum length of the program was 12 months, and aftercare was considered the final 3 months. Participants must have successfully completed the aftercare program in order to graduate.	The comparison group was constructed by selecting juvenile offenders who were eligible for drug court but not referred, for reasons including counselor preference for another program, transportation issues, etc. The sample was then matched on demographic and criminal history characteristics. Comparison youth may have received a variety of different treatments, but no further information is provided about the services and treatment they received.
Crumpton et al. (2006)	Harford County, MD	The Harford County Juvenile Drug Court was designed for adjudicated juvenile repeat-offenders aged 13-17, with a history of substance abuse. Violent and sex offenders were excluded. The court structure involved three phases, which entailed phase-dependent requirements such as random drug screens, attendance at treatment group and drug court sessions, enrollment in school or obtainment of employment, and attendance at self-help groups. Each phase lasted 90 days, with successful participants taking 11 months to graduate.	A sample of comparison youth was compiled from the juvenile justice database and matched by demographic information. Youth were eligible if they were residents of Harford County and were under a high level of supervision during the selected time period. There is no additional information about the services these youth received.

DeCaire (2012)	Louisiana Counties, LA	The Louisiana drug courts were designed for non-violent juvenile offenders arrested for a drug offense or drug-related offense. The court structure involved four phases, which entailed drug screens, therapy, attendance at judiciary hearings, and community service. Court imposed incentives and sanctions were used. The minimum length of the program was 43 weeks, although some juveniles took up to 61 weeks to complete the program.	The comparison group was randomly selected from the Drug Court Case Management database. The comparison participants were matched to the drug court participants on the year of offense and drug offense. No further information was provided about treatments and services provided to this sample.
Dennis (2013)	MT, NY, TX, CA, MA, RI, MI, PA, FL, OK, CO, MO, OH, WA	JDTC: The Juvenile Drug Treatment Court group was comprised of a cohort of 16 sites. There is no further information about the court structures, components, or lengths.  JDTC/RF: The Juvenile Drug Treatment Court + Reclaiming Futures group was comprised of a cohort of 10 sites. Juveniles received the Reclaiming Futures treatment modality in addition to JDTC services as usual. Reclaiming Futures focuses on evidenced-based ways to improve quality and access to mental health and substance use services. There is no further information about the court structure, components, or length.	A propensity score matched comparison group was constructed from the historical records of adolescent outpatients. Youth were matched on baseline substance abuse problems, psychiatric comorbidity, justice system involvement, rates of victimization, and other baseline measures. No other information was provided about this sample.
Dickie (2000)	Summit County, OH	The Summit County Juvenile Drug Court was designed for substance abusing juvenile offenders who were not charged with violent or sex offenses. Court structure, key components, and program length were not reported.	The comparison group sample was randomly assigned to juveniles eligible for drug court for the purpose of the study. Instead of drug court services, they received traditional probation supervision services.
Dickie (2001)	Summit County, OH	The Summit County Juvenile Drug Court was designed for non-violent juvenile offenders who did not have a history of sexual offenses, mental disorders, or failure to complete a previous drug court program. Offenders were referred by probation officers if they were considered to be abusing or dependent on alcohol and drugs. The structure, key components, and length of the drug court were not reported.	The comparison group consisted of youth who were eligible for the drug court program but were randomly selected to be part of the comparison group. This group received traditional probation monitoring. Like the drug court program, comparison group youth could not have a violent felony, sexual offense, or mental disorder.

Ferguson et al. (2006)	Augusta, ME	The Augusta County Juvenile Drug Court was designed for adolescent offenders who had a medium to high risk of criminal recidivism and a substance abuse problem. The court structure involved four phases, which entailed drug testing, court appearances, treatment completion, and the use of sanctions and incentives. The approximate length of the program was 12 months.	The comparison group consisted of juvenile offenders who had substance abuse problems but had not been referred to or participated in the drug court; they had been matched on demographic information, substance use history, and criminal risk factors to participants in the drug court. No further information was provided about the services received by comparison youth.
Ferguson et al. (2006)	Bangor, ME	The Bangor County Juvenile Drug Court was designed for adolescent offenders who had a medium to high risk of criminal recidivism and a substance abuse problem. The court structure involved four phases, which entailed drug testing, court appearances, treatment completion, participation in educational or vocational activities, and the use of sanctions and incentives. The approximate length of the program was 12 months.	The comparison group consisted of juvenile offenders who had substance abuse problems but had not been referred to or participated in the drug court; they had been matched on demographic information, substance use history, and criminal risk factors to participants in the drug court. No further information was provided about the services received by comparison youth.
Ferguson et al. (2006)	Biddeford, ME	The Biddeford County Juvenile Drug Court was designed for adolescent offenders who had a medium to high risk of criminal recidivism and a substance abuse problem. The court structure involved four phases, which entailed drug testing, court appearances, treatment completion, and the use of sanctions and incentives. The approximate length of the program was 12 months.	The comparison group consisted of juvenile offenders who had substance abuse problems but had not been referred to or participated in the drug court; they had been matched on demographic information, substance use history, and criminal risk factors to participants in the drug court. No further information was provided about the services received by comparison youth.
Ferguson et al. (2006)	Portland, ME	The Portland County Juvenile Drug Court was designed for adolescent offenders who had a medium to high risk of criminal recidivism and a substance abuse problem. The court structure involved four phases, which entailed drug testing, court appearances, treatment completion, and the use of sanctions and incentives. The approximate length of the program was 12 months.	The comparison group consisted of juvenile offenders who had substance abuse problems but had not been referred to or participated in the drug court; they had been matched on demographic information, substance use history, and criminal risk factors to participants in the drug court. No further information was provided about the services received by comparison youth.



Ferguson et al. (2006)	West Bath, ME	The West Bath County Juvenile Drug Court was designed for adolescent offenders who had a medium to high risk of criminal recidivism and a substance abuse problem. The court structure involved four phases, which entailed drug testing, court appearances, treatment completion, and the use of sanctions and incentives. The approximate length of the program was 12 months.	The comparison group consisted of juvenile offenders who had substance abuse problems but had not been referred to or participated in the drug court; they had been matched on demographic information, substance use history, and criminal risk factors to participants in the drug court. No further information was provided about the services received by comparison youth.
Hartmann et al. (2003)	Kalamazoo County, MI	The Kalamazoo County Juvenile Drug Treatment Court Program was designed for juvenile offenders aged 13-17. The structure of the court involved four phases, which entailed status review hearings, frequent urine screens, court-imposed sanctions, and treatment completion elements. The number of hearings, screens, and other completion elements was phase-dependent. Each phase was expected to last a minimum of 12 weeks, with the average graduate taking 54 weeks to complete the program.	The co comparison group was selected from a pool of youth who had been referred to the drug court. Once a juvenile entered the criminal justice system and was referred, the Assessment and Referral team would determine if he/she was eligible for drug court, comparison group, or neither. It was not a random selection. Youth in the comparison group did not receive regular drug screening and less supervision than the drug court. There is no other information about services received.
Herz et al. (2003)	Douglas County, NE	The Douglas County Juvenile Drug Court was designed for high risk juvenile offenders with substance use disorders. The court structure involved three phases, which entailed drug testing, supervision contact, court hearings, and the use of sanctions and incentives. The length of the program was not reported.	The comparison group youth were eligible for drug court and were matched on disposition date, gender, and race/ethnicity to juveniles in the drug court. The comparison group youth were offenders who received traditional court services such as probation or placement at the Office of Juvenile Services or Youth Rehabilitation Center.
Herz et al. (2003)	Lancaster County, NE	The Lancaster County Juvenile Drug Court was designed for high risk juvenile offenders with substance use disorders. The court structure involved four phases, which entailed drug testing, court hearings, and supervision contact. The length of the program was not reported.	The comparison group youth were eligible for drug court and were matched on disposition date, gender, and race/ethnicity to juveniles in the drug court. The comparison group youth were offenders who received traditional court services such as probation or placement at the Office of Juvenile Services or Youth Rehabilitation Center.

Herz et al. (2003)	Sarpy County, NE	The Sarpy County Juvenile Drug Court was designed for high risk juvenile offenders with substance use disorders. The court structure involved three phases, which entailed drug testing, court hearings, and supervision contact. The length of the program was not reported.	The comparison group youth were eligible for drug court and were matched on disposition date, gender, and race/ethnicity to juveniles in the drug court. The comparison group youth were offenders who received traditional court services such as probation or placement at the Office of Juvenile Services or Youth Rehabilitation Center.
Hickert et al. (2011)	Utah Counties, UT	The Utah Juvenile Drug Court was designed for juvenile offenders, a majority of whom had an alcohol or drug related offense. The court structure varied by county and involved 3-4 phases. Phases entailed random drug testing, appearances before a judge, parental involvement, and the use of sanctions. The average length of the program was seven months, with a majority of programs varying from 6-12 months.	The comparison group was constructed from youth similar to drug court youth with alcohol and other drug offenses. Juveniles were on probation and it is possible they attended substance abuse treatment as a requirement of probation. The comparison group had more severe delinquency histories than the drug court participants.
Hornby et al (2014)	Fairbanks, AK	The Fairbanks Juvenile Treatment Court was designed as a diversion program for juvenile offenders aged 12-18 who had a mental illness that likely contributed to the commission of their offense. The court structure and key components were not reported, but the program did involve drug testing and judicial supervision. The average length of stay in the program was 10 months.	The comparison group was comprised of youth on traditional juvenile probation who were matched to the drug court youth on demographics, substance use severity, age of first arrest, number of referrals, and type of DSM IV Axis 1 disorder. There is no other information about services received.
Guerin (2001)	Second District, NM	The Second Judicial District Court County Juvenile Drug Court was designed for juvenile offenders with no felonies, violent, or sex offenses. The court structure and key components were not reported. The average length of stay in the program was 8 months.	The comparison group was constructed from historical files of probationers who were eligible for drug court but did not participate for reasons such as not being referred. Juveniles in this group were under the supervision of the local probation department. They were matched to the drug court youth on demographic characteristics and referring offense.

Guerin (2001)	Third District, NM	The Third Judicial District Court County Juvenile Drug Court was designed for juvenile offenders with no felonies, violent, or sex offenses. The court structure and key components were not reported. The average length of stay in the program was 6.5 months.	The comparison group was constructed from historical files of probationers who were eligible for drug court but did not participate for reasons such as not being referred. Juveniles in this group were under the supervision of the local probation department. They were matched to the drug court youth on demographic characteristics, substance use history, and referring offense.
Guerin (2001)	Thirteenth District, Sandoval County, NM	The Thirteenth Judicial District Court Sandoval County Juvenile Drug Court was designed for juvenile offenders with no felonies, violent, or sex offenses. The court structure and key components were not reported. The average length of stay in the program was 8 months.	The comparison group was constructed from historical files of probationers who were eligible for drug court but did not participate for reasons such as not being referred. Juveniles in this group were under the supervision of the local probation department. They were matched to the drug court youth on demographic characteristics and referring offense.
Henggeler et al. (2006)	Charleston County, SC	The Charleston County juvenile drug court program was designed for juveniles aged 12-17 who had formal or informal probationary status, a substance use disorder, and were referred from the Department of Juvenile Justice. The court structure involved three phases, which entailed either weekly, biweekly, or monthly appearance in court with a caregiver, depending on the juvenile's current phase placement, accompanied by urine testing. Sanctions were imposed by a judge for positive urine screens. Drug court participants and their substance abuse counselors focused on behaviors in four areas: drug use, compliance with rules at home, school behavior, and attendance and participation in treatment groups and community service. Advancement through phases depended on clean drug screens, attendance at hearings, and acceptable juvenile behavior. On average, participants took 12 months to complete drug court.	Some youth eligible for drug court were randomized to the family court intervention. Youth assigned to this intervention attended group treatment for 12 weeks, with topics including risk reduction, peer influence, conflict resolution, and anger management. They simultaneously attended 6 weeks of treatment concerning drug selling behavior, 12 weeks of individual sessions, and 12 weeks of family group therapy. In addition, they appeared before a family court judge 1-2 times per year. The group treatments were grounded in cognitive-behavioral theory and systems theory, but they were not manually guided and ultimately left to the therapist's discretion.

Henggeler et al. (2012)	South Carolina	<p>JDC Usual Services: Juveniles randomly assigned to the JDC usual services group were enrolled in juvenile drug court services whose court structure was not reported. Key components of the court included weekly status hearings, sanctions and rewards, drug testing, and tailored treatment planning. The average length of stay in the program was not reported.</p> <p>JDC + CM-FAM: Juveniles randomly assigned to the JDC + CM-FAM group were enrolled in juvenile drug court services who implemented a four-month contingency management and family engagement program in addition to usual services. While the court structure was not reported, key components of the court included weekly status hearings, sanctions and rewards, drug testing, and tailored treatment planning. The average length of stay in the program was not reported.</p>	Not applicable; this study only compared active treatment conditions.
Kralstein (2008)	Suffolk County, NY	The Suffolk County Juvenile Treatment Court was designed for non-violent juveniles referred for delinquency, person in need of supervision, or family offense, who showed a pattern of substance abuse. The court structure involved three phases, which entailed sanctions and rewards, court appearances, school attendance, substance treatment, drug-testing, and an accumulation of various lengths of clean-time. The average length of time it took to successfully complete the program was 17.4 months and required 12 months of clean urine screens.	All Juvenile Delinquency and Persons in Need of Supervision records from the year before the court opened were reviewed to construct the comparison group. Files were reviewed and those that indicated drug use were placed in the comparison group. No information is provided about treatment and services received by comparison youth.
Latessa et al. (2002)	Belmont, Summit, Montgomery Counties, OH	The Ohio Juvenile Drug Court was designed for non-violent juvenile offenders aged 13-18. The court structure was broken into phases, although the number of phases was not explicitly stated. Participants were subject to random drug screens, with sanctions or incentives imposed for negative or positive screens, respectively. The duration of the program was not reported.	The comparison group was comprised of juveniles with substance use problem histories who were eligible for the drug court but did not receive the program for various reason (e.g., denial from the probation department, too many pending cases against them). The group received standard court services (and potentially received other treatment services); there was no other information about the other services this group received.

Latessa et al. (2013)	Ada County, ID	The Ada County Juvenile Drug Court was designed for juvenile offenders aged 14-18 who showed evidence of drug abuse. The court structure involved four phases, which entailed drug testing, attendance at court, enrollment in school or work, and abiding by a curfew. Sanctions and incentives were imposed when necessary. The minimum length of time in the program was 9 months.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.
Latessa et al. (2013)	Clackamas County, OR	The Clackamas County Juvenile Drug Court was designed for juvenile offenders aged 14-18 who showed evidence of drug abuse. The court structure involved four phases, which entailed monitoring through drug testing, curfew, enrollment in school or work, drug treatment, and attendance at court. The program lasted from 7-8 months.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.
Latessa et al. (2013)	Jefferson County, OH	The Jefferson County Juvenile Drug Court was designed for juvenile offenders aged 14-18 who showed evidence of drug abuse issues. The drug court is broken into two tracks. Track I entailed education classes, attendance at NA/AA meetings, random urine screens, 90 clean days, and enrollment in school or work. Track I lasted 3-6 months. Track II involved three phases, which entailed drug testing, enrollment in school or work, substance abuse treatment, home visits by court staff, and attendance at court. The typical length of Track II was 6-9 months.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.
Latessa et al. (2013)	Lane County, OR	The Lane County Juvenile Drug Court was designed for juvenile offenders aged 13-17 who showed evidence of drug abuse issues and did not have a history of violent or sex offenses. The court structure involved four phases, which entailed attendance at court hearings, random drug testing, completion of drug treatment, and creation of an aftercare plan. The minimum length of the program was 7 months, although most participants took 9-12 months to complete the program.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.

Latessa et al. (2013)	Lucas County, OH	The Lucas County Juvenile Drug Court was designed for juvenile offenders aged 14-17.5 who showed evidence of substance abuse issues. The court structure involved three phases, which entailed attendance at NA/AA, treatment completion, attendance at court hearings, drug testing, and home and school visits. Parents of the juveniles were also court ordered to participate by attending court hearings and parenting workshops. The minimum length of time in the program was 6 months, with an average of 8-9 months.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.
Latessa et al. (2013)	Medina County, OH	The Medina County Juvenile Drug Court was designed for juvenile offenders aged 13-18 who are charged with a drug-related crime or tested positive for drug use. Drug trafficking offenses, and violent and sex offenses, were not eligible. The drug court had two tracks. The non-intensive Component involved three phases, lasting an average of 4 months. The intensive component involved three phases, which included a family component, and lasted an average of 11 months. Both tracks entailed group and individual counseling, drug testing, and attendance at court.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.
Latessa et al. (2013)	Rhode Island County, RI	The Rhode Island County Juvenile Drug Court was designed for non-violent juveniles charged with a drug-related offense or other non-violent offense with known substance abuse issues. Court structure was not reported, but graduation was decided on a case-by-case basis. The program entailed drug screens, attendance at court, and home and school visits. Post-adjudication participants needed clean urine screens for 6 months to graduate, while diversion program participants needed clean urine screens for 3 months to graduate.	The comparison sample was comprised of youth from traditional probation and non-drug court diversion. Youth in the comparison group were matched with drug court youth. No information is provided about treatment and services received by this sample.
Latessa et al. (2013)	San Diego County, CA	The San Diego County Juvenile Drug Court was designed for juveniles aged 13-17.5 who showed evidence of substance abuse issues. The structure of the court involved three phases, which entailed drug treatment, contact with a probation officer, attendance at court hearings, frequent drug screens, and the accumulation of varying amounts of clean time. The minimum length of time in the program was 9 months, with most participants taking an average of 11-12 months.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.

Latessa et al. (2013)	Santa Clara County, CA	The Santa Clara County Juvenile Drug Court was designed for juvenile offenders under age 18 with a history of substance abuse. A history of selling drugs, firearm possession, or felony sex offense made a youth ineligible. The court structure involved three phases, which entailed substance abuse treatment, random drug screens, meetings with probation officer, and attendance at court hearings. The minimum length of the program was 6 months, with participants taking an average of 12 months.	The comparison sample was comprised of youth from traditional probation with alcohol/drug issues. Youth in the comparison group were matched to drug court youth on risk level, race, gender, and alcohol/drug abuse or dependence. No information is provided about treatment and services received by this sample.
Legrice (2003)	Tarrant County, TX	The Tarrant County Juvenile Drug Court Program was designed for juveniles aged 10-17 who had a limited arrest history and had been charged with a non-violent misdemeanor or felony drug possession. Through the court adolescents and their families met with probation officers and treatment providers to discuss treatment progress, report on school performance, and submit to random drug screens. The average length of the program was 6 months.	The supervisory caution group was used as a comparison group because it is a similar level of intervention of the drug court. Juveniles in this group had drug related offenses and minimal contact with the court for six months. If there were no additional arrests in 6 months, the case was closed. During this period, juveniles might be referred to community resources. No additional information was provided about the services and treatments received.
Letourneau et al. (2017)	Charleston, SC; other	<p>JDC +Usual Services: Juveniles randomly assigned to the JDC + Usual Services group were mandated to participate in substance use services delivered by state or privately-funded drug treatment providers. The court structure was three phases and involved regular status hearings, weekly drug testing, and sanctions or rewards based on drug screen results and behavior reports from treatment providers. The average length of stay in the program was 12 months.</p> <p>JDC- Risk Reduction Therapy for Adolescents: Juveniles randomly assigned to the JDC + Risk Reduction Therapy group were mandated to participate in risk reduction substance use therapy. Family members were required to attend each session and the course of this treatment was 6-7 months on average. The court structure involved three phases and involved regular status hearings, weekly drug testing, sanctions or rewards based on drug screen results and behavior reports from treatment providers. The average length of stay in the program was 12 months.</p>	Not applicable; this study only compared active treatment conditions.

Mackin et al. (2010)	Anne Arundel County, MD	The Anne Arundel County Juvenile Treatment Court was designed for juvenile offenders with non-violent property or drug charges where substance use contributed to the offense. The court structure involved three phases, which entailed attendance at status hearings, group and individual counseling, random drug testing, school or occupational enrollment, and completion of community service. The program lasted a minimum of five months, although most juveniles remained in the program for 10 months. Participants must have completed all program requirements and attained 60 days clean in order to graduate.	The comparison group consisted of eligible youth who were not drug court participants for various reasons (such as not being referred). Comparison group juveniles were matched on offense and demographic characteristics; in addition, they were under a moderate, high, or intensive level of juvenile supervision during the time period selected. No further information is provided about the treatment they received.
Mackin et al. (2010)	Baltimore County, MD	The Baltimore County Juvenile Drug Court was designed for juvenile offenders aged 13-17 who admitted to substance abuse. The court structure involved four phases, with the last two phases designed as aftercare. The program entailed attendance at drug-court hearings, case management meetings, group and individual counseling, drug testing, attendance at school or job, and completion of community service. Judges used incentives and sanctions to reward positive behaviors and discourage negative ones. The minimum length of the program was 12 months, although most juveniles took 13 months to complete. In order to graduate, participants must have completed all program requirements and have 90 consecutive clean days.	Youth in the comparison group were eligible for the drug court but did not participate for reasons such as not being referred or opting out of the program; in addition, comparison youth were similar to those in drug court demographically and in substance abuse and criminal history. Juveniles in the comparison group were under a moderate, high, or intensive level of supervision; no other information is provided about treatment or services they received.
Mackin et al. (2010)	St. Mary's County, MD	The St. Mary's County Juvenile Drug Court Program was designed for offenders under 18 years old without a history of violent offenses or drug trafficking. The court structure involved four phases, which entailed attendance at drug court hearings, case management meetings, group and individual counseling, drug testing, school attendance or employment, and the completion of a community service project. Judges used sanctions and goal-oriented incentives to encourage positive behaviors. The program was completed in as little as 12 months, with graduates spending an average of 358 days in the program. Participants were required to have 120 consecutive clean days to graduate.	The comparison group included similar, eligible youth who did not participate in the drug court for reasons such as not being identified as eligible at time of arrest or opting out of the program; in addition, comparison youth were similar to those in drug court demographically and in substance abuse and criminal history. Juveniles in the comparison group were under a high or intensive level of supervision; no further information is provided about treatment or services they received.



Marc Bolan Consulting (2016)	King County, WA	The King County Juvenile Drug Court program was designed for non-violent, substance using juveniles. The court structure was not reported, but the program entailed weekly status hearings, judicial monitoring, drug testing, and the use of incentives and sanctions. The average length of time spent in the program was 17.5 months.	Youth in the comparison group were eligible for the drug court but were not referred or considered for the program. Juveniles in the comparison group were comprised of a historical sample matched using propensity scores based on a combination of variables including demographics, criminal history, severity of offense, and year of start date. No further information is provided about treatment or services they received.
O'Connell et al. (1999)	Delaware Counties, DE	The Delaware Juvenile Drug Court program was created as a diversion program for non-violent, non-probationary, substance abusing juvenile (age 11-19) offenders. In a majority of cases, juveniles were referred as a first-time offender for misdemeanor drug possession, or possession with intent to deliver. The court involved an unspecified number of phases, with judicial monitoring, random urinalysis, case management, and family and group counseling. The average participant remained in the program for 200 days. Graduation from the program required a minimum completion of a 12-week educational program and clean urinalyses.	The comparison group was created by matching all drug court participants to youth who had equivalent criminal histories; they were also matched on race and gender. The comparison sample was a historical sample, consisting of youth who had been arrested for misdemeanor drug charges prior to the drug court's implementation. There is no information about the treatment the comparison sample received.
ORS (2007)	King County, WA	The King County Juvenile Drug Court was designed for non-violent juveniles charged with a drug or alcohol offense, misdemeanor offense, or felony property offense. Court structure was not reported, but the program entailed attendance at status hearings, judicial monitoring, and the use of incentives and sanctions. The average length of time in the program was 16.5 months.	The comparison group was matched to the drug court participants on baseline characteristics and criminal history score; these youth had been convicted of an offense during the same time period but had no involvement with the drug court. No further information is provided about the treatment they received.
Parsons & Byrnes (2006)	Third District, UT	The Third District Juvenile Drug Court Program was designed for first time juvenile drug offenders. The program entailed drug testing, attendance at judicial hearings where sanctions and incentives were imposed, and completion of judicial assignments, community service, and treatment as necessary. The typical length of the program was 6 months.	The comparison group was created with a sample of youth who had either dropped out of drug court or who had received traditional juvenile probation services. The sample was matched to the drug court participants on background and criminal history. No further information was provided about treatment received by the comparison group.

Picard-Fritsche & Kralstein (2012)	Nassau County, NY	The Nassau Juvenile Treatment Court was designed for youth ages 13-17 charged with juvenile delinquency or as a person in need of supervision. The court structure involved three phases, which entailed intensive judicial monitoring, frequent drug testing, and the use of incentives and sanctions. The minimum length of the program was 8 months, although some youth took longer to complete the program.	The comparison sample was comprised from juvenile delinquency and persons in need of supervision cases. The juveniles selected were similar to the drug court youth and were matched on baseline characteristics through a propensity score. Each drug court participant was matched to two youth with the nearest neighbor propensity scores. No information is provided about the services offered to the comparison sample.
Pitts (2006)	Eleventh District, San Juan County, NM	The Eleventh Judicial District Juvenile Drug Court was designed for juveniles with a drug or alcohol related offense who had no prior violent or sex offenses. The structure of the court and its key components were not reported. The average length of time in the program was 10.1 months for successful graduates.	The comparison group was matched on factors including demographic characteristics, substance abuse history, and current offense data. All youth in the historical matched comparison group were drug court eligible but did not participate for reasons such as not being referred. These youth were under the supervision of the local probation department; no further information is provided about the treatment they received.
Rodriguez & Webb (2004)	Maricopa County, AZ	The Maricopa County Juvenile Drug Court was designed for youths, aged 13-16.5, with no prior history of violent or sex offenses, and who were not at risk for suicidal or psychotic episodes. The drug court involved three phases, which entailed weekly status hearings, frequent urinalyses, group and family sessions, and successful completion of treatment components. Juveniles participated in the drug court between 9-12 months.	Youth in the comparison group were screened for drug court, but ultimately placed on standard probation. Initially, youth were placed randomly in the drug court or comparison, but after a few months youth were placed by a measure of geographic and screening criteria in addition to the judges' discretion. From the group screened but not selected for drug court participation, a random sample of 100 was drawn. No further information is provided about treatment and services received.

Sloan et al. (2004)	Jefferson County, AL	The Jefferson County Juvenile Drug Court was designed for juvenile offenders who were charged with a drug-related crime, a drug crime, or tested positive on urinalysis at intake. The court structure involved four phases, which entailed intensive probation supervision, drug testing, judicial monitoring, and the use of incentives and sanctions. Juveniles were monitored electronically in the first phase. The minimum length of the program was 12 months.	The comparison group was constructed from a historical group of juveniles who had been through the Adolescent Substance Abuse Program (ASAP). ASAP was intended for juvenile offenders who tested positive for drugs, self-reported drug use, or who had a drug related offense. The 12-week program consisted of drug education curriculum, drug treatment options, and urine screens.
Sullivan & Gummelt (2017)	Jefferson County, TX	The Jefferson County Drug Court was designed for substance-abusing juvenile offenders aged 13-17. The drug court structure involved three phases, judicial supervision, and weekly urinalysis. Juveniles involved in this program received case management, family based services, anger management, career preparation, and mentoring. The average participation length was 12 months.	Youth in the comparison group were on traditional probation following a Class B or higher misdemeanor offense. The comparison group was a historical sample matched to the treatment group on initial criminal offense, age, race, and gender. No information is provided about treatment received.
Supreme Court of Virginia (2003)	Richmond County, VA	The Richmond County Juvenile Drug Treatment Court was designed for non-violent juvenile drug-offenders aged 12-17. The structure of the court was not reported, but the program entailed random drug screening, court appearances, and the use of sanctions and incentives. Program length was not reported.	The comparison group was matched to the drug court group on baseline characteristics. The comparison group juveniles were seen for a drug offense at a neighboring juvenile court during the time that the Richmond County drug court was seeing clients. No information is provided about treatment received.
Thompson (2004)	East Central & Northeast Central Counties, ND	The North Dakota Juvenile Drug Court was designed for juvenile offenders aged 13-17, diagnosed with a substance use disorder, and who had no history of violent or drug-selling offenses. The East Central Court structure involved three phases, taking between 6-9 months to complete. The Northeast Central Court had four phases and took 7-10 months for juveniles to complete. Both court structures mandated random drug screening, regular meetings with a probation officer, community service, individual therapy, and enrollment in school. Sanctions and incentives were used in both court structures.	Drug abusing juveniles referred to the East Central Judicial District and the South Central Judicial District were used for the comparison group. Evaluators constructed a comparison group from the pool of substance abusing juveniles who were drug court eligible but not enrolled in the drug court. No information is provided about the services these juveniles received.

White et al. (2017)	Wayne, Barry, Oakland, Kalamazoo, Macomb, Bay, Isabella, Washtenaw, Marquette, Charlevoix, Livingston, and Emmet Counties, MI	The Michigan JDC system, consisting of 12 courts, was designed for juvenile offenders diagnosed with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, family involvement, and incentives and sanctions. The mean length of stay in the program was 10.6 months.	The ‘business as usual’ comparison group was constructed from a historical sample of juveniles who were matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court A	The “Court A” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, family involvement, collaborative planning, educational linkages, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual A’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court B	The “Court B” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, and collaborative planning, Program length for this cohort was not reported.	The ‘business as usual B’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.

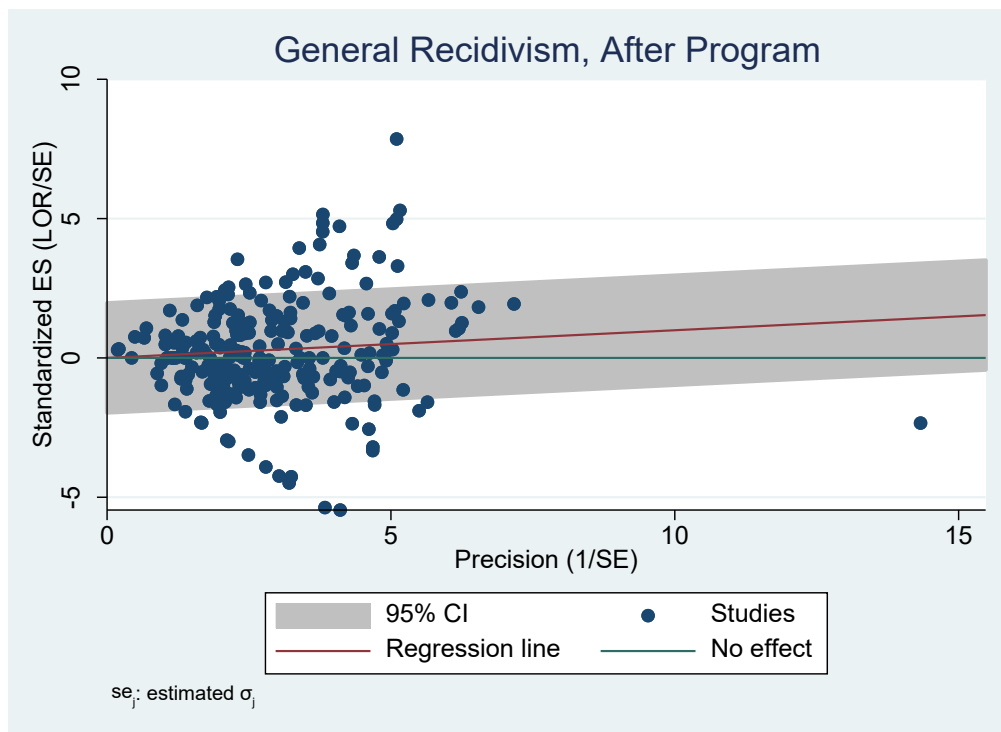
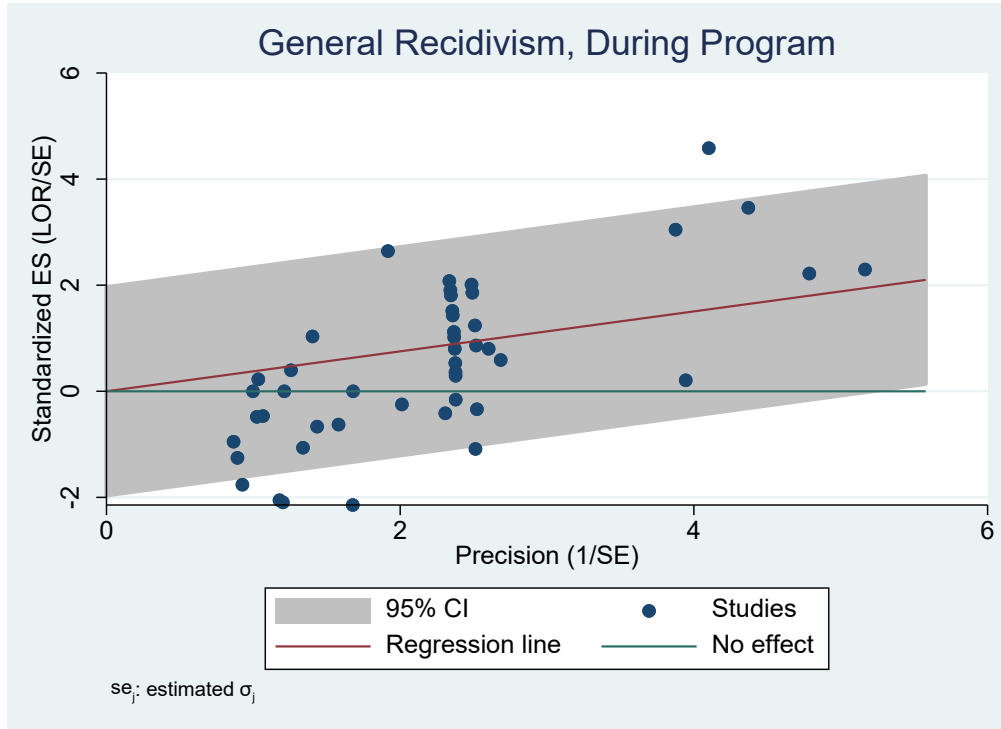
White et al. (2017)	Court C	The “Court C” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, family involvement, collaborative planning, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual C’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court D	The “Court D” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, family involvement, collaborative planning, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual D’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court E	The “Court E” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, family involvement, collaborative planning, educational linkages, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual E’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court G	The “Court G” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, collaborative planning, family involvement, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual G’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.

White et al. (2017)	Court H	The “Court H” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, family involvement, and collaborative planning. Program length for this cohort was not reported.	The ‘business as usual H’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court I	The “Court I” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, collaborative planning, and educational linkages. Program length for this cohort was not reported.	The ‘business as usual I’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court J	The “Court J” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, family involvement, collaborative planning, educational linkages, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual J’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court K	The “Court K” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, family involvement, collaborative planning, and incentives and sanctions. Program length for this cohort was not reported.	The ‘business as usual K’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.

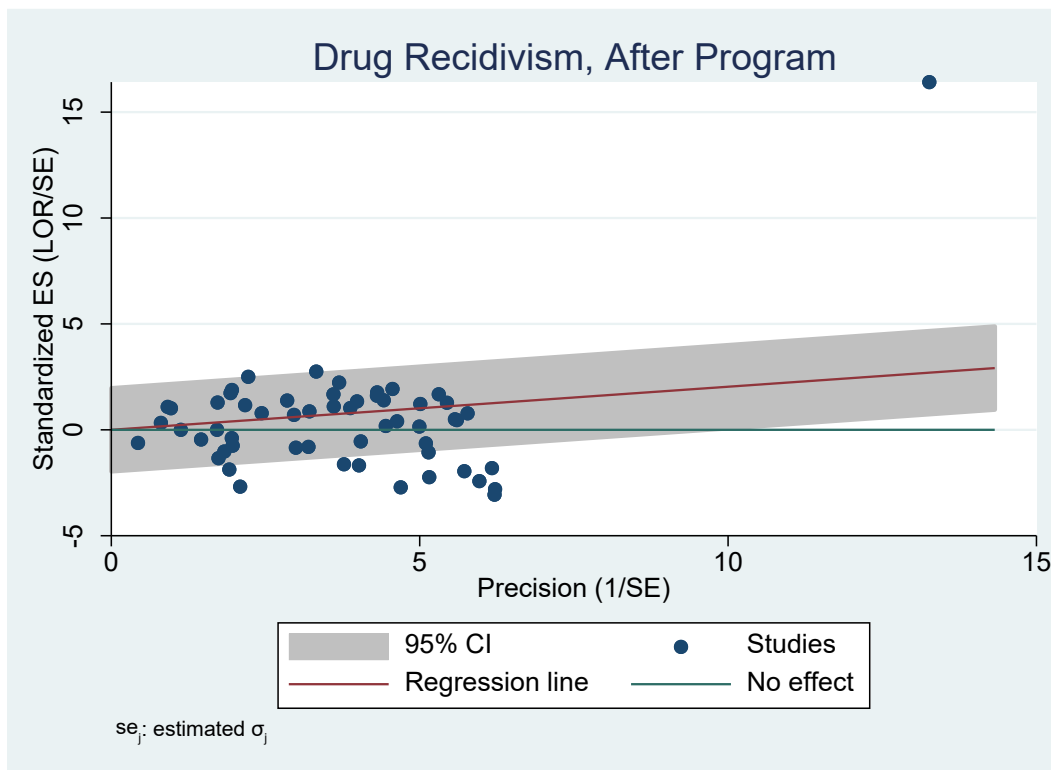
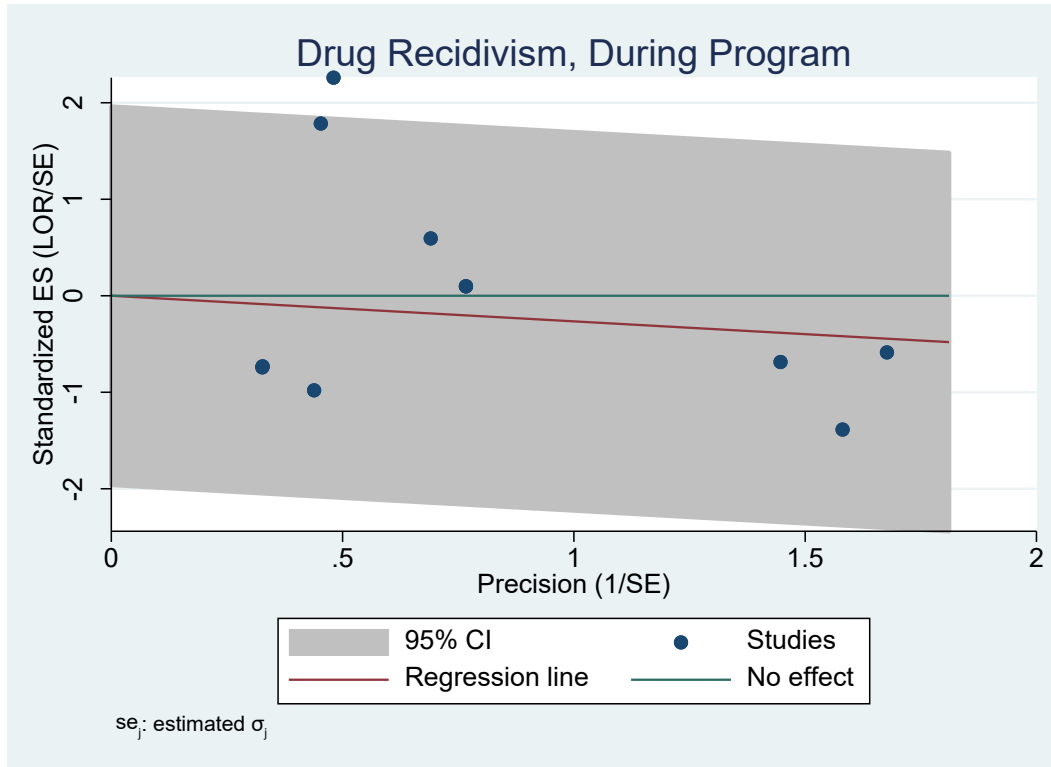
White et al. (2017)	Court L	The “Court L” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, judicial supervision, family involvement, and collaborative planning. Program length for this cohort was not reported.	The ‘business as usual L’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
White et al. (2017)	Court M	The “Court M” JDC was designed for juvenile offenders with a substance use disorder. The court structure involved four phases with weekly status hearings, weekly drug testing, judicial supervision, and family involvement. Program length for this cohort was not reported.	The ‘business as usual M’ comparison group was constructed from a historical sample of juveniles matched to the treatment group on offense type, demographics, and year of offense. Youth assigned to the business as usual group must never have participated in any juvenile drug court program. No information is provided about the services these juveniles received.
Wright & Clymer (2001)	Beckham County, OK	The Beckham County Juvenile Drug Court was designed for non-violent juvenile first or second time offenders, or a person in need of supervision. The court structure involved three phases, which entailed sanctions and incentives to encourage positive behaviors, and urinalyses. The median length of the program was 13 months for graduates.	The Beckham County Graduated Sanction’s program was used as the comparison group. The Graduated Sanctions program was similar to the drug court as far as corresponding severity of sanctions for curfew violations and positive urinalyses; the programs differed in that the Graduated Sanctions program did not have a substance abuse treatment component.

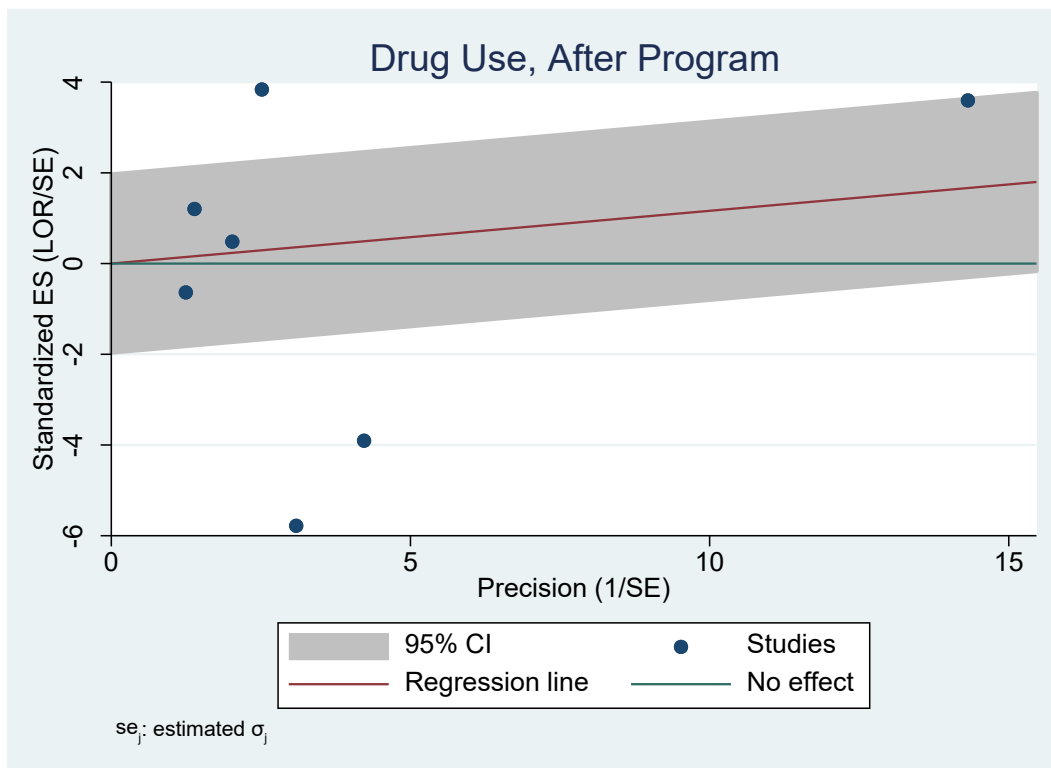
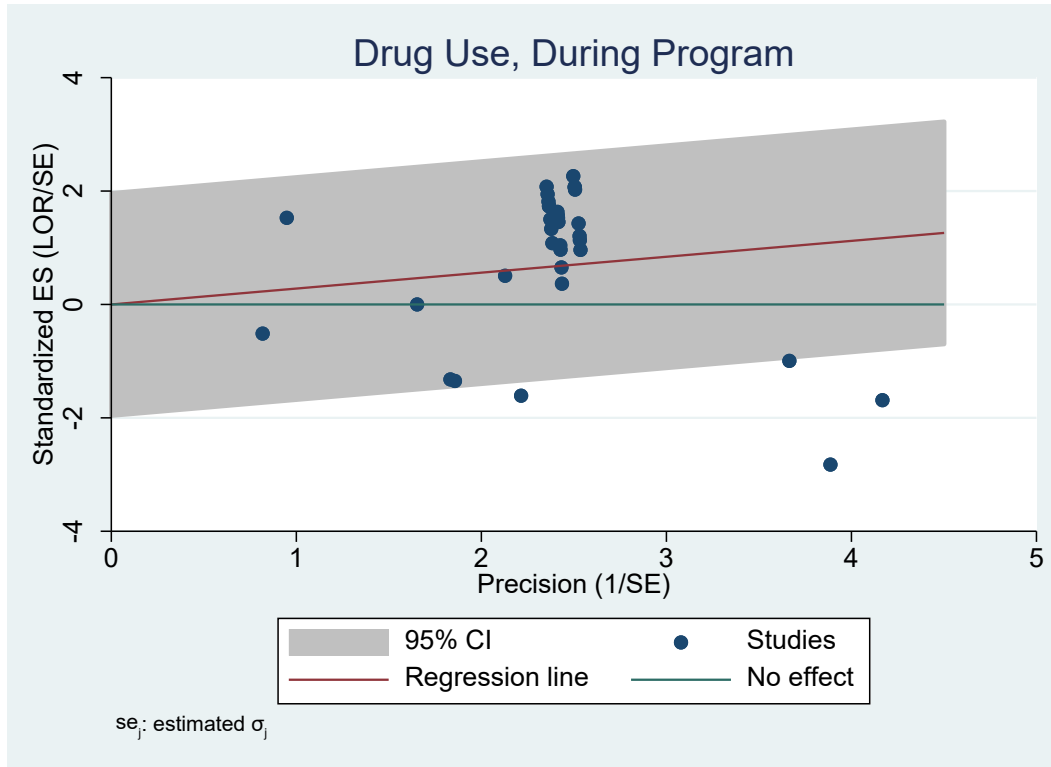
Appendix C

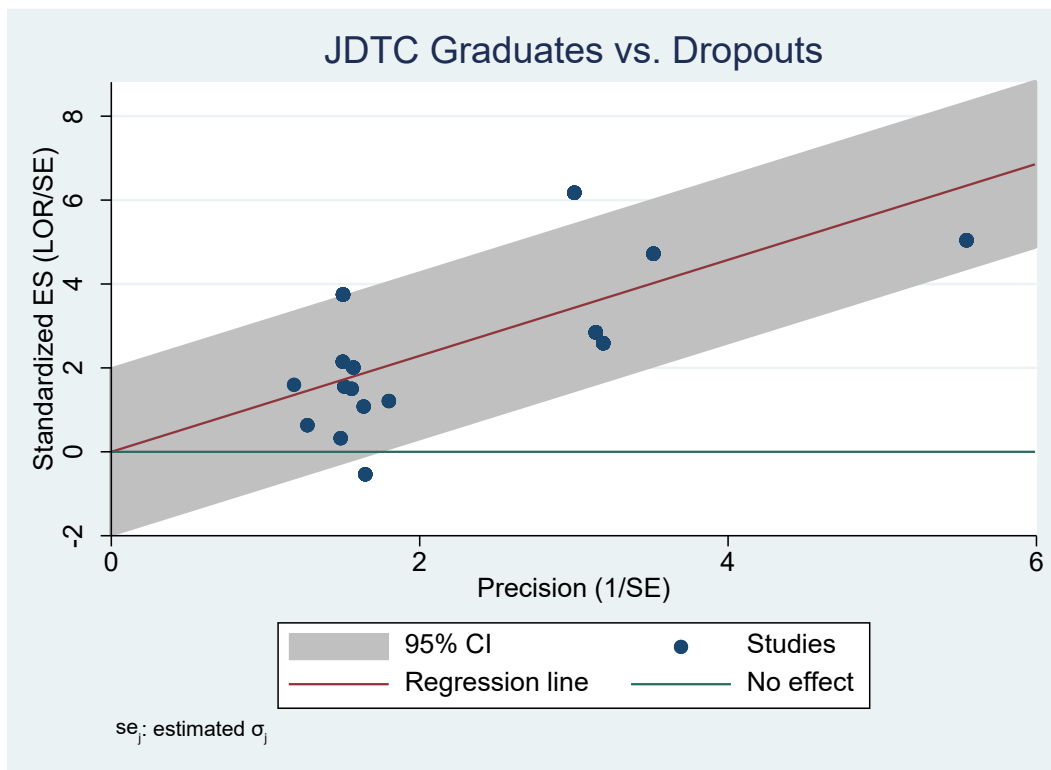
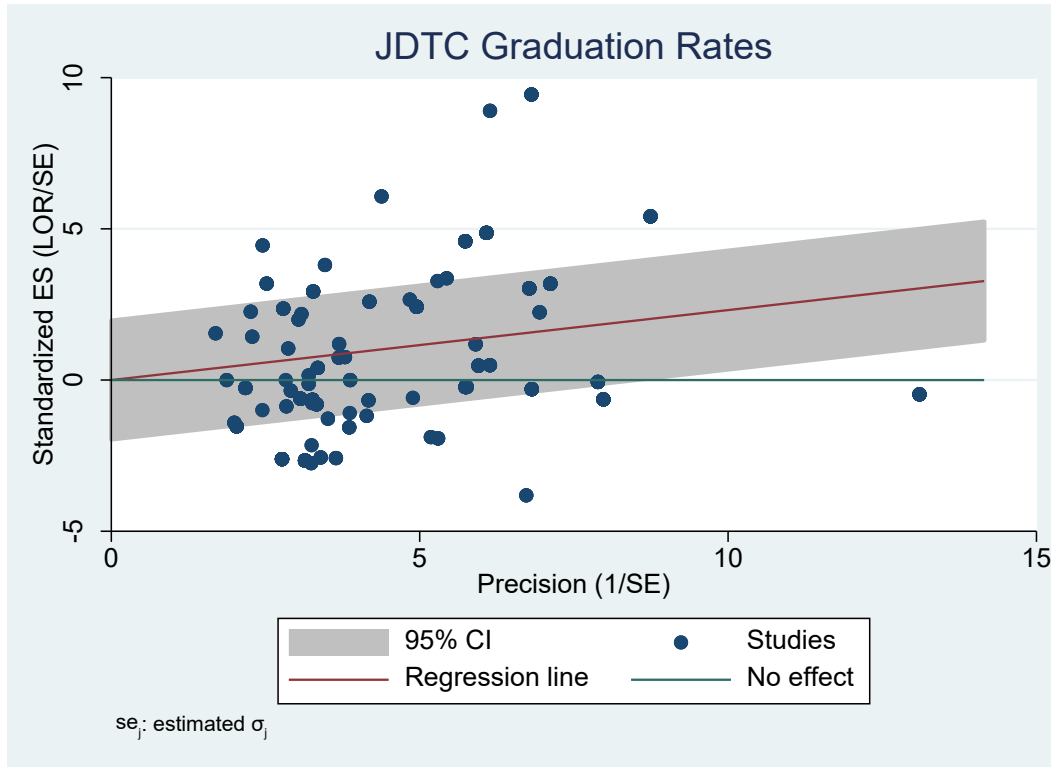
Galbraith Plots, by Outcome Type and Measurement Timing





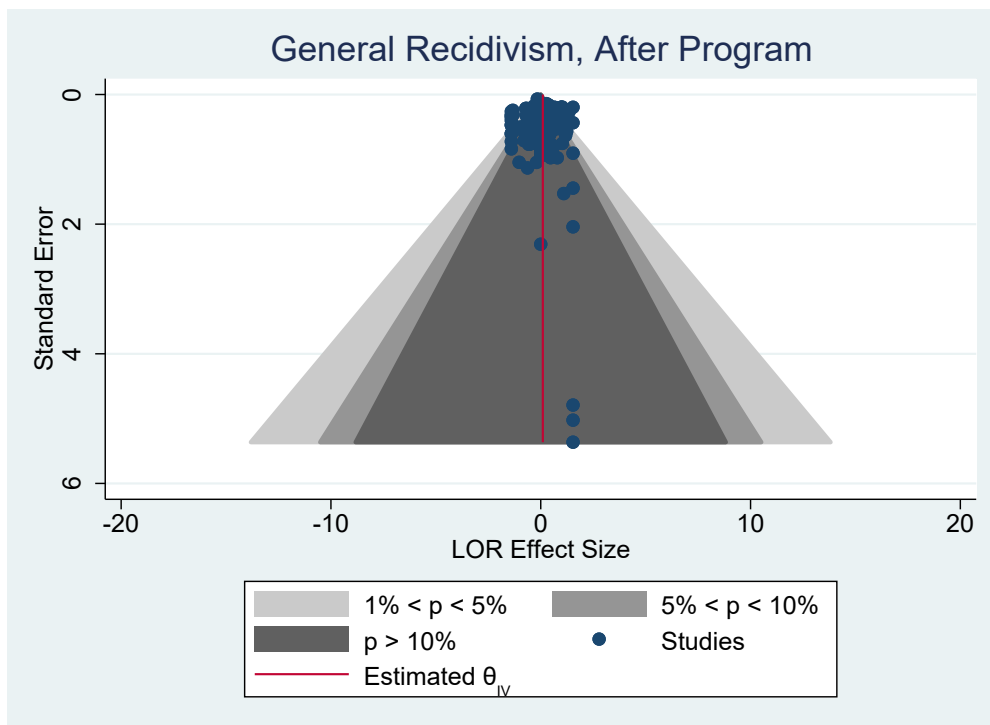
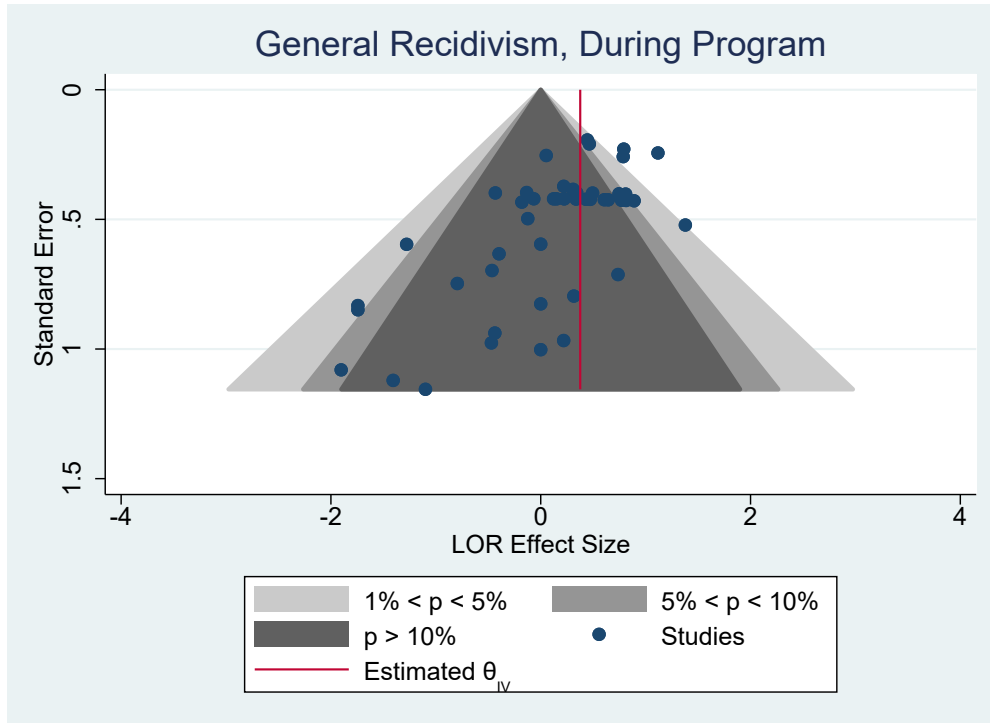


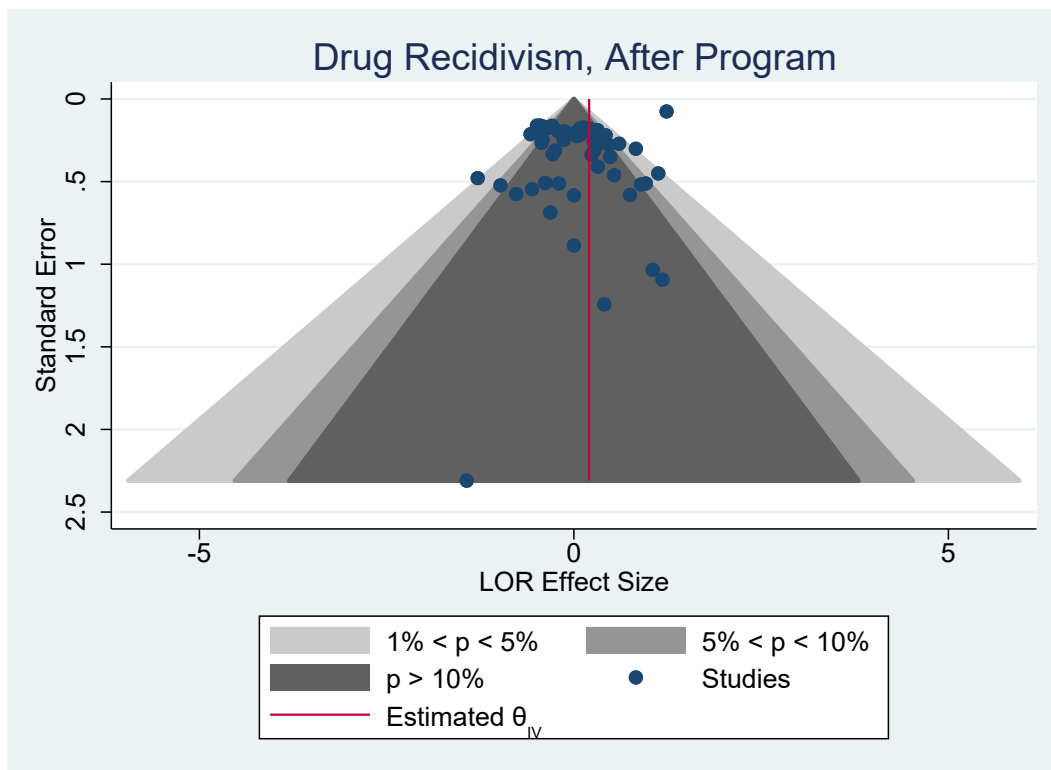
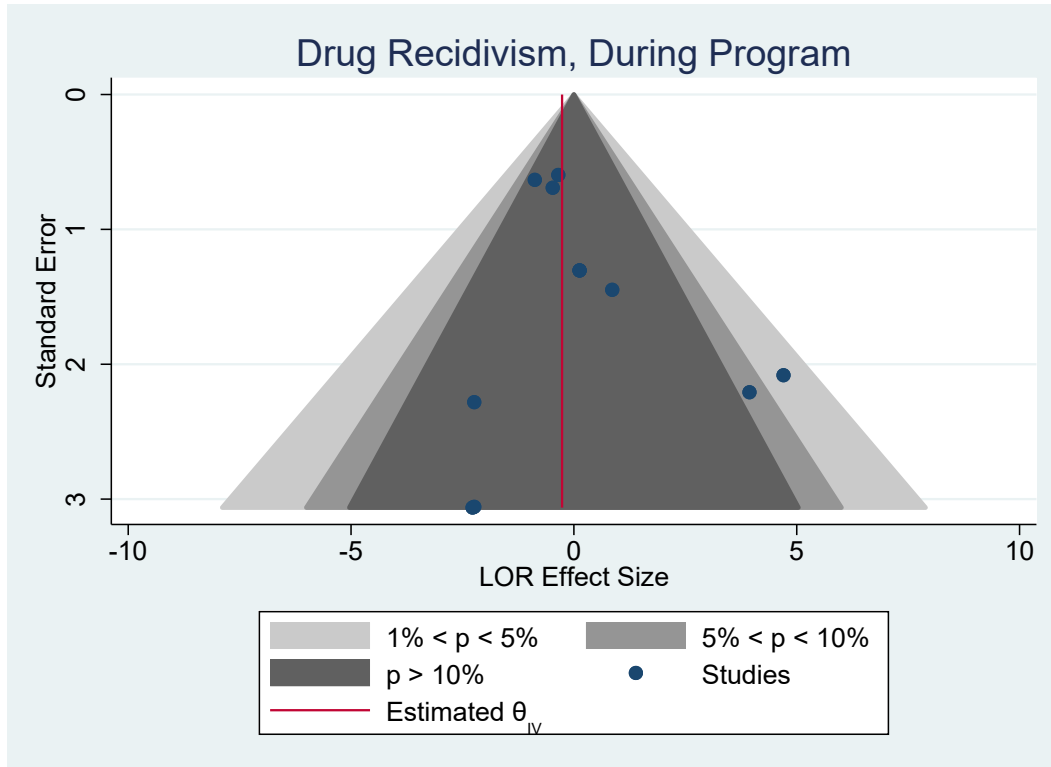


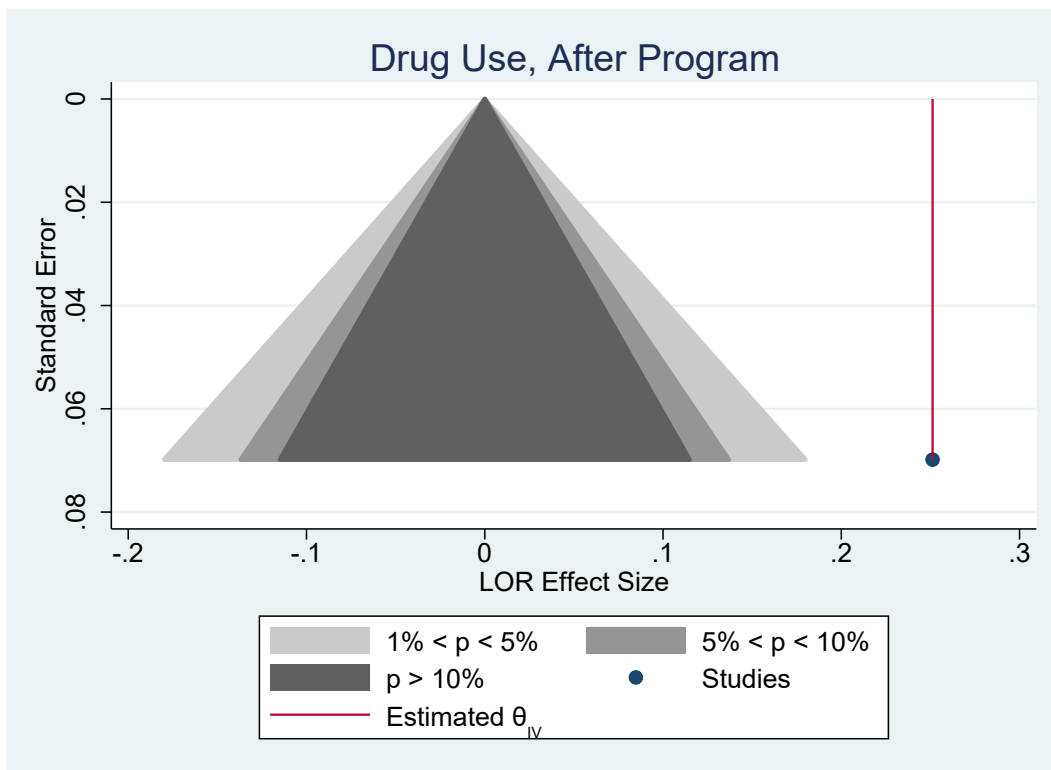
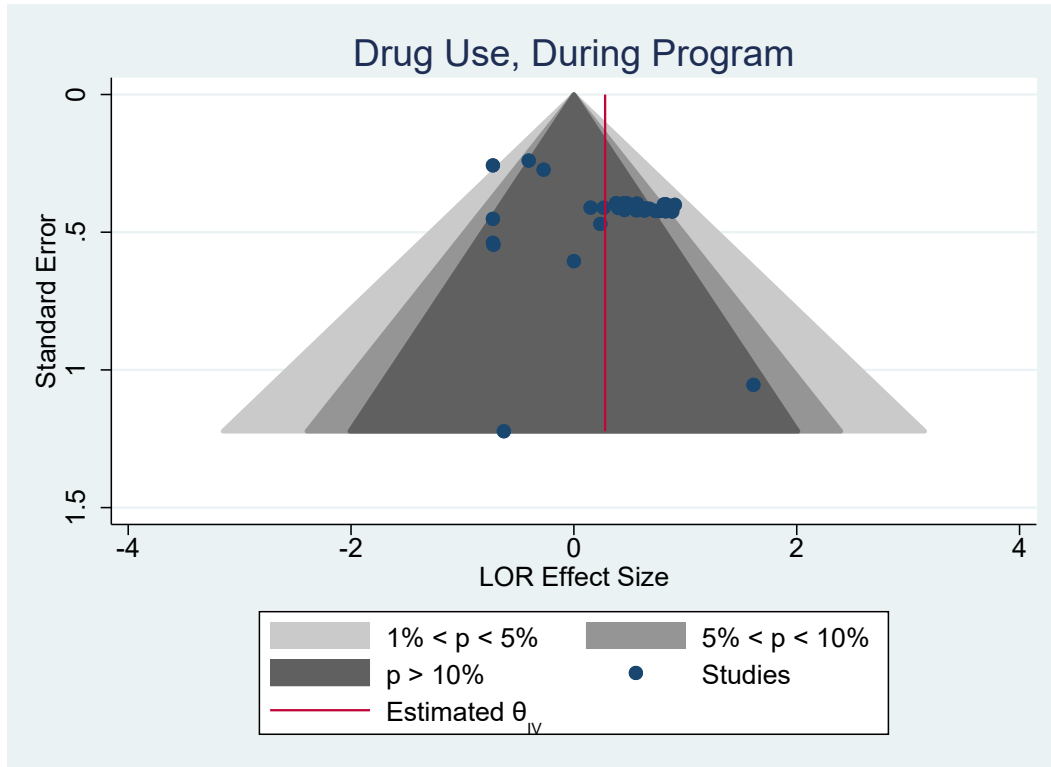


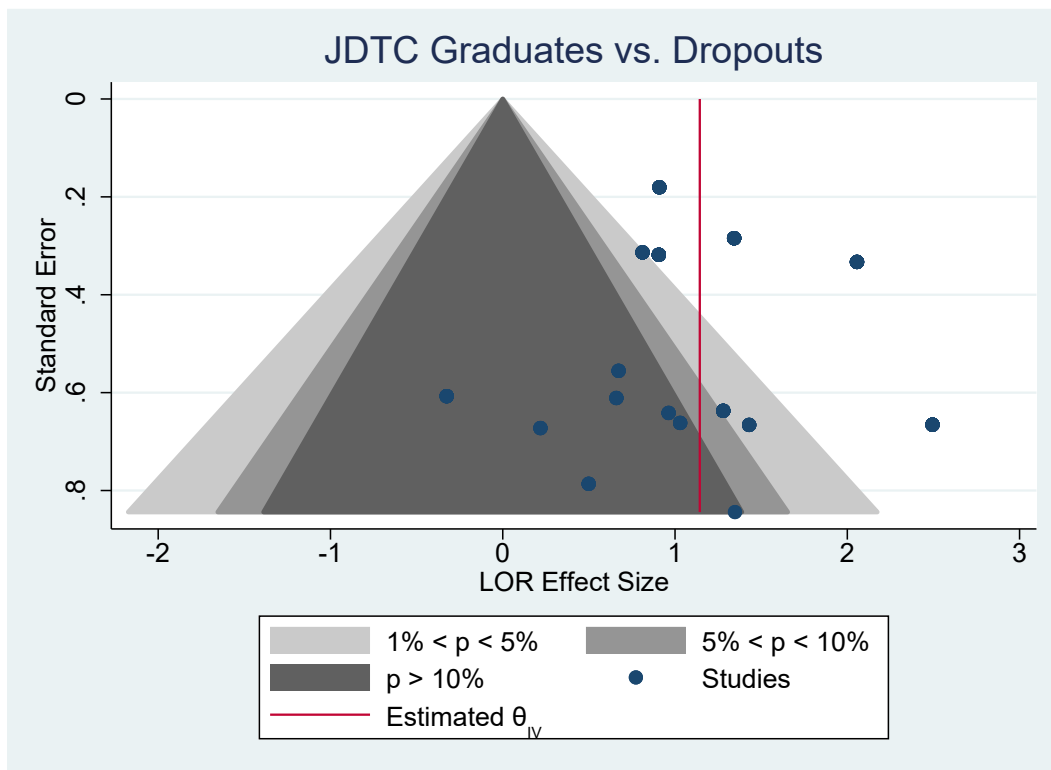
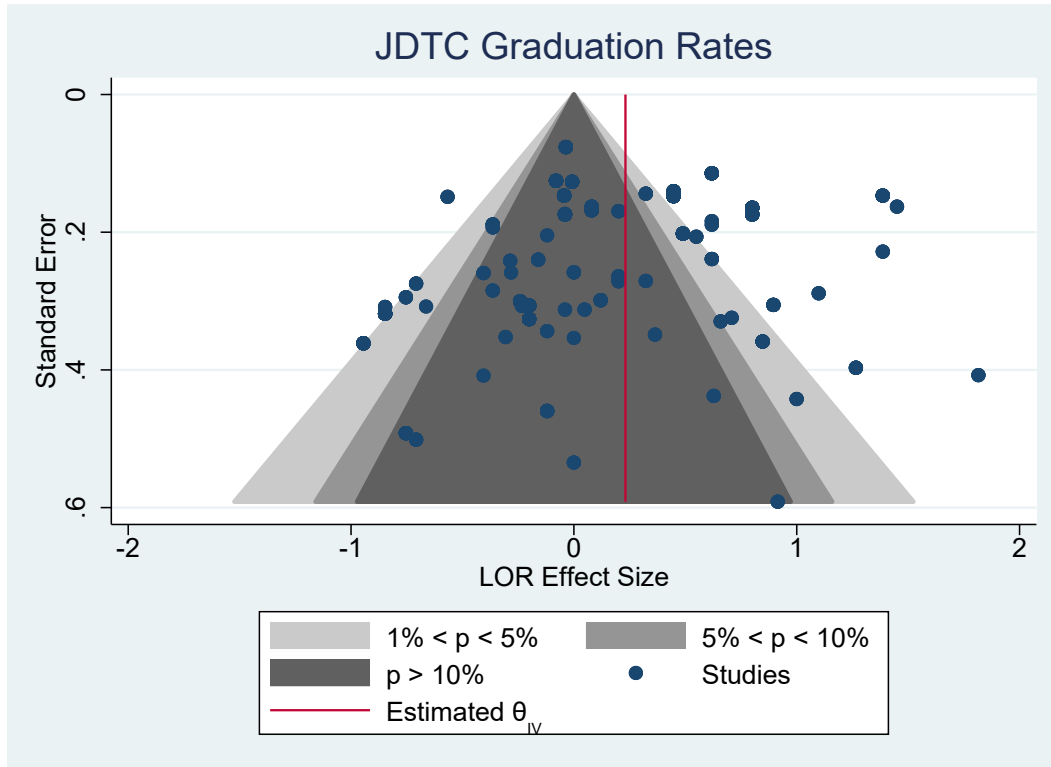
Appendix D

Contour Enhanced Funnel Plots, by Outcome Type and Measurement Timing









## Appendix E

## Publication Bias/Small Study Bias Regression Tests for Funnel Plot Asymmetry

	<i>b</i>	95% <i>CI</i>
<b>JDTC vs. Comparison Effects (<i>LOR</i>)</b>		
General recidivism (all), during program	-1.55 *	[-2.61, -0.49]
General recidivism (all), after program	-0.34	[-1.30, 0.62]
Drug recidivism (all), during program	0.60	[-2.86, 4.07]
Drug recidivism (all), after program	-0.78	[-3.23, 1.68]
Drug use (all), during program	0.39	[-2.05, 2.84]
<b>JDTC Graduation Rates (<i>p</i>)</b>		
Graduation rate	-0.29	[-1.19, 0.61]
<b>JDTC Graduate vs. Dropout Difference in Recidivism (<i>LOR</i>)</b>		
Recidivism at first follow-up	-0.91	[-3.71, 1.87]

Notes: *b* = regression coefficient testing the null hypothesis of no small study bias. All small study bias coefficients estimated using robust variance estimation with an assumed within-study correlation of effect sizes ( $\rho$ ) of .70.

\*  $p < .05$ .



## Appendix F

## Sensitivity Analyses for Handling Missing Data and Assumed Within-Study Correlation of Dependent Effect Sizes

Mean Effect Sizes and Heterogeneity Estimates for Main Effects Meta-Analyses, by Outcome Type and Measurement Timing

	Mean Effect Size		95% CI	$\tau^2$	$n_{es}$	$n_k$
<b>JDTC vs. Comparison Effects (LOR)</b>						
<i>General recidivism (all), during program</i>	0.32	*	[0.03, 0.61]	0.11	46	14
No Winsorized outliers	0.32	*	[0.03, 0.61]	0.11		
$\rho = .10$	0.32	*	[0.04, 0.61]	0.11		
$\rho = .90$	0.32	*	[0.03, 0.61]	0.11		
<i>Arrests/referrals</i>	0.40		[-0.01, 0.81]	0.09	12	9
No Winsorized outliers	0.40		[-0.01, 0.81]	0.09		
$\rho = .10$	0.40		[-0.01, 0.81]	0.09		
$\rho = .90$	0.40		[-0.01, 0.81]	0.09		
<i>Charges/filings/petitions</i>	0.29		[-0.13, 0.71]	0.03	7	6
No Winsorized outliers	0.28		--	0.09		
$\rho = .10$	0.28		--	0.09		
$\rho = .90$	0.28		--	0.09		
<i>Illegal activity</i>	0.31		--	--	12	1
No Winsorized outliers	0.31		--	--		
$\rho = .10$	0.31		--	--		
$\rho = .90$	0.31		--	--		
<i>Offenses</i>	-0.50		--	0.65	14	5
No Winsorized outliers	-0.50		--	0.68		
$\rho = .10$	-0.48		--	0.61		
$\rho = .90$	-0.49		--	0.66		

	<i>Mean Effect Size</i>	<i>95% CI</i>	$\tau^2$	<i>n<sub>es</sub></i>	<i>n<sub>k</sub></i>
<b><i>General recidivism (all), after program</i></b>	0.09	[-0.10, 0.29]	0.30	254	50
No Winsorized outliers	0.05	[-0.19, 0.28]	0.45		
$\rho = .10$	0.09	[-0.10, 0.29]	0.30		
$\rho = .90$	0.09	[-0.10, 0.29]	0.31		
<i>Admissions</i>	0.22	--	--	2	1
No Winsorized outliers	0.18	--	--		
$\rho = .10$	0.18	--	--		
$\rho = .90$	0.18	--	--		
<i>Arrests/referrals</i>	0.05	[-0.16, 0.26]	0.37	139	45
No Winsorized outliers	0.04	[-0.20, 0.27]	0.53		
$\rho = .10$	0.08	[-0.13, 0.28]	0.38		
$\rho = .90$	0.08	[-0.13, 0.28]	0.38		
<i>Charges/filings/petitions</i>	0.28	[-0.44, 0.99]	0.44	32	10
No Winsorized outliers	0.25	[-0.59, 1.10]	0.86		
$\rho = .10$	0.27	[-0.45, 0.99]	0.45		
$\rho = .90$	0.27	[-0.45, 0.99]	0.46		
<i>Convictions/adjudications</i>	-0.22	[-0.50, 0.07]	0.15	72	17
No Winsorized outliers	-0.33	[-0.77, 0.10]	0.50		
$\rho = .10$	-0.22	[-0.51, 0.07]	0.15		
$\rho = .90$	-0.22	[-0.51, 0.07]	0.15		
<i>Offenses</i>	-0.08	--	--	8	3
No Winsorized outliers	-0.08	--	--		
$\rho = .10$	-0.08	--	--		
$\rho = .90$	-0.08	--	--		

	<i>Mean Effect Size</i>	<i>95% CI</i>	$\tau^2$	<i>n<sub>es</sub></i>	<i>n<sub>k</sub></i>
<b><i>Drug recidivism (all), during program</i></b>	-0.54	--	--	11	4
No Winsorized outliers	-0.54	--	--		
<i><math>\rho = .10</math></i>	-0.54	--	--		
<i><math>\rho = .90</math></i>	-0.54	--	--		
<i>Charges/filings/petitions</i>	0.38	--	--	8	1
No Winsorized outliers	0.38	--	--		
<i><math>\rho = .10</math></i>	0.38	--	--		
<i><math>\rho = .90</math></i>	0.38	--	--		
<i>Offenses</i>	-0.56	--	--	3	3
No Winsorized outliers	-0.56	--	--		
<i><math>\rho = .10</math></i>	-0.56	--	--		
<i><math>\rho = .90</math></i>	-0.56	--	--		
<b><i>Drug recidivism (all), after program</i></b>	0.28	[-0.12, 0.67]	0.56	56	15
No Winsorized outliers	0.27	[-0.13, 0.66]	0.57		
<i><math>\rho = .10</math></i>	0.28	[-0.12, 0.67]	0.56		
<i><math>\rho = .90</math></i>	0.28	[-0.12, 0.67]	0.56		
<i>Arrests/referrals</i>	0.60	[-0.11, 1.31]	0.40	7	7
No Winsorized outliers	0.60	[-0.11, 1.31]	0.40		
<i><math>\rho = .10</math></i>	0.60	[-0.11, 1.31]	0.40		
<i><math>\rho = .90</math></i>	0.60	[-0.11, 1.31]	0.40		
<i>Charges/filings/petitions</i>	-0.48	--	--	9	4
No Winsorized outliers	-0.49	--	--		
<i><math>\rho = .10</math></i>	-0.51	--	--		
<i><math>\rho = .90</math></i>	-0.47	--	--		
<i>Convictions/adjudications</i>	-0.12	--	--	7	3
No Winsorized outliers	-0.12	--	--		
<i><math>\rho = .10</math></i>	-0.12	--	--		
<i><math>\rho = .90</math></i>	-0.12	--	--		

	<i>Mean Effect Size</i>	<i>95% CI</i>	$\tau^2$	<i>n<sub>es</sub></i>	<i>n<sub>k</sub></i>
<i>Offenses</i>	0.11	--	--	33	4
No Winsorized outliers	0.11	--	--		
$\rho = .10$	0.11	--	--		
$\rho = .90$	0.11	--	--		
<b><i>Drug use (all), during program</i></b>	-0.27	[-0.70, 0.15]	0.10	34	9
No Winsorized outliers	-0.46	[-1.17, 0.25]	0.50		
$\rho = .10$	-0.27	[-0.70, 0.15]	0.10		
$\rho = .90$	-0.27	[-0.70, 0.15]	0.10		
<b>JDTC Graduation Rates (<i>p</i>)</b>					
<b><i>Graduation rate</i></b>	0.55 *	[0.50, 0.59]	0.30	68	50
No Winsorized outliers	0.55 *	[0.50, 0.59]	0.30		
$\rho = .10$	0.43 *	[0.33, 0.54]	0.30		
$\rho = .90$	0.55 *	[0.50, 0.59]	0.30		
<b>JDTC Graduate vs. Dropout Effects on Recidivism (<i>LOR</i>)</b>					
<b><i>Recidivism at first follow-up</i></b>	1.04 *	[0.72, 1.35]	0.13	15	15
No Winsorized outliers	1.04 *	[0.72, 1.35]	0.13		
$\rho = .10$	1.04 *	[0.69, 1.39]	0.13		
$\rho = .90$	1.04 *	[0.69, 1.39]	0.13		

Notes:  $\rho$  = assumed within-study correlation of dependent effect sizes. LOR = log odds ratio. All LOR effect sizes coded so that values  $> 0$  indicate a beneficial JDTC effect or JDTC graduate effect.

\*  $p < .05$ .