

# Juvenile drug court effects on recidivism and drug use: a systematic review and meta-analysis

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## Abstract

*Objectives* To conduct a meta-analysis of the effects of juvenile drug courts on general recidivism, drug recidivism, and drug use, and to explore variability in effects across characteristics of the drug courts and juvenile participants.

*Methods* We conducted a comprehensive literature search to identify randomized and controlled quasi-experimental studies that reported the effects of juvenile drug courts in the United States. Random-effects meta-analysis models were used to estimate mean odds ratio effect sizes, and meta-regression models were used to explore variability in effects.

*Results* The literature search yielded 46 eligible evaluation studies. The meta-analysis found that, overall, juvenile drug courts were no more or less effective than traditional court processing, with mean effects sizes that were not statistically significant for general recidivism, drug recidivism, or drug use. There was statistically significant heterogeneity in those effect sizes, but none of the drug court or participant characteristics coded from the study reports were associated with that variability. However, the juvenile drug court evaluations were generally of poor methodological quality, with very few studies employing random assignment and many instances of substantial baseline differences between drug court and comparison groups.

*Conclusions* Juvenile drug courts were not found to be categorically more or less effective than traditional court processing for reducing recidivism or drug use. The great variability in effects, nonetheless, suggests that there may be effective drug courts, but no distinctive characteristics of the more effective courts could be identified from

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the descriptive information provided in the generally low quality research studies currently available.

**Keywords** Drug courts · Juveniles · Meta-analysis · Recidivism · Substance use

## Introduction

Many youth involved in the juvenile justice system suffer from alcohol or drug use problems (McClelland et al. 2004; Robertson et al. 2004; Teplin et al. 2005). Given that substance use problems are highly correlated with criminal recidivism (e.g., van der Put et al. 2014), rehabilitative efforts aimed at reducing recidivism among youth may also need to address these concurrent drug use issues. Juvenile drug courts are specialized dockets designed for juvenile offenders with alcohol or other drug problems. Drug court programs aim to reduce criminal recidivism among drug-involved offenders by addressing substance use and abuse, and typically involve risk assessments, periodic interaction with judges, monitoring and supervision, incentives and sanctions, and referral to counseling and treatment services (Belenko and Dembo 2003). Although the therapeutic model of the juvenile drug court is similar to traditional juvenile courts' rehabilitative mission, juvenile courts have historically shifted between these therapeutic models and more crime-control, punishment-oriented models (Feld 1988; Greenwood and Turner 2011; Lipsey et al. 2010).

The first drug court program opened in 1989 in Miami-Dade County, Florida, and by 2014, there were an estimated 2966 drug courts in the United States, 433 of which were juvenile drug courts (National Drug Court Resource Center [NDCRC] 2015). Despite this proliferation, prior reviews of research suggest that, although adult drug courts are effective in reducing recidivism (Mitchell et al. 2012a, b), juvenile drug courts may have only modest, if any, effects on recidivism (Latessa and Reitler 2015; Latimer et al. 2006; Mitchell et al. 2012a; Shaffer 2006; Stein et al. 2015). However, these reviews have not fully explored whether and how various characteristics of juvenile drug court programs may be associated with program effects. The current systematic review and meta-analysis, therefore, aimed to provide a comprehensive synthesis of the juvenile drug court effectiveness research, with particular emphasis on examining variability in effects across programs.

## Juvenile drug court model

Compared to the punitive, adjudication-focused approaches common in traditional criminal courts, drug courts take a rehabilitative problem-solving approach to dealing with crime and substance use (Butts and Roman 2004a, b; Inciardi et al. 1996). Juvenile drug courts use a therapeutic jurisprudence model aimed at reducing recidivism and rehabilitating juvenile offenders with substance use problems. This integrated treatment and justice model recognizes that juvenile offenders with substance use problems face unique challenges and treatment needs (Belenko and Dembo 2003). Services include frequent judicial hearings in court where judges review juveniles' progress, working with program staff and/or families to develop individualized treatment and rehabilitation plans, and providing incentives and sanctions based on juvenile behavior. The

incentives and sanctions in a juvenile drug court are based on results from frequent drug tests, rewarding abstinence from drugs and punishing youth who use substances. In addition to this periodic judicial monitoring, youth are referred to substance use treatment services in the community. Juvenile drug court programs often last for 12 to 18 months, but can vary considerably in length given that program graduation often requires sustained abstinence from drugs and compliance with program requirements.

In 2003, the National Drug Court Institute (NDCI) and National Council of Juvenile and Family Court Judges (NCJFCJ) convened a workgroup of experts that outlined 16 strategies and recommendations for juvenile drug court implementation (U.S. Bureau of Justice Assistance 2003). These 16 strategies (see Table 1) were not intended to be research-based benchmarks, but, nonetheless, provide a useful framework for understanding some of the key issues in the implementation and operation of juvenile drug courts.

### Prior reviews of juvenile drug court research

Several prior research reviews have arrived at different conclusions about the effectiveness of juvenile drug courts. For instance, whereas some narrative literature reviews have concluded that there is limited evidence of effectiveness (Belenko 2001; Roman and DeStafano 2004), others report that the research does demonstrate that drug courts might be effective (Henggeler 2007; van Wormer and Lutze 2011). Similarly, the conclusions from meta-analyses have been mixed. The largest meta-analysis to date, Mitchell et al. (2012a), synthesized findings from 34 juvenile drug court evaluations current through 2010. They found that juvenile drug courts were associated with significantly lower general recidivism, but found no evidence of an effect on drug recidivism or drug use. However, in a more recent meta-analysis of 31 juvenile drug

**Table 1** The “16 Strategies” for juvenile drug courts (U.S. Bureau of Justice Assistance 2003)

1. Collaborative planning that engages all stakeholders in a coordinated systemic approach
2. Teamwork conducted in an interdisciplinary and non-adversarial way
3. Clearly defined target population and eligibility criteria aligned with the program’s goals and objectives
4. Frequent judicial involvement and supervision
5. Monitoring and evaluation system to assess program impact
6. Partnerships with community organizations
7. Comprehensive treatment planning tailored to the unique needs of youth
8. Developmentally appropriate services tailored to the unique needs of youth
9. Gender-appropriate services
10. Cultural competence in policies, procedures, and personnel training
11. Focus on strengths of youth and their families
12. Family engagement throughout the program
13. Educational linkages tailored to the unique needs of youth
14. Frequent, random, and observed drug testing
15. Goal-oriented incentives and sanctions
16. Confidentiality policies and procedures that guard the privacy of youth

court evaluations current through 2012, Stein et al. (2015) reported a statistically significant but small reduction in post-program recidivism. Older meta-analyses based on smaller numbers of studies have also reported either small beneficial effects (Shaffer 2006) or no significant effects on recidivism (Latimer et al. 2006; Utah Criminal Justice Center 2012).

These prior meta-analyses are not up-to-date with the most current research, however, and, thus, do not include evidence from recent evaluations (e.g., Latessa et al. 2013). Furthermore, these prior meta-analyses did not thoroughly investigate variability in the effects of juvenile drug courts, nor focus on how courts' adoption of the 16 strategies (Table 1) might be associated with program effects.

## Objectives

This meta-analysis sought to quantitatively synthesize findings from the evidence base of juvenile drug court research, including more recent studies, with particular emphasis on examining variability in effectiveness. Specifically, this meta-analysis examined: (1) the effects of juvenile drug courts on general recidivism, (2) the effects of juvenile drug courts on drug-related recidivism, (3) the effects of juvenile drug courts on drug use, and (4) variability in these effects across participant and drug court characteristics.

## Methods

### Inclusion and exclusion criteria

The population of eligible studies for this meta-analysis was experimental and controlled quasi-experimental evaluations of juvenile drug courts. To be eligible for inclusion, studies had to (1) evaluate a drug court program, defined as a specialized court designed to handle drug-involved cases that involves referring youth to treatment services, conducting regular drug screens, and involvement of a judge who actively monitors progress and sanctions prohibited behaviors; (2) include a comparison condition that was treated in the traditional fashion by the court system (e.g., probation with or without referral to treatment services); (3) measure criminal behavior (such as arrest or conviction) at least once after the start of the program; (4) report findings on a study sample of youth aged 18 years or under; (5) be published during or after 1989; (6) be conducted in the United States or Canada; and (7) use an appropriate research design.

Appropriate research designs included those where youth were randomly assigned to conditions, quasi-experiments that matched participants on at least one baseline measure of criminal offending or substance use, quasi-experiments that used statistical controls to adjust for baseline differences in participants' offending or substance use, and quasi-experiments that provided enough information to permit calculation of effect sizes indexing baseline differences in participants' offending or substance use. We excluded studies that compared one drug court program to another of similar intensity (i.e., treatment–treatment comparisons or dose–response evaluations). There were no other restrictions on eligibility.

## Search strategy

A comprehensive search strategy was used to identify studies that met the aforementioned inclusion criteria. We included all studies reviewed in the most recent meta-analysis on juvenile drug court effectiveness (Mitchell et al. 2012a), which included literature between 1989 and August 2011. The Mitchell et al. (2012a) meta-analysis used the same eligibility criteria described above and used a comprehensive systematic literature search to identify studies; therefore, we used the reference list from this meta-analysis to identify literature between 1989 and August 2011. We then conducted our own literature search, designed to extend and update the body of research compiled by Mitchell et al. (2012a). This literature search was used to identify studies reported between August 2011 and December 2014. The following electronic databases were searched using the ProQuest platform: ERIC, International Bibliography of the Social Sciences, ProQuest Criminal Justice, ProQuest Education, ProQuest Family Health, ProQuest Health & Medical Complete, ProQuest Health Management, ProQuest Nursing & Allied Health, ProQuest Psychology, ProQuest Science, ProQuest Social Science, ProQuest Sociology, ProQuest Dissertations & Theses (US, UK, & Ireland), PsycARTICLES, PsycINFO, and Sociological Abstracts. We also conducted extensive supplementary searches of the following research registers and websites: Campbell Collaboration Library, Cochrane Collaboration Library, CrimeSolutions.gov, International Clinical Trials Registry, National Criminal Justice Reference Service, Center for Court Innovation, Chestnut Health Systems, Drug Court Clearinghouse, National Drug Court Institute, National Council of Juvenile and Family Court Judges, NPC Research, RAND Drug Policy Research Center, Reclaiming Futures, and the Urban Institute. We checked the bibliographies of all screened and eligible studies, as well as the bibliographies of prior narrative reviews and meta-analyses. We also conducted hand-searches of 2010–2014 conference proceedings from the American Society of Criminology, as well as manuscripts published in *Drug Court Review* and *Juvenile and Family Court Journal*.

## Screening and coding procedures

Under the supervision of the first author, a team of master's level research assistants conducted all eligibility screening and coding. First, all abstracts and titles were screened independently by two researchers; we retrieved the full text for any report deemed potentially eligible by at least one researcher. Next, all retrieved full-text reports were screened for eligibility independently by two researchers; the first author resolved any disagreements about eligibility. Finally, studies deemed eligible for inclusion were independently coded by two researchers and the first author resolved any coding disagreements. All data extraction followed a standardized coding protocol, with data entered directly into a FileMaker Pro database. The coding protocol was an abbreviated version of the one used in the Mitchell et al. (2012a) meta-analysis and provided detailed instructions for extracting data related to general study characteristics, participant groups, the drug court conditions, outcome measures, and statistical data needed for effect size calculations (coding protocol available upon request). Data collection and extraction was completed for all eligible studies, including those identified from the Mitchell et al. (2012a) meta-analysis, as well as the updated literature search.

## Statistical procedures

### *Effect size metric*

Most of the eligible studies reported binary measures for recidivism and substance use, so we used an odds ratio (OR) effect size to index the reported effects. Odds ratios were coded such that values greater than 1 indicated beneficial drug court effects relative to the comparison condition (e.g., lower recidivism, lower substance use). All analyses were conducted using the log odds ratio, with results translated back into the odds ratio metric for ease of interpretability. For the handful of studies that measured outcomes on a continuous scale (e.g., mean number of new arrests), we first computed the small-sample corrected standardized mean difference effect size (Hedges' *g*, 1981), then used the Cox transformation to convert those to odds ratio effect sizes (Sánchez-Meca et al. 2003). We examined the distribution of effect sizes and sample sizes for outliers, but no outliers were identified.

### *Moderator variables*

We coded a wide range of moderator variables from the study reports that described general study, method, drug court setting, and participant characteristics. General study and method characteristics included publication type (journal article vs. other), publication year, country, study design (randomized experiment vs. quasi-experiment), possible implementation problems (yes, no/unclear), and overlap between the period within which outcomes were assessed and the drug court treatment period (complete, partial, or no overlap). Defining this overlap period was complicated given that many youth may have received supplementary or ongoing services after the formal completion of the drug court; for our purposes, we simply defined overlap with the formal drug court treatment period (and did not consider overlap due to any ongoing or supplementary services).

Characteristics of the drug courts included year first opened, number of youth served per year, number of youth served in the most recent year, number of drug court phases, number of drug tests per week in the first phase, number of status hearings per month in the first phase, length of drug court (in months), method of disposition (pre-plea, post-plea, both), whether charges were dismissed upon graduation, whether violent offenders were excluded from participation, whether drug offenses were required for eligibility, explicit mention of dedicated drug court staff, provision of a written document of contingencies, explicit mention of a standardized risk assessment tool, referral of youth to brand-name substance use treatment providers, number of treatment providers used for referrals (single, multiple), number of substance use treatment modalities referred to (single, multiple), and whether psychiatric comorbidities were addressed in the treatment. We also coded whether the drug court adhered to the 16 strategies, assessing whether each strategy was explicitly mentioned in the program description, implied by the description of the program, explicitly not used based on the program description, or not mentioned/implied.

Finally, characteristics of the 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 prior arrests, and average number of prior drug arrests.

### *Missing data*

When primary studies failed to include sufficient statistical information to estimate effect sizes, we contacted the study authors for that information. We did not impute missing effect sizes on any outcome variables but, rather, omitted them from any analysis involving those outcomes. Some studies also failed to provide information on key characteristics of the study methods, drug court programs, or outcome characteristics. We did not impute missing data on any of these other study characteristics; rather, we only present descriptive information for those studies with available data.

### *Analytic strategies*

All analyses were weighted using random-effects inverse variance weights to ensure that each effect size's contribution was proportionate to its statistical precision (Hedges and Olkin 1985; Lipsey and Wilson 2001). Only one effect size per participant sample was included in any given meta-analysis to ensure the statistical independence of the effect size estimates in each analysis. Several studies included two or more measures of recidivism, or measured outcomes at multiple follow-up points. To ensure the statistical independence of effect sizes within any given analysis, we conducted separate analyses by outcome type (general recidivism, drug recidivism, drug use) and follow-up period (during-program, post-program). For studies that reported multiple post-program effects for a given outcome, we first selected effects measured at the most frequently reported follow-up point (12–18 months for general recidivism; 6–12 months for drug recidivism), and when those were not available, we selected the first available follow-up point for that study.<sup>1</sup> If more than one effect size was reported within each of these categories, we used a set of decision rules to select the effect size to be used in the analysis. Namely, preference was given to effect sizes that were (1) general (i.e., covered all types of offenses as opposed to a specific offense type), (2) based on arrests, (3) dichotomous, (4) measured at the latest time point during a follow-up period, and (5) adjusted for other confounding characteristics (e.g., past arrest history, demographics).

Random-effects meta-analyses using the restricted maximum likelihood estimator for the random-effects variance component were used to estimate the mean effects for each outcome type at each follow-up period. Mixed-effects meta-regression models were then used to investigate variability in effects in relation to the moderator variables. We also used contour-enhanced funnel plots (Peters et al. 2008) to explore the possibility of bias resulting from the omission of small sample size studies with null or negative findings due to selective publication, reporting, or other forms of dissemination biases. None of the funnel plots (available upon request) indicated asymmetry, thus providing no indication of potential small-study bias.

<sup>1</sup> ESM 2 presents results from meta-analyses estimated separately for specific post-program follow-up periods: 0–5.9 months, 6–11.9 months, 12–17.9 months, 18–23.9 months, and 24–35.9 months. To examine whether recidivism effects varied over follow-up periods, we estimated meta-regression models with robust variance estimates, including all effect sizes at all follow-up points, split by recidivism type. The results from these models provided no evidence that recidivism effects varied across follow-up periods (general recidivism  $b = 0.01$ , 95 % CI [-0.02, 0.03]; drug recidivism  $b = -0.01$ , 95 % CI [-0.10, 0.08]). We, therefore, elected to present the main findings using the general during-program and post-program periods, given that there was no evidence that effects varied significantly across shorter or longer post-program follow-up periods.

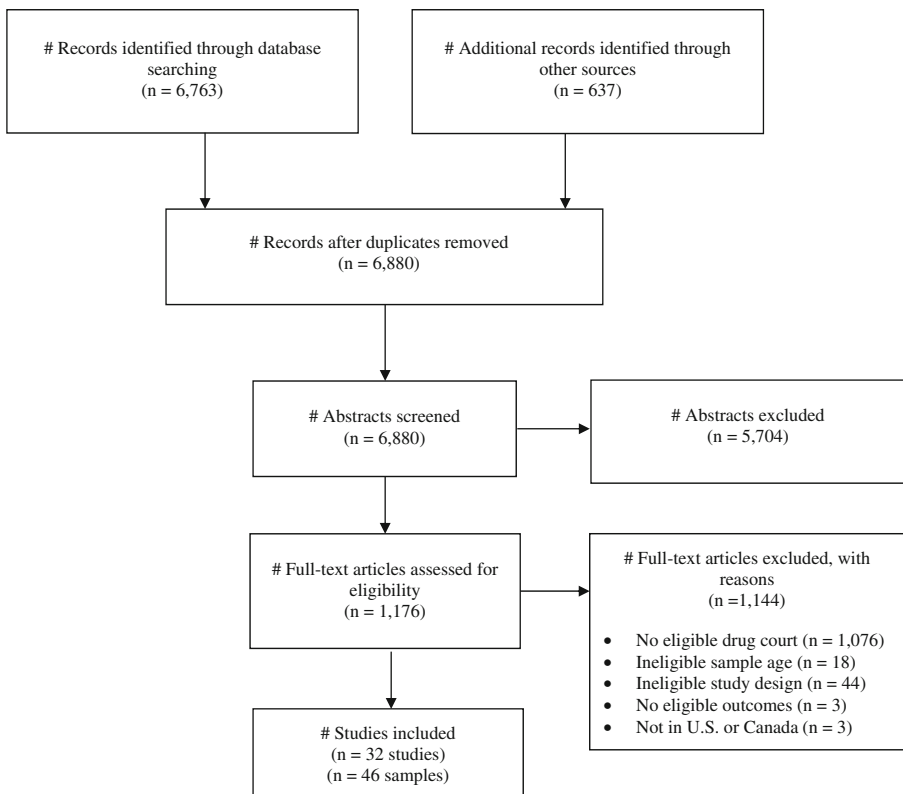
## Results

### Literature search

We identified 7400 candidate reports in the updated literature search (6763 through database searching; 637 through other sources); 520 were duplicates that were dropped from consideration and 5704 were screened as ineligible at the abstract level (see Fig. 1). Of the 1176 articles retrieved in full text, 1144 were deemed ineligible. The final meta-analysis includes findings from 32 studies; these 32 studies reported findings for 46 independent samples comprised of 8738 juveniles (ESM 1 includes references to all the studies included in the meta-analysis).

### Description of included studies

Table 2 provides a brief summary of the 46 study samples included in the meta-analysis, and the left panel of Table 3 presents descriptive statistics for the key features of the studies, outcomes, and participants in those 46 samples. Most of the studies (89 %) were published in journal articles and all (100 %) were conducted in the United States. The methodological quality of the studies was generally poor—only three studies (7 %) randomly assigned participants to conditions, the average overall attrition



**Fig. 1** Study identification flow diagram



**Table 2** Characteristics of the 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 youth 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 was no information about the type of treatment and services received by comparison group youth.
Brown and 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 to 18 months.	A historical comparison group was selected from a pool of juveniles who met eligibility criteria for the drug court. There was no information about the type of treatment and services received by comparison group youth.
Byrnes and 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 of 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.

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
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 was 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 years, 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 attainment 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 was 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.

**Table 2** (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
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 participants, 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 were 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 were 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	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 were matched on

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Ferguson et al. (2006)	Portland, ME	<p>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.</p> <p>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.</p>	<p>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.</p> <p>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 were 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.</p>
Ferguson et al. (2006)	West Bath, ME	<p>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.</p>	<p>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 were 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.</p>
Guerin (2001)	Second District, NM	<p>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.</p>	<p>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.</p>
Guerin (2001)	Thirteenth District, Sandoval County, NM	<p>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.</p>	<p>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.</p>

**Table 2** (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Hartmann et al. (2003)	Kalamazoo County, MI	<p>The Kalamazoo County Juvenile Drug Treatment Court Program was designed for juvenile offenders aged 13–17 years. 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.</p>	<p>The 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 was no other information about services received.</p>
Henggeler et al. (2006)	Charleston County, SC	<p>The Charleston County Juvenile Drug Court program was designed for juveniles aged 12–17 years 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.</p>	<p>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 court 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.</p>
Herz et al. (2003)	Douglas County, NE	<p>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</p>	<p>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</p>

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Herz et al. (2003)	Lancaster County, NE	<p>use of sanctions and incentives. The length of the program was not reported.</p> <p>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.</p>	<p>court services such as probation or placement at the Office of Juvenile Services or Youth Rehabilitation Center.</p> <p>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.</p>
Herz et al. (2003)	Sapry County, NE	<p>The Sapry 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.</p>	<p>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.</p>
Hickert et al. (2011)	Utah Counties, UT	<p>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 7 months, with a majority of programs varying from 6 to 12 months.</p>	<p>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.</p>
Kralstein (2008)	Suffolk County, NY	<p>The Suffolk County Juvenile Treatment Court was designed for non-violent juveniles referred for delinquency, persons in need of supervision, or family offenses, 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</p>	<p>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 was provided about treatment and services received by comparison youth.</p>

**Table 2** (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Latessa et al. (2002)	Belmont, Summit, Montgomery Counties, OH	<p>complete the program was 17.4 months and required 12 months of clean urine screens.</p> <p>The Ohio Juvenile Drug Court was designed for non-violent juvenile offenders aged 13–18 years. 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.</p>	<p>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 reasons (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.</p>
Latessa et al. (2013)	Ada County, ID	<p>The Ada County Juvenile Drug Court was designed for juvenile offenders aged 14–18 years 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.</p>	<p>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 was provided about treatment and services received by this sample.</p>
Latessa et al. (2013)	Clackamas County, OR	<p>The Clackamas County Juvenile Drug Court was designed for juvenile offenders aged 14–18 years 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 to 8 months.</p>	<p>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 was provided about treatment and services received by this sample.</p>
Latessa et al. (2013)	Jefferson County, OH	<p>The Jefferson County Juvenile Drug Court was designed for juvenile offenders aged 14–18 years 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</p>	<p>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 was provided about treatment and services received by this sample.</p>

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Latessa et al. (2013)	Lane County, OR	<p>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.</p> <p>The Lane County Juvenile Drug Court was designed for juvenile offenders aged 13–17 years 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.</p>	<p>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 was provided about treatment and services received by this sample.</p>
Latessa et al. (2013)	Lucas County, OH	<p>The Lucas County Juvenile Drug Court was designed for juvenile offenders aged 14–17.5 years 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.</p>	<p>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 was provided about treatment and services received by this sample.</p>
Latessa et al. (2013)	Medina County, OH	<p>The Medina County Juvenile Drug Court was designed for juvenile offenders aged 13–18 years who were 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</p>	<p>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 was provided about treatment and services received by this sample.</p>



**Table 2** (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Latessa et al. (2013)	Rhode Island County, RI	<p>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.</p> <p>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. The 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.</p>	<p>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 was provided about treatment and services received by this sample.</p>
Latessa et al. (2013)	San Diego County, CA	<p>The San Diego County Juvenile Drug Court was designed for juveniles aged 13–17.5 years 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.</p>	<p>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 was provided about treatment and services received by this sample.</p>
Latessa et al. (2013)	Santa Clara County, CA	<p>The Santa Clara County Juvenile Drug Court was designed for juvenile offenders under the age of 18 years 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 the probation officer, and attendance at court</p>	<p>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 was provided about treatment and services received by this sample.</p>

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
LeGrice (2003)	Tarrant County, TX	<p>hearings. The minimum length of the program was 6 months, with participants taking an average of 12 months.</p> <p>The Tarrant County Juvenile Drug Court Program was designed for juveniles aged 10–17 years 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.</p>	<p>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 6 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.</p>
Mackin et al. (2010)	Anne Arundel County, MD	<p>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 5 months, although most juveniles remained in the program for 10 months. Participants must have completed all program requirements and attained 60 days of being clean in order to graduate.</p>	<p>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 was provided about the treatment they received.</p>
Mackin et al. (2010)	Baltimore County, MD	<p>The Baltimore County Juvenile Drug Court was designed for juvenile offenders aged 13–17 years 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</p>	<p>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 was provided about treatment or services they received.</p>

**Table 2** (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Mackin et al. (2010)	St. Mary's County, MD	<p>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.</p> <p>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.</p>	<p>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 the 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 was provided about treatment or services they received.</p>
O'Connell et al. (1999)	Delaware Counties, DE	<p>The Delaware Juvenile Drug Court program was created as a diversion program for non-violent, non-probationary, substance-abusing juvenile (aged 11–19 years) 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.</p>	<p>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 was no information about the treatment the comparison sample received.</p>

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
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 was provided about the treatment they received.
Parsons and Bymes (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 and Kralstein (2012)	Nassau County, NY	The Nassau Juvenile Treatment Court was designed for youth aged 13–17 years 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 youths with the nearest neighbor propensity scores. No information was 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 was provided about the treatment they received.

**Table 2** (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Rodriguez and Webb (2004)	Maricopa County, AZ	The Maricopa County Juvenile Drug Court was designed for youth, aged 13–16.5 years, 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 was 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). The 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.
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 years. 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 years, 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 and 9 months to complete. The Northeast Central Court had four phases and took 7–10 months for juveniles to complete. Both court	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 was provided about the services these juveniles received.

Table 2 (continued)

Study authors	Drug court location(s)	Drug court description	Comparison condition(s)
Wright and Clymer (2001)	Beckham County, OK	<p>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.</p> <p>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.</p>	<p>The Beckham County Graduated Sanction's program was used as the comparison group. The Graduated Sanctions program was similar to the drug court in terms of 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.</p>

**Table 3** Key features of the study methods and participants, and bivariate associations with effect sizes

	Descriptive statistics for all studies		Bivariate associations with effect sizes				
	<i>N</i> (%)	Mean (SD)	Range	General recidivism (during program), <i>k</i> = 11	General recidivism (post-program), <i>k</i> = 41	Drug recidivism (post-program), <i>k</i> = 12	Drug use (during program), <i>k</i> = 8
<b>Study methods and quality</b>							
Randomized experiment	3 (7)			0.19	-0.14	ne	0.58
Quasi-experiment	43 (93)			-0.19	0.14	ne	-0.58
Overall attrition <sup>a</sup>		0.18 (0.24)	0-0.91	0.10	0.05	-0.30	0.63
Differential attrition <sup>a</sup>		0.06 (0.10)	0-0.5	-0.09	0.17	-0.10	0.06
Possible implementation problems	14 (30)			0.06	-0.33*	-0.27	0.80
Baseline differences in age ( <i>g</i> )		0.00 (0.24)	-0.50-0.89	0.56	-0.40	-1.06	-0.32
Baseline differences in risk level ( <i>g</i> )		1.58 (1.64)	0.21-12.07	-0.47	-0.13	-1.11	0.29
Baseline differences in race (OR)		1.72 (1.18)	0.01-3.94	0.26	0.24	0.15	0.63
Baseline differences in sex (OR)		4.33 (21.60)	0.42-145.16	-0.19	0.00	0.29	-0.38
<b>Participant characteristics</b>							
Percent male		0.79 (0.09)	0.56-1.00	0.20	0.12	0.35	-0.07
Percent Black		0.20 (0.24)	0.00-0.97	0.30	-0.01	0.40	0.24
Percent Hispanic		0.21 (0.26)	0.00-0.80	0.31	-0.06	0.59	0.81
Percent White		0.67 (0.27)	0.02-1.00	-0.32	0.09	-0.45	-0.17
Average age (years)		15.93 (0.59)	14.6-17.1	-0.17	-0.15	-0.10	0.15
Average number of prior arrests (any)		4.95 (3.67)	1.22-14.6	ne	0.43	ne	ne
Average number of prior drug arrests		1.21 (0.53)	0.64-2.2	ne	-0.11	ne	ne

Means and standard deviations shown for continuous measures; frequencies and percentages shown for dichotomous measures. Standardized meta-regression coefficients shown for bivariate associations. None of the bivariate regression coefficients with *p* < 0.05 remained statistically significant after applying the Benjamini-Hochberg correction for multiple comparisons

<sup>a</sup> Estimates calculated at effect size level (*n* = 105)

ne = not estimable

\**p* < 0.05

rate was 0.18 (standard deviation (SD)=0.24) and the average differential attrition between drug court and comparison groups was 0.06 (SD=0.09). Although the drug court and comparison groups in the studies were matched well in terms of age, on average, groups were non-equivalent in terms of risk level, racial composition, and sex composition. All baseline difference effect sizes were coded such that positive values ( $g > 0$ ,  $OR > 1$ ) indicated the participants in the juvenile drug courts were at lower risk of recidivism. Thus, as shown in Table 3, compared to participants in the comparison conditions, the juvenile drug court participants tended to be at significantly lower risk, more likely to be White, and more likely to be female. This suggests that many of these studies may suffer from a selection bias that favors the juvenile drug court.

Most of the effect sizes reported in the studies indexed differences on measures of general recidivism (72 %), and the average maximum length of follow-up was 18.5 months (SD=12.8). The effect sizes reported in studies often involved outcomes measured over intervals that were completely overlapping with the drug court intervention period (17 %) or partially overlapping (43 %); only 39 % of the effect sizes were reported entirely in a post-program period.

The demographic composition of the study samples was predominantly male ( $M=79$  %) and White ( $M=67$  %), with an average age of 15.9 years (SD=0.59). Few studies reported prior arrest history for participants; among those studies, youth in the drug courts had an average of 4.95 prior arrests (SD=3.67;  $k=17$ ) and 1.21 prior drug arrests (SD=0.53;  $k=6$ ) upon entry into the drug court.

The left panel of Table 4 presents descriptive statistics for the key features of the juvenile drug courts. On average, the drug courts served 16.5 youths per year (SD=10.95), involved 3.6 phases (SD=1.57), conducted urinalysis screens around 3.9 times per week in the first phase (SD=3.36), had 2.5 status hearings per month in the first phase (SD=1.38), and lasted 10.4 months (SD=2.61). The method of disposition, and how charges were handled upon graduation, were poorly reported in most studies. Most of the drug courts explicitly excluded violent offenders (67 %) and very few (15 %) required youth to have a drug offense to be eligible for participation. Most studies reported that the drug court had dedicated staff (74 %) and reported using a risk assessment tool (61 %), but few studies (24 %) reported that the court provided youth with written documents explaining the contingencies of the program. Finally, most of the drug courts (80 %) referred youth to multiple substance use treatment providers (e.g., multiple community agencies offering treatment, which may have used different modalities or types of treatment) and most of the drug courts (70 %) referred youth to treatment providers using multiple levels of care (i.e., outpatient, intensive outpatient, inpatient).

Figure 2 shows the drug courts' adherence to each of the 16 juvenile drug court strategies as reported in the studies (rated as explicitly used, implicitly used, explicitly not used, or unclear). The strategies most frequently reported explicitly were monitoring and evaluation (100 %), drug testing (91 %), family engagement (83 %), judicial involvement and supervision (80 %), and goal-oriented incentives and sanctions (78 %). The strategies least frequently reported explicitly in the reports were the use of culturally competent approaches (0 %), developmentally appropriate services (0 %), confidentiality (2 %), and a focus on strengths (9 %) (see also left panel of Table 5).



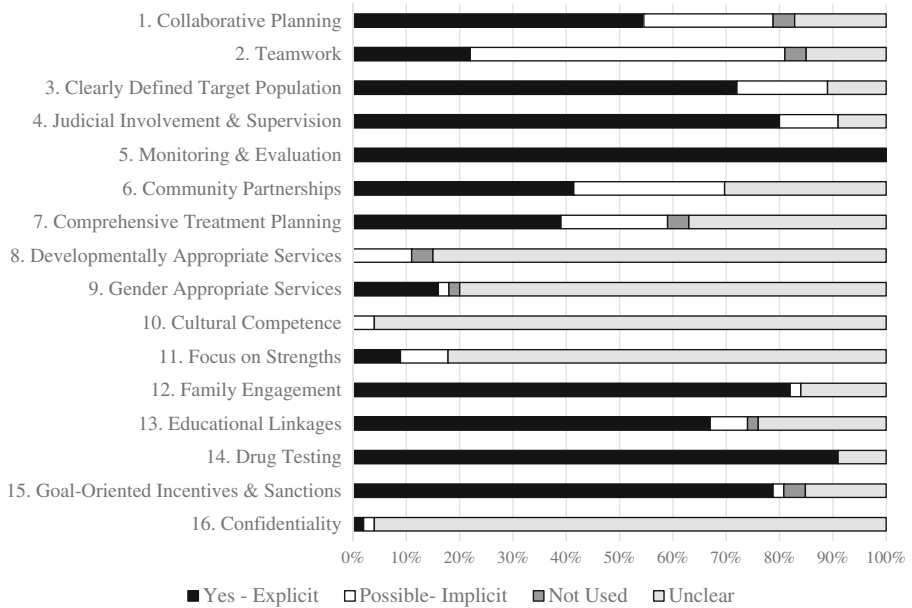
**Table 4** Key features of the juvenile drug courts, and bivariate associations with effect sizes ( $k = 46$ )

	Descriptive statistics for all studies			Bivariate associations with effect sizes			
	<i>N</i> (%)	Mean (SD)	Range	General recidivism (during program), $k = 11$	General recidivism (post-program), $k = 41$	Drug recidivism (post-program), $k = 12$	Drug use (during program), $k = 8$
Year first opened		2000 (2.64)	1995–2008	0.02	0.18	0.24	-0.36
Average number of youth served per year		16.5 (10.95)	1–34	0.34	-0.27	0.11	0.33
Number of youth served in most recent year		3.37 (4.19)	1–16	0.37	0.23	-0.05	0.61
Number of phases		3.57 (1.57)	1–5	-0.22	-0.26	0.28	-0.54
Number of drug tests/week in first phase		3.89 (3.36)	1–11	0.25	-0.23	0.42	0.02
Number of status hearings/month in first phase		2.48 (1.38)	1–4	0.35	-0.22	0.13	0.21
Length of drug court (months)		10.43 (2.61)	6–17.4	-0.12	-0.12	0.27	0.94
Excludes violent offenders	31 (67)			0.28	0.13	-0.11	0.48
Drug offenses required for eligibility	7 (15)			0.12	0.22	0.05	ne
Explicit mention of dedicated drug court staff	34 (74)			-0.05	-0.03	0.47	-0.36
Youth provided written document of contingencies	11 (24)			0.34	0.16	-0.08	ne
Explicit mention of a risk assessment tool	28 (61)			0.30	-0.17	-0.38	0.61*
Refers youth to brand-name treatment services	8 (17)			0.21	0.07	0.46	-0.08
Psychiatric comorbidities addressed in treatment	7 (15)			ne	-0.05	0.00	ne
Multiple treatment providers	38 (73)			-0.19	-0.22	-0.55*	-0.21
Multiple levels of care	10 (22)			-0.15	-0.06	ne	-0.55
Multiple modalities	22 (48)			0.23	-0.07	0.04	-0.08

Means and standard deviations shown for continuous measures; frequencies and percentages shown for dichotomous measures. Standardized meta-regression coefficients shown for bivariate associations. None of the bivariate regression coefficients with  $p < 0.05$  remained statistically significant after applying the Benjamini–Hochberg correction for multiple comparisons. All estimates calculated at the study level

ne = not estimable

\* $p < 0.05$



**Fig. 2** Reporting of adherence to “16 Strategies” for juvenile drug courts

**Overall effects of juvenile drug courts**

We first conducted a series of meta-analyses to estimate the overall effects of juvenile drug courts, with analyses split by outcome type (general recidivism, drug recidivism, drug use) and outcome timing (during program, post-program<sup>2</sup>).

*General recidivism*

Figure 3 shows results from the meta-analysis synthesizing findings from the 11 studies that measured general recidivism during the juvenile drug court program. Although the mean effect size was positive in direction (favoring the juvenile drug court groups), it was not statistically significant, thus indicating that, on average, these juvenile drug courts did not have more beneficial effects on general recidivism during the program than traditional juvenile justice system processing (OR = 1.18, 95 % CI [0.71, 1.98]). However, the heterogeneity across those effect sizes was statistically significant with the individual estimates ranging across a relatively broad range, as is evident in Fig. 3 ( $\tau^2 = 0.29$ ;  $I^2 = 67.4\%$ ;  $Q_{10} = 25.8$ ,  $p = 0.004$ ).<sup>3</sup>

Figure 4 shows results from the meta-analysis synthesizing findings from the 41 studies that measured general recidivism after the juvenile drug court program period. In these 41 studies, the average post-drug court follow-up period was

<sup>2</sup> See ESM 2 for results split by different post-program follow-up periods

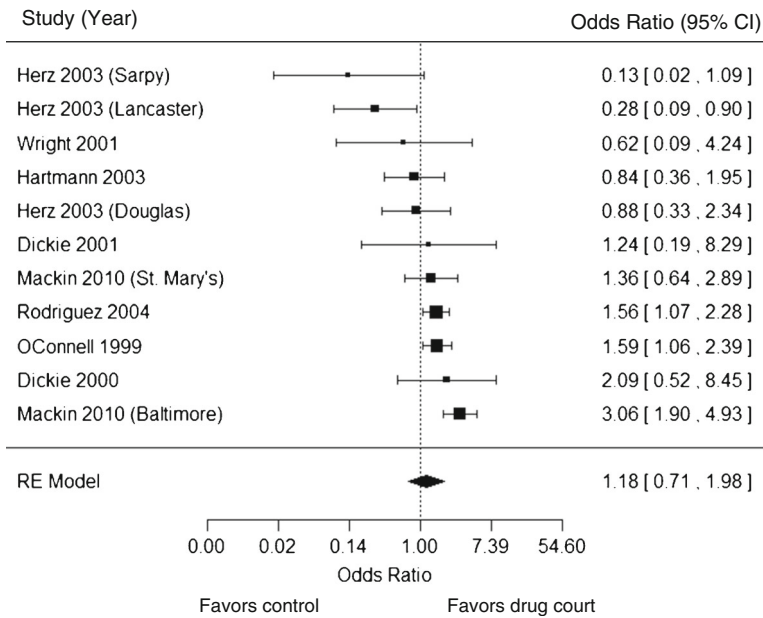
<sup>3</sup> These three statistics are used to index the heterogeneity in the effect size distribution. The  $\tau^2$  statistic, or “between-studies variance component”, provides an estimate of the variance of the effect size distribution around the mean effect size. The  $I^2$  statistic indicates the proportion of observed variability attributable to true heterogeneity, rather than chance. The  $Q$  statistic tests the null hypothesis that the effects are homogeneous and all observed variability is due to chance.

**Table 5** Juvenile drug courts' explicit adherence to "16 Strategies" and bivariate associations with effect sizes ( $k=46$ )

Explicit report of strategy use	Descriptive statistics for all studies					Bivariate associations with effect sizes			
	<i>N</i> (%)	General recidivism (during program), $k=11$	General recidivism (post-program), $k=41$	Drug recidivism ( $k=12$ )	Drug use (during program), $k=8$				
Collaborative planning	25 (54)	0.21	-0.01	0.04	-0.46				
Teamwork	10 (22)	0.21	0.13	-0.06	ne				
Clearly defined target population	33 (72)	0.04	-0.14	0.14	-0.51				
Judicial involvement & supervision	37 (80)	-0.06	-0.34	ne	-0.02				
Monitoring & evaluation	46 (100)	ne	ne	ne	ne				
Community partnerships	19 (41)	0.04	0.20	0.07	-0.51				
Comprehensive treatment planning	18 (39)	-0.52	0.13	-0.42	-0.61				
Developmentally appropriate services	0 (0)	ne	ne	ne	ne				
Gender appropriate services	7 (15)	0.34	0.15	0.32	ne				
Cultural competence	0 (0)	ne	ne	ne	ne				
Focus on strengths	4 (9)	-0.66	-0.09	-0.40	-0.61				
Family engagement	38 (83)	0.14	-0.37	ne	-0.59				
Educational linkages	31 (67)	-0.24	-0.20	0.10	-0.61				
Drug testing	42 (91)	ne	-0.31	ne	ne				
Goal-oriented incentives & sanctions	36 (78)	-0.30	-0.30	-0.32	-0.48				
Confidentiality	1 (2)	ne	-0.02	-0.40	ne				
Count of strategies used explicitly	Mean = 8.52 (SD = 2.99)	-0.27	-0.26	-0.12	-0.56				

Means and standard deviations shown for continuous measures; frequencies and percentages shown for dichotomous measures. Standardized meta-regression coefficients shown for bivariate associations. None of the bivariate regression coefficients with  $p < 0.05$  remained statistically significant after applying the Benjamini-Hochberg correction for multiple comparisons. All estimates calculated at the study level

ne = not estimable  
 \* $p < 0.05$

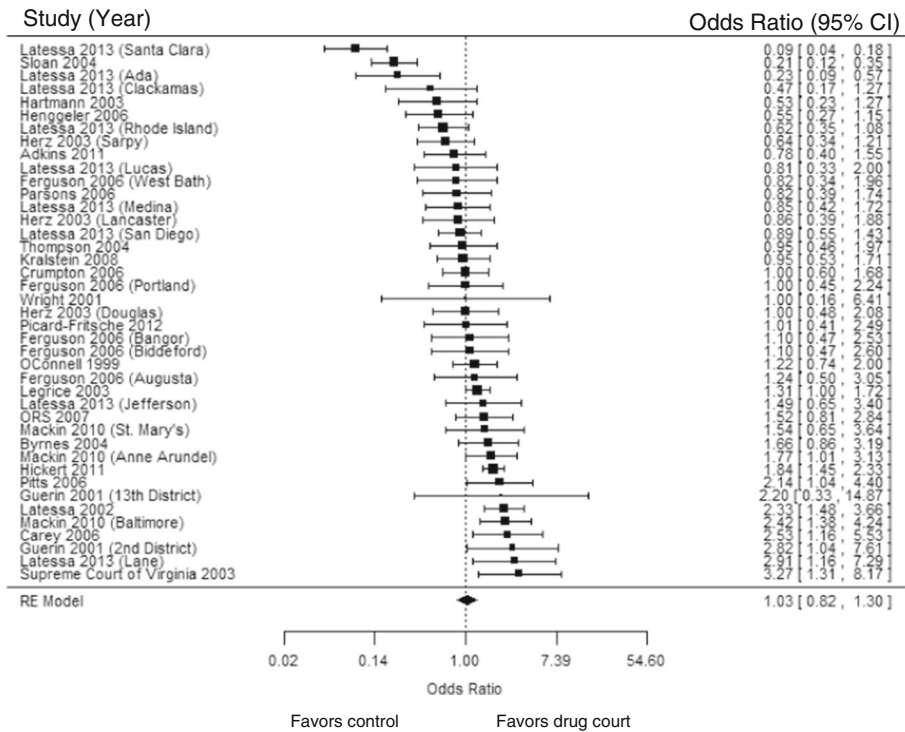


**Fig. 3** Forest plot of general recidivism effect sizes, during program. Notes: Odds ratios and 95 % confidence intervals shown for each included study. All effect sizes coded such that odds ratios greater than 1 indicate a beneficial effect of the drug court (i.e., lower recidivism). The *boxes* represent the proportionate weight of each individual effect size's contribution to the mean effect size (larger boxes indicate larger inverse variance weights). The *diamond* represents the random-effects mean effect size and 95 % confidence interval

14.15 months (SD = 5.59). The mean odds ratio effect size was close to a value of 1, a mean effect that was not statistically significant (OR = 1.03, 95 % CI [0.82, 1.30]). On average, therefore, these drug courts did not reduce the recidivism of the participating juveniles after their involvement with the drug court ended, relative to traditional juvenile justice alternatives. These effect estimates, however, also showed statistically significant heterogeneity ( $\tau^2 = 0.40$ ;  $I^2 = 79.8\%$ ;  $Q_{40} = 187.3$ ,  $p < 0.0001$ ). As Fig. 4 shows, this variability ranged from odds ratios that were individually significant in favor of the comparison group to those individually significant in favor of the drug court group.

*Drug recidivism*

None of the studies included in the meta-analysis provided effect sizes for drug recidivism outcomes during the program period. Figure 5 shows results from the meta-analysis synthesizing findings from the 12 studies that measured drug recidivism after drug court participation. In these 12 studies, the average post-drug court follow-up period was 15.83 months (SD = 10.28). Although the mean effect size was positive in direction (favoring the juvenile drug court groups), and of a size with practical significance, it was not statistically significant (OR = 1.31, 95 % CI [0.78, 2.19]). Here also, the effect estimates showed statistically significant heterogeneity ( $\tau^2 = 0.47$ ;  $I^2 = 86.5\%$ ;  $Q_{11} = 111.4$ ,  $p < 0.0001$ ).



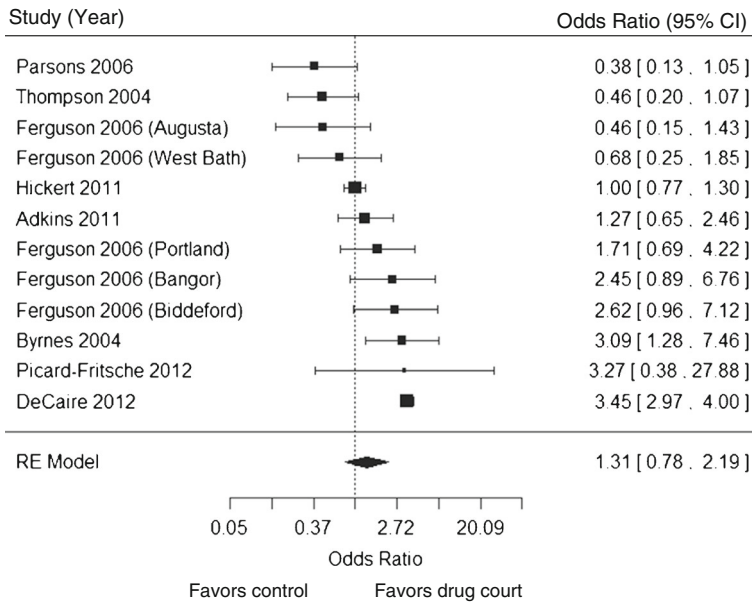
**Fig. 4** Forest plot of general recidivism effect sizes, post-program. Notes: Odds ratios and 95 % confidence intervals shown for each included study. All effect sizes coded such that odds ratios greater than 1 indicate a beneficial effect of the drug court (i.e., lower recidivism). The boxes represent the proportionate weight of each individual effect size's contribution to the mean effect size (larger boxes indicate larger inverse variance weights). The diamond represents the random-effects mean effect size and 95 % confidence interval

*Drug use*

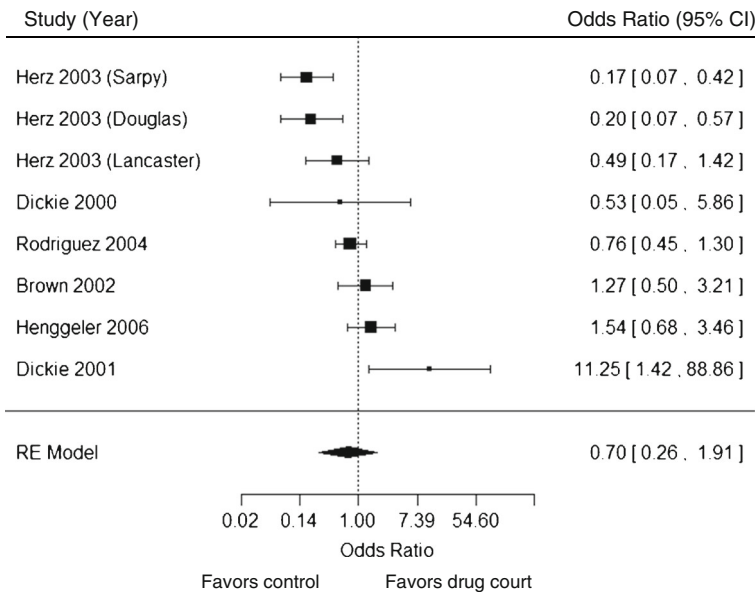
Figure 6 shows results from the meta-analysis synthesizing findings from the eight studies that measured drug use during the juvenile drug court program period. The mean effect size was negative in direction (favoring the comparison groups), but not statistically significant (OR = 0.70, 95 % CI [0.26, 1.91]). And, once again, the individual effect estimates showed statistically significant heterogeneity ( $\tau^2 = 0.92$ ;  $I^2 = 79.4\%$ ;  $Q_7 = 27.7$ ,  $p = 0.0002$ ). None of the studies included in the meta-analysis provided effect sizes for drug use outcomes in the post-program period.

**Exploring the variability in effects**

Despite the discouraging finding of no significant mean effects in any of the relevant outcome domains reported above, the consistently significant heterogeneity statistics indicate that the effects of some of the juvenile drug courts were more positive than others. A particular goal of this synthesis was to examine this variability and explore the extent to which it was associated with identifiable characteristics of the respective drug courts or the juvenile participants whose outcomes were assessed in the available



**Fig. 5** Forest plot of drug recidivism effect sizes, post-program. Notes: Odds ratios and 95 % confidence intervals shown for each included study. All effect sizes coded such that odds ratios greater than 1 indicate a beneficial effect of the drug court (i.e., lower recidivism). The *boxes* represent the proportionate weight of each individual effect size's contribution to the mean effect size (larger boxes indicate larger inverse variance weights). The *diamond* represents the random-effects mean effect size and 95 % confidence interval



**Fig. 6** Forest plot of drug use effect sizes, during program. Notes: Odds ratios and 95 % confidence intervals shown for each included study. All effect sizes coded such that odds ratios greater than 1 indicate a beneficial effect of the drug court (i.e., lower drug use). The *boxes* represent the proportionate weight of each individual effect size's contribution to the mean effect size (larger boxes indicate larger inverse variance weights). The *diamond* represents the random-effects mean effect size and 95 % confidence interval

studies. To explore this variability, we conducted a series of meta-regressions to examine whether various methodological features, juvenile characteristics, or drug court characteristics were associated with the magnitude of the effects on the recidivism and drug use outcomes.

These analyses were conducted separately by outcome type (general recidivism, drug recidivism, drug use) and follow-up timing (during program, post-program). With so few effect sizes available for each outcome, it was not possible to estimate meta-regression models that included covariates to control for any potential confounders. Each meta-regression, thus, examined only the bivariate relationship between a selected moderator variable and the effect sizes for the respective outcome. Given the large number of significance tests used to examine these bivariate relationships, we used a Benjamini–Hochberg (1995) correction for multiple comparisons within each of the four outcome categories to account for potential inflation in estimates of statistical significance. The results from these moderator analyses should be interpreted cautiously, however, given the small number of effect sizes and the omission of covariates in each analysis.

### *Study methods and quality*

We first examined whether the various methodological features of the studies were associated with the observed effects on recidivism and drug use outcomes. If so, those methodological features might be confounded with some of the substantive features of interest and, as such, would require special attention in the analysis. The right panel in Table 3 shows standardized regression coefficients from a series of bivariate meta-regression models predicting the effect sizes with each of the method quality characteristics in turn.

The results indicated that none of the method quality characteristics were significantly associated with effect size magnitude. For instance, there was no evidence that effects varied for studies using randomized versus quasi-experimental designs (for general recidivism post-program:  $b = -0.63$ , 95 % CI  $[-2.14, 0.87]$ ,  $\beta = -0.14$ ).<sup>4</sup> Given that so few studies ( $k = 3$ ) used randomized designs, we also conducted sensitivity analyses restricting the meta-analyses to studies using either randomized or quasi-experimental designs with individual matching. Restricting the meta-analyses to only include studies using these more rigorous designs yielded substantively similar results to those reported in Figs. 3, 4, 5, and 6 for general recidivism during program (OR = 1.15, 95 % CI [0.53, 2.49]), general recidivism post-program (OR = 1.04, 95 % CI [0.79, 1.36]), drug recidivism post-program (OR = 1.67, 95 % CI [0.89, 3.11]), and drug use during program (OR = 0.64, 95 % CI [0.14, 2.99]). Thus, despite the generally poor quality of the study designs present in this research, restricting the analyses to the more rigorous evaluations available still provided no clear pattern of evidence for the overall effectiveness of juvenile drug courts on recidivism or drug use.

There were also no statistically significant relationships between either overall or differential attrition rates with effect sizes for any of the outcomes. On the other hand, studies with possible implementation problems had significantly smaller effects on

<sup>4</sup>  $b$  = unstandardized meta-regression coefficient;  $\beta$  = standardized meta-regression coefficient equivalent to the bivariate correlations shown in Tables 3 and 4.

post-program general recidivism measures ( $b = -0.51$ , 95 % CI  $[-1.00, -0.02]$ ,  $\beta = -0.33$ ). However, when each group was examined separately, the mean effect size was not significant among the studies reporting implementation problems (OR = 1.21, 95 % CI  $[0.92, 1.59]$ ) or among studies without implementation problems (OR = 0.73, 95 % CI  $[0.48, 1.09]$ ). Further, after applying the Benjamini–Hochberg correction for multiple comparisons, the meta-regression coefficient was no longer statistically significant. Thus, although the body of research synthesized in this meta-analysis suffers from poor methodological quality, there was no clear pattern of evidence that the variations in study quality indexed by these variables were associated with larger or smaller effects.

### *Juvenile characteristics*

The bottom right panel of Table 3 shows standardized regression coefficients from another series of bivariate meta-regression models predicting effect sizes from various characteristics of the juvenile participants represented in the studies providing each outcome. Those regression analyses revealed no statistically significant relationships between the variability in juvenile drug court effects and the age, race, or sex composition of the participating juveniles (none of these effects were significant before or after the Benjamini–Hochberg correction). It is important to note that these demographic variables are at the aggregate study level (e.g., percentage of male participants), so they cannot provide much insight into variability in effects at the individual level (e.g., whether drug courts are more effective for males). It was not possible to reliably estimate the associations between juveniles' average number of prior arrests (any arrest or only drug arrests) on any outcome except general post-program recidivism given the inconsistent reporting of prior arrest histories. For post-program general recidivism, those relationships were not statistically significant.

### *Drug court characteristics*

The right panel of Table 4 shows standardized regression coefficients from bivariate meta-regression models that examined whether the characteristics of the drug courts themselves, including their adherence to the 16 strategies, were associated with effect size magnitude. Drug courts that used multiple treatment providers for youth referrals showed significantly smaller effects on post-program drug recidivism than courts that used a single provider ( $b = -1.18$ , 95 % CI  $[-2.10, -0.27]$ ,  $\beta = -0.55$ ). Also, explicitly reported use of risk assessment tools was significantly related to larger effects on drug use outcomes ( $b = 1.57$ , 95 % CI  $[0.36, 2.79]$ ,  $\beta = 0.61$ ). For that contrast, the mean effect sizes for each of these groups separately were also statistically significant (OR = 1.19, 95 % CI  $[0.56, 2.50]$  with risk assessment; OR = 0.25, 95 % CI  $[0.09, 0.64]$  without risk assessment). However, none of these effects remained statistically significant after applying the Benjamini–Hochberg correction for multiple comparisons.

The right panel of Table 5 shows results from the meta-regression models examining whether each of the 16 recommended juvenile drug court strategies for which use was explicitly reported was associated with effect size magnitude (vs. implicit or not reported). There was no clear pattern of evidence that the explicit use of any of the



16 strategies was associated with the effects of juvenile drug courts on recidivism or drug use outcomes. We conducted additional sensitivity analysis examining whether the explicit/implicit vs. no reporting of each of the strategies were associated with effects; those results were substantively similar and, thus, are not reported here. It is important to note, however, that several of the strategies initially showed significant negative relationships with effects. Namely, during-program general recidivism was higher in courts that explicitly reported using comprehensive treatment planning ( $b = -0.91$ , 95 % CI  $[-1.69, -0.13]$ ,  $\beta = -0.52$ ) and focused on strengths ( $b = -1.29$ , 95 % CI  $[-2.30, -0.28]$ ,  $\beta = -0.66$ ); post-program general recidivism was higher in courts that explicitly reported frequent judicial involvement ( $b = -0.70$ , 95 % CI  $[-1.37, -0.03]$ ,  $\beta = -0.34$ ) and supervision and family engagement ( $b = -0.75$ , 95 % CI  $[-1.44, -0.07]$ ,  $\beta = -0.37$ ); and during program drug use was higher in courts that explicitly reported comprehensive treatment planning ( $b = -1.57$ , 95 % CI  $[-2.79, -0.36]$ ,  $\beta = -0.61$ ), a focus on strengths ( $b = -1.57$ , 95 % CI  $[-2.79, -0.36]$ ,  $\beta = -0.61$ ), and educational linkages ( $b = -1.57$ , 95 % CI  $[-2.79, -0.36]$ ,  $\beta = -0.61$ ). None of these effects remained statistically significant after applying the Benjamini–Hochberg correction however. These results should be interpreted cautiously given the small number of effect sizes in any given analysis, and even smaller subgroup sample sizes across the strategies.

## Discussion

This meta-analysis synthesized findings from 46 controlled evaluation studies to examine the effects of juvenile drug courts on recidivism and drug use. The results showed no clear pattern of evidence indicating that the juvenile drug courts examined, on average, produced greater reductions in general recidivism, drug recidivism, or drug use than did the traditional juvenile court processes with which they were compared. The methodological quality of the included studies was low, however, with few studies using random assignment and many studies with high attrition rates and substantial baseline differences between drug court and comparison participants on prior risk, race, and sex. When the analysis was restricted to studies using more rigorous designs, the results were substantially the same. Thus, the overall conclusion from this meta-analysis is that the currently available research does not support the view that juvenile drug courts are generally more effective at reducing recidivism or drug use than traditional court processing. These findings are consistent with those reported in prior reviews of the juvenile drug court research, which have also concluded that drug courts have small to no effect on juveniles' subsequent recidivism (Latessa and Reitler 2015; Latimer et al. 2006; Mitchell et al. 2012a; Shaffer 2006; Stein et al. 2015).

However, there was substantial and statistically significant variability in the effects of juvenile drug courts on all of the outcomes examined. That variability allows for the possibility that there are some configurations of juvenile drug courts that are effective. This meta-analysis, therefore, also explored the relationship of different features of the juvenile participants and the drug courts themselves to the different outcomes, including adherence to the 16 strategies recommended for juvenile drug courts. The aim of those analyses was to identify the distinctive characteristics of those drug courts that did show better outcomes than their comparison conditions in the respective studies.

However, none of the participant or drug court characteristics that could be coded from the research reports showed a significant relationship with the recidivism or drug use effects reported. These findings are also consistent with those of prior meta-analyses (e.g., Mitchell et al. 2012a). Though there may indeed be certain forms of juvenile drug courts that are effective, the available research does not provide sufficient information to identify their distinctive characteristics so that they might be emulated elsewhere. Future evaluation studies should attempt to provide more extensive information about the nature of the drug courts and their juvenile participants in order to facilitate identification of any features that are reliably associated with better outcomes. Additional research is also needed to examine the potential effects of juvenile drug courts on other important outcomes, such as school engagement, truancy, and general measures of psychosocial adjustment.

Although our moderator analyses failed to identify drug court characteristics capable of differentiating those courts that produced larger or smaller effects, the overall null findings could be due to several factors about which we might speculate. As noted, for instance, the methodological quality of the currently available studies is quite low, so the null findings could simply be due to the poor baseline equivalence of the juveniles served by drug courts and those served by traditional juvenile courts. Large and variable selection bias in those comparisons could mask positive or negative effects and would increase the heterogeneity of the observed effects across studies. We attempted to investigate this possibility by analyzing only higher quality studies, but were limited by the paucity of such studies.

The descriptive data assembled in this meta-analysis suggest another possible explanation for the null findings. The fundamental logic of juvenile drug courts is that they will be more effective than traditional courts in reducing substance use among youth for whom substance use is problematic and that, in turn, will lead to less overall delinquent behavior. However, while the juvenile participants in most of the drug courts represented in this meta-analysis were drug-involved, there was little indication that very many of them would meet criteria for clinical substance use disorders (i.e., abuse or dependence). Adolescence is a period when experimentation with drugs is not unusual. Youth who do not have serious substance use problems may not benefit greatly from enforced treatment, and whatever drug involvement they have may not be strongly linked to other delinquent behaviors.

Moreover, the low levels of substance use disorders among participants could mean that many juveniles are being referred to inappropriate levels of treatment (Butts and Roman 2004b). Ideally drug court staff would create individualized and tailored treatment plans for each juvenile based on their specific risks and needs (Belenko and Dembo 2003), but the research reviewed here provided little indication that this was common practice. Thus, the services these juvenile drug courts offered may be mismatched with clients' actual needs in ways that undermine their effectiveness. Whether such mismatches are a particular problem or not, the results of this meta-analysis raise general questions about the effectiveness of the treatment services used by juvenile drug courts. It is surprising how few of the available studies assessed drug use outcomes and, among those that did, how little indication there was of positive effects on those outcomes. Indeed, the increased monitoring and supervision of drug court participants might explain why juveniles in the drug courts had slightly higher rates of drug use compared to those in traditional court processing with presumably less

intensive supervision. Nevertheless, if juvenile drug courts do not serve juveniles with serious substance use problems and/or do not provide them with effective substance use treatment, there is little reason to expect them to be more effective in reducing drug-related or general recidivism than traditional court processing.

Indeed, it is not apparent from the data compiled in this meta-analysis that the way traditional juvenile courts handle juveniles with drug involvement is very different from the way they are handled in drug courts. The traditional court comparison conditions described in many of the studies included services similar to those provided in the drug courts, such as judicial supervision and referral to community substance use treatment programs (see Table 1). The substantial similarity in this regard reflects an important difference between adult drug courts and juvenile drug courts, a point well made a decade ago by Butts and Roman (2004a).

The most important unresolved issue may be whether the juvenile justice system really needs juvenile drug courts. Adult drug courts were a significant innovation for the criminal justice system. They introduced a problem-solving approach to a system accustomed to fact finding and punishment... But this approach is not exactly revolutionary in the juvenile justice system. In fact, it is standard operating procedure in traditional juvenile courts. Justice experts even refer to [adult] drug courts as 'juvenile courts for adults.' (Butts and Roman 2004a, p. x–xi)

The contrast between juvenile drug court and traditional juvenile court processing thus may be relatively small in many juvenile justice systems. As such, the incremental benefits of handling drug-involved juveniles in specialized drug courts may be as generally negligible as they appear in this meta-analysis, despite the limitations of the research on which those results are based. Indeed, adult drug courts may be effective in reducing recidivism (Mitchell et al. 2012a, b), given that their therapeutic, rehabilitative model is so different from the punitive model used in traditional court processing; whereas, in contrast, most juvenile courts and juvenile drug courts use a therapeutic problem-solving model. An important direction for future research, therefore, is to examine the effects of juvenile drug courts relative to other therapeutic court models, such as mental health courts, which have a similar therapeutic mandate but may address other important comorbid health issues.

Nonetheless, the findings from this review must be interpreted cautiously. Its strengths include the comprehensive literature search used to identify the most current evidence on juvenile drug courts, the relatively large number of studies available for the quantitative synthesis, examination of effects on a range of recidivism and drug use outcomes, and exploration of potential effect size moderators related to the juvenile participants and drug court procedures. The primary limitation for drawing conclusions from this review, however, stems from the low methodological quality of the research evidence that was synthesized. Further, inconsistent reporting of the characteristics of the methods, participants, and court procedures in the available studies hampered our ability to conduct extensive moderator analyses.

While recognizing the shortcomings of the available evidence, the consistency of the overall null results across the outcomes examined and the moderator analyses conducted provides little or no support for the view that juvenile drug courts are generally more effective than traditional juvenile courts for reducing drug use or re-offense rates. The

heterogeneity in the drug court effects leaves open the possibility that there may be particular drug court configurations that are especially effective but, if so, their characteristics cannot be identified from currently available research. The available evidence, therefore, neither shows overall average positive effects of drug courts on any of the relevant outcomes nor offers guidance about what might be effective drug court practice for obtaining such effects. To be most informative under these circumstances, any future research studies should use high quality controlled trials to study drug courts that have well-specified structures, procedures, and treatment protocols.

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### Compliance with ethical standards

**Conflict 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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