



RESEARCH AND
STATISTICS DIVISION

A Meta-Analytic Examination
of Drug Treatment Courts:
Do they Reduce Recidivism?



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*The opinions expressed within are those of the authors
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Abstract

A meta-analysis was conducted to determine if drug treatment courts reduce recidivism compared to traditional justice system responses. After a comprehensive search of both the published and unpublished literature, 54 studies were located and deemed acceptable according to the study inclusion criteria. Since studies oftentimes contained information on more than one program, data from 66 individual drug treatment court programs were aggregated and analyzed. The results indicated that drug treatment courts significantly reduced the recidivism rates of participants by 14% compared to offenders within the control/comparison groups. Several variables identified in the analysis, however, had an impact on the results, including the age of the participants, the length of the program, the follow-up period used to measure recidivism, and other methodological variables (i.e., the use of random assignment and the choice of the comparison group). While there are other issues that were not the subject of this research, such as the cost-effectiveness of DTCs, the results of this meta-analysis provides clear support for the use of drug treatment courts as a method of reducing crime among offenders with substance abuse problems.



1. Introduction

Drug treatment courts (DTCs) aim to reduce crime committed as a result of illicit drug dependency through court-monitored treatment and community service support for offenders with substance abuse problems. Participants are generally referred to DTC programs through a number of sources, such as the courts or Crown prosecutors, and must meet a set of eligibility requirements (e.g., serious drug use, non-violent offences). As part of their treatment, DTC participants typically attend counselling sessions through a structured out-patient program (although some may attend in-patient programs) and are typically subject to random drug tests during the program. Participants must also appear regularly in court, where a judge reviews their progress and often imposes sanctions for negative behaviour (e.g., verbal reprimands, incarceration, expulsion from the program) or provides rewards for positive behaviour (e.g., verbal commendations, reductions in the frequency of court contact). DTC staff in many programs also work with community partners to address participants' other needs, such as safe housing, stable employment and vocational skills training. Once a participant gains stability and demonstrates control over the substance abuse problems, criminal charges may be stayed or, in some cases, the offender may receive a non-custodial sentence. If unsuccessful, an offender will usually be sentenced as part of the regular court process.

The first formal DTC in Canada was established in Toronto in 1998, followed by a second court in Vancouver in 2001. As part of its commitment under Canada's Drug Strategy to expand drug treatment courts in Canada, the federal government announced in 2005 that additional funding would be provided to establish four additional courts in Edmonton, Regina, Winnipeg and Ottawa. In the United States, there are a substantial number of DTCs operating within many states.

Despite the popularity and intuitive appeal of DTCs, it is crucial to fully evaluate the effectiveness of such an approach, particularly as the cost of using the courts as a social control mechanism is relatively high. The main goal of DTCs is to reduce substance use and subsequently reduce criminal behaviour which is committed as a result of the substance abuse. There have been numerous evaluations of individual DTCs, and the results have varied considerably. Fielding, Tye, Ogawa, Imam and Long (2002), for example, reported that participation in a drug treatment court was associated with significant reductions in recidivism compared to participation in the traditional court process, while Meither, Lu and Reese (2000) reported that DTC participation was associated with an increase in recidivism.

Given that there are a relatively high number of drug treatment court evaluations and that the results are difficult to interpret individually, this body of empirical knowledge would need to be aggregated. Summarizing this research through standard narrative approaches (e.g., literature review, annotated bibliography), however, would perhaps not analyze the available data objectively and might lead to inappropriate conclusions. In order to objectively summarize this body of research, a meta-analysis was selected as the most appropriate method.

A meta-analysis can be understood as a statistical analysis of a collection of studies that aggregates the magnitude of a relationship between two or more variables (Glass, McGaw & Smith, 1981). Meta-analytic statistics can describe the typical strength of the effect under investigation (i.e., change in recidivism as a result of DTC participation), the degree of statistical significance, and the variability, and can provide an opportunity to explore and identify potential moderating variables. The outcome of a meta-analysis is an effect size estimate (ESE), which can be interpreted as the estimated effect of the independent variable on the dependent variable. For example, an average effect size estimate of +0.10 translates into the independent variable accounting for a 10% change in the dependent variable (Rosenthal, 1991).

Meta-analytic reviews are generally regarded as a superior method of research synthesis compared to traditional narrative reviews as the former are “more systematic, more explicit, more exhaustive, and more quantitative” (Rosenthal 1991, p. 17). Critics argue, however, that one of the major limitations of meta-analytic techniques is that the sampling procedures are biased in favour of including predominantly published studies. It is surmised that, since the probability of publishing a study is increased by the statistical significance of the results, published studies are not actually representative of the entire body of research that has been conducted in a given area. Consequently, a calculated effect size, based exclusively on published studies, may be overestimating the relationship. Coined the “file drawer problem” (Rosenthal, 1991, p. 103), this suggests that if unpublished studies were included in the meta-analysis, the effect size estimate would be smaller. In order to counter this issue, unpublished articles, governmental and non-governmental reports, and student papers were sought in the present meta-analysis.



2. Method

Similar to traditional quantitative research methods, the meta-analytic process involves three basic steps:

1. literature review – identifying and gathering relevant research studies;
2. data collection – extracting data through pre-determined coding procedures; and
3. data analysis – analyzing the aggregated data using statistical techniques.

To gather eligible studies for the meta-analysis, a comprehensive search was conducted of the literature over the last 20 years including unpublished doctoral theses and governmental reports. A secondary search was conducted using the bibliographies of the relevant literature, prior meta-analyses and the Internet. An explicit set of criteria was established in order for a study to be included in the analysis:

1. the study examined the effectiveness of a drug treatment court (i.e., an intervention that involved both a court monitored component and a substance abuse treatment component) for offenders charged with a criminal offence;
2. the study used a control group or comparison group that did not experience the drug treatment court (or provided sufficient pre/post data);
3. sufficient statistical information was reported in order to extract an effect size; and,
4. the study measured the impact of the DTC on recidivism rates.

Standardized information was drawn from each accepted study using a pre-designed coding manual. In accordance with standard meta-analytic techniques, multiple definitions of recidivism were accepted. For example, recidivism was defined as a new conviction or simply a new charge. It was not, however, defined as a relapse on the substance of choice – only new criminal behaviour was coded as recidivism. In order to generate sufficient data for analysis, several coding techniques were used. For example, if 70% or more of the study sample were first-time offenders, it was coded as a “primarily first-time offender program.” In addition, several variables were coded only if the authors made an explicit positive statement. For example, the use of methadone was only coded as “yes” if the authors directly stated this to be a fact. Therefore, the comparisons made in this report are subject to this limitation. It should be noted, however, that this is a general issue within all meta-analyses.

In accordance with the meta-analytic techniques of Rosenthal (1991), the *phi* coefficient (Pearson’s *r* product moment correlation applied to dichotomous data) was used as the effect size estimate. In cases where multiple control groups were used in a single study, the results were combined in order to generate a single ESE for each program in order to avoid skewing the results by double counting programs. In addition, where multiple follow-up periods were reported in a single study, the longer period was selected.

Once the ESE from each study was calculated for recidivism, the overall mean effect size estimate, along with the corresponding confidence intervals, and a weighted effect size estimate were calculated. Additional analyses were also conducted to explore whether certain variables had a moderating impact on ESE magnitude where adequate information was available. For example, the effect of DTC participation was analyzed based upon the length of the programs or the criminal history of the offenders within the programs.



3. Results

3.1 Study Characteristics

Although 185 individual studies were identified through the search process, only 54 (29.2%) studies were deemed acceptable according to the study inclusion criteria. As Table 1 indicates, the research located on drug treatment courts originates almost exclusively from the United States. Only two studies were located in Canada (which is consistent with the number of Canadian DTCs that were operating long enough to generate evaluations) and two in Australia.

TABLE 1: STUDY CHARACTERISTICS	
VARIABLE	N (%)
Country (N=54)	
United States	50 (92.6%)
Canada	2 (3.7%)
Australia	2 (3.7%)
Publication type (N=54)	
Academic journal article	31 (57.4%)
Other publication type (e.g., government report)	23 (42.6%)
Study design (N=54)	
Random control group	7 (13.0%)
Simple comparison group	27 (50.0%)
Matched comparison group	20 (37.0%)
Control/comparison group (N=72)	
Justice system (e.g., probation or custody sample)	39 (54.2%)
Drop-outs/non graduates	10 (13.9%)
Eligible but did not participate	23 (31.9%)

The studies were published between 1993 and 2005 with a median year of 2001. Just over half (57.4%) were published in peer-reviewed academic journals, which indicates that this meta-analysis is not relying solely on “traditionally published” studies. A large majority of the studies (87.0%) used a comparison group (simple or matched). Although the control/comparison groups were combined in the calculation of the ESE, there was a total of 72 unique control/comparison groups within the 54 studies. Most compared the DTC participants to offenders within the traditional justice system (54.2%) or offenders who were

eligible but did not participate (31.9%) – the latter being a more appropriate comparison group as these offenders would have been screened for substance abuse problems.

One of the more important issues within program evaluation research, and particularly within DTC research, is the attrition rate (i.e., the proportion of participants who voluntarily or involuntarily leave the program before completion). The recidivism rates used in analysis do not include (or rarely include) offenders who did not complete the program. Therefore, it is important to consider attrition when examining recidivism rates. The attrition rates within the studies in this meta-analysis ranged from 9.0% up to 84.4% with a mean of 45.2% ($SD=19.0$), which indicates that almost half of DTC participants do not complete the program. Clearly, strategies need to be developed to decrease attrition rates within DTC programs.

A second important factor to consider in a study of recidivism is the follow-up length used to measure recidivism. Generally, longer follow-up periods produce higher recidivism rates as offenders have more time at-risk to re-offend. The follow-up length used to measure recidivism within the included studies ranged from 3 months up to 48 months with a mean of 18.7 months ($SD=11.5$).

Sample size is a third factor considered important in program evaluation research as larger sample sizes are considered more rigorous than smaller sample sizes. The sample sizes ranged from 39 participants up to 856 participants, with a mean of 260 participants ($SD=189$).

3.2 Program Characteristics

Although there were 54 individual studies, some studies reported on multiple DTCs. As such, a total of 66 individual DTC programs were included in this meta-analysis. Table 2 summarizes the DTCs described in the individual research studies. The data, however, should be viewed with some caution. There were difficulties in coding detailed information, as the programs were not adequately described in many of the studies.

Very few DTCs restricted participation based upon drug type. Some programs (4.6%) restricted access to only hard drug users (e.g., cocaine, heroin, crystal methamphetamine), and other programs (7.6%) to only soft-drug users (e.g., marijuana, hashish, alcohol). Approximately one-third of programs (31.8%) dealt primarily with repeat offenders (19.7% mostly repeat offenders and 12.1% all repeat offenders) and 19.7% dealt primarily with first-time offenders (18.2% mostly first-time offenders and 1.5% all first-time offenders). Finally, almost all DTC programs (93.9%) accepted only offenders who had been charged with non-violent offences. In summary, the programs in this meta-analysis are dealing with both first-time and repeat non-violent offenders who have substance abuse problems with numerous types of drugs.

The program lengths of DTCs (i.e., the time an offender was monitored) within this meta-analysis varied from 6 months up to 26 months with a mean of 13.4 months ($SD=4.0$).



TABLE 2: PROGRAM CHARACTERISTICS	
VARIABLE	N (%)
Substance abuse accepted (N=66)	
Hard drugs only (e.g., heroin, cocaine)	3 (4.6%)
Mixed drugs/unknown	58 (87.8%)
Soft drugs only (e.g., marijuana, hashish)	5 (7.6%)
Offence types accepted (N=66)	
Non-violent only	62 (93.9%)
Mixed/unknown	4 (6.1%)
Violent only	0 (0.0%)
Criminal history (N=66)	
All first-time offenders	1 (1.5%)
Mostly first-time offenders (seventy percent or more)	12 (18.2%)
Mixed/unknown	32 (48.5%)
Mostly repeat offenders (seventy percent or more)	13 (19.7%)
All repeat offenders	8 (12.1%)
Program setting (N=66)	
Out-patient only	20 (30.3%)
Combined (both inpatient and outpatient) / unknown	46 (69.7%)

The identified studies sometimes indicated specific components of the DTC programs under scrutiny. For example, in recognition that substance abuse and criminality are often linked to other factors, some programs targeted a number of additional areas such as academic skills, vocational skills, and family functioning. Table 3 provides information on the additional treatment targets reported in the studies. It should be noted that the specific treatment components were only coded if there was an explicit indication in the study that the DTC targeted that particular area. Therefore, the figures in Table 3 may not necessarily reflect the treatment programs accurately. In general, the DTC programs appear to target a number of additional issues beyond substance abuse.

TABLE 3: ADDITIONAL TREATMENT COMPONENTS	
VARIABLE	N (%)
Treatment component (N=66)	
Academic skills (e.g., school attendance and performance)	40 (60.6%)
Vocational skills (e.g., specific trades, interview skills)	36 (54.6%)
Family functioning (e.g., communication, parenting skills)	33 (50.0%)
Aftercare (e.g., follow-up supervision after program completion)	25 (37.9%)
Social skills (e.g., social competence, ability to work in groups)	24 (36.4%)
Cognitive skills (e.g., goal setting, problem solving) 21	(31.8%)
Anger management (e.g., perspective taking, reducing aggression)	16 (24.2%)
Antisocial peers (e.g., association with criminal peers)	15 (22.7%)
Antisocial attitudes (e.g., lack of respect for authority, criminal values)	15 (22.7%)
Relapse prevention (e.g., techniques for remaining substance free)	15 (22.7%)
Psychological well-being (e.g., self-esteem, depression, anxiety)	14 (21.2%)

3.3 Participant Characteristics

In total, the studies examined 17,214 offenders who had successfully completed drug treatment court programs and 14,505 offenders in the control or comparison groups. The mean age of DTC participants recorded within the studies was 28.4 years – 7 studies provided data primarily on youth under 18 years of age. Given that the literature is almost exclusively American, Aboriginal identity was rarely recorded. Instead, when racial information was provided, the data was broken down according to categories such as Black, Hispanic or Caucasian. However, these data were not available often enough to include in the meta-analysis. Table 4 provides the gender breakdown within studies and indicates that most of the participants were male.

TABLE 4: PARTICIPANT CHARACTERISTICS	
VARIABLE	N (%)
Gender (N=66)	
All male	1 (1.5%)
Mostly male (seventy percent or more)	31 (47.0%)
Mixed/unknown 32	(48.5%)
Mostly female (seventy percent or more)	1 (1.5%)
All female	1 (1.5%)



3.4 Recidivism Results

The 66 DTC programs within this meta-analysis directly measured the effectiveness of treatment on reducing future criminal behaviour. The mean overall ESE was + 0.14 with a 95% confidence interval of + 0.10 to + 0.17. By converting the ESE into a Binomial Effect Size Display, a simple statement can be made:

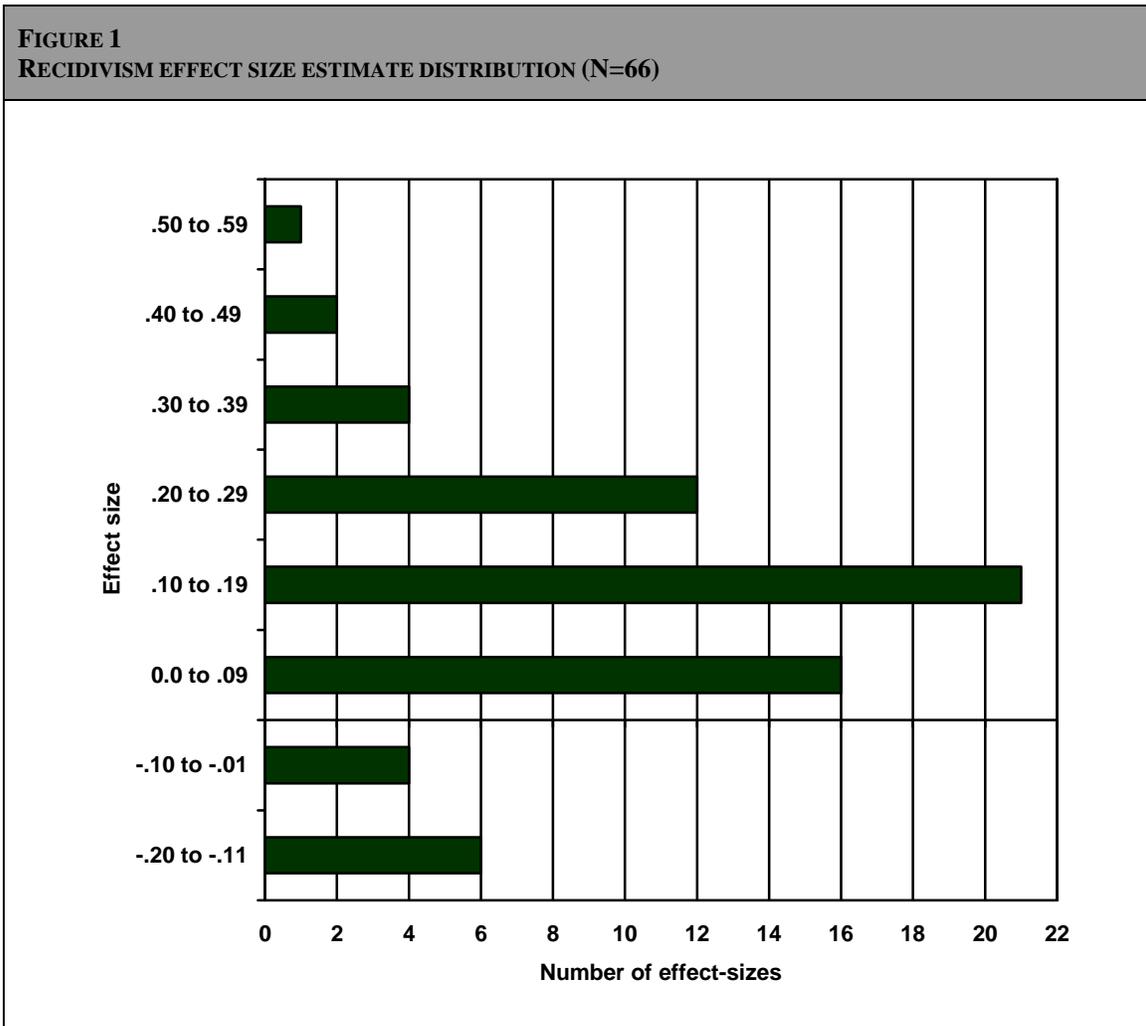
Generally, 57% of the participants in the drug treatment courts will not be charged with a new criminal offence during the follow-up period compared to 43% of offenders within the control/comparison groups.

This can also be translated into a similar but more general statement:

Drug treatment courts reduced recidivism rates by 14% compared to traditional criminal justice system responses.

There is, however, an explicit relationship between statistical significance, effect size and sample size whereby the size of a study increases the level of significance (Rosenthal, 1991). In order to give more weight to studies with larger sample sizes, a weighted ESE was calculated according to the technique described by Hunter, Schmidt and Jackson (1982). The weighted ESE was +0.13, which is relatively similar to the unweighted ESE.

As Figure 1 indicates, the majority of the DTC programs demonstrated a positive impact on recidivism (i.e., programs with an effect size above zero). Only 10 studies indicated a negative impact while 56 studies demonstrated a positive impact. A single-sample t-test indicated that the mean effect size estimate was significantly different from zero ($t(df=65)=7.58, p<.001$). Therefore, in general, DTCs appear to decrease the likelihood of future criminal behaviour better than traditional justice responses. Heterogeneity analysis, however, indicated that the variance in effect size estimates was also significant ($\chi^2(df=65)=465.3, p<.001$). The moderating variables were, therefore, further examined to determine differences in effect based upon program characteristics, participant characteristics and study characteristics.



3.5 Moderating Variable Analysis

In order to understand the potential impact of moderating variables, individual ESEs were calculated across a number of different groups such as adults versus youth and first-time offenders versus repeat offenders. Table 5 provides the results of this analysis. Variables that were not amenable to this form of analysis (e.g., substantial amount of missing data, minimal variance) were not included. As well, due to missing data within some studies, the total number of effect size estimates within each moderator analysis is not always equal to the total number of possible ESEs. For example, only 49 of the possible 66 ESEs had information regarding the age of the participants. Finally, the additional treatment components reported in Table 3 (e.g., anger management, academic skills, vocational skills) were not used within the moderator analysis as the information was deemed too unreliable. As indicated previously, it was only recorded when the authors made a direct statement that the component was part of the treatment. In other words, the data is not necessarily an accurate reflection of the programs.

**TABLE 5: MODERATING VARIABLE ANALYSIS**

VARIABLE	Mean ESE (N)	95% CI
Age groups (N=49)		
Youth (less than eighteen years)	+ .06 (7)	- .12 to + .24
Adults (eighteen years and older)	+ .16 (42)	+ .11 to + .20
Criminal history (N=56)		
First-time offenders	+ .15 (13)	+ .09 to + .22
Mixed/unknown	+ .13 (22)	+ .07 to + .16
Repeat offenders	+ .17 (21)	+ .08 to + .25
Publication type (N=66)		
Academic journal	+ .14 (33)	+ .08 to + .20
Other publication type	+ .13 (33)	+ .09 to + .17
Follow-up length (N=64)		
Less than one year	+ .09 (8)	+ .01 to + .17
One year to two years	+ .14 (44)	+ .10 to + .19
Greater than two years	+ .17 (12)	+ .10 to + .23
Attrition rate (N=44)		
Forty-five percent attrition or less	+ .13 (20)	+ .06 to + .21
Greater than forty-five percent attrition	+ .14 (24)	+ .08 to + .19
Study design (N=66)		
Random assignment	+ .09 (8)	- .01 to + .20
Non-random assignment	+ .14 (58)	+ .10 to + .18
Control/comparison group (N=72)		
Justice system	+ .13 (39)	+ .09 to + .18
Drop-outs/non-graduates	+ .31 (10)	+ .17 to + .45
Eligible (not participating)	+ .11 (23)	+ .05 to + .17
Program setting (N=54)		
Out-patient only	+ .11 (24)	+ .03 to + .18
Combined (both in-patient and out-patient)	+ .13 (30)	+ .08 to + .17
Program length (N=54)		
Less than one year	+ .07 (15)	- .00 to + .15
One year to eighteen months	+ .18 (33)	+ .13 to + .23
Longer than eighteen months	+ .08 (6)	+ .02 to + .14

First, one of the noteworthy findings from the moderator analysis is the difference in the reported effectiveness of DTCs according to age. When comparing youth and adults, the results indicate that DTCs are more effective for adults, although the difference is not statistically significant. However, when examining the mean ESE for youth alone, the 95% confidence interval includes zero, thus diminishing confidence that DTCs are actually effective with youth. Confidence intervals give us a measure of the precision of the mean effect size estimate computed. In this case, the 95% confidence interval implies that 19 times out of 20, the 'true' mean will fall within the provided range. If this range includes zero, we cannot be statistically certain that there is an actual effect from DTC participation, as a zero ESE implies no difference between the DTC participants and the control/comparison group. Since there are only 7 ESEs contributing to the youth results, however, additional research is warranted to determine if the DTC model is, in fact, not effective with youth.

Second, the difference in the mean ESE based upon the follow-up length used to measure recidivism is important. Those studies with longer follow-up periods produced larger effects compared to those with shorter follow-up periods. Normally, recidivism rates increase with longer follow-up lengths as offenders have more time at-risk to re-offend and/or come to the attention of police. Not surprisingly, the results of this meta-analysis follow this trend as recidivism rates generally increase within both DTC programs and control/comparison groups as the follow-up length increases. The important difference, however, is that the gap between the two groups increases over time. In other words, as the follow-up time increases, those in the comparison group become even more likely to re-offend compared to the DTC participants. It is therefore likely that the benefits of DTC participation increase with time. As such, longer follow-up periods are particularly important in DTC research to fully understand the impact of participation on recidivism.

Third, it is not surprising that those evaluators who chose to randomly assign offenders into a treatment or control group generated diminished effects compared to those who did not use random assignment. Previous research has demonstrated that as the methodological rigour of a study increases, the reported effects decrease (Latimer, 2001). Further, the 95% confidence interval for the six studies that used random assignment actually included zero and therefore diminishes confidence that DTCs are effective when a random treatment/control design is used to measure effectiveness. However, random assignment is difficult within this context as judges and lawyers often prefer (understandably) to prioritize treatment for those deemed most appropriate. Therefore, in many of the studies that initially tried to implement random assignment procedures, the process was discontinued and replaced with a comparison group design.

The fourth finding from the moderator analysis is the fact that the choice of control/comparison group has a significant impact on ESEs. Studies that used drop-outs or non-completers as a comparison group demonstrated a significantly higher mean ESE ($F(df=2)=6.87, p<.01$) compared to studies that used a traditional justice system comparison group or offenders who were eligible but did not participate. These results are also not surprising given that drop-outs/non-completers would logically provide a comparison group that are not as motivated as those who completed the program. Those who were eligible for the program but did not participate likely form the most similar group for comparison as they



would have met the inclusion criteria (i.e., screened for substance abuse problems, similar criminal histories and offence types). And when this group was used, DTC participation still demonstrated an 11% improvement in recidivism.

The fifth and final finding is the difference in reported effects based upon the length of the DTC program. Programs that provided services for one year to eighteen months demonstrated a significant reduction in recidivism ($F(df=2)=3.76, p<.05$) compared to shorter or longer programs. In fact, the 95% confidence interval for shorter programs includes zero, which further reduces confidence that programs shorter than one year have a positive impact on recidivism. It is possible that the shorter time frame is not sufficient for the cognitive and behavioural changes to become entrenched while the longer timeframe may induce some form of “treatment fatigue.”

4. Conclusion

Drug treatment courts are now operating within six major cities in Canada (Vancouver, Edmonton, Regina, Winnipeg, Toronto, and Ottawa) and many cities across the United States. The results of this meta-analysis suggest that such a response is an effective method of reducing future criminal behaviour compared to traditional responses. There are, however, several important additional findings and caveats.

First, it appears from the results of this meta-analysis that youth may not be suitable candidates for DTCs. Additional research is warranted, however, given the low number of studies using a youth sample to further examine a possible age effect.

Second, longer follow-up periods should be used in DTC research as it is likely that the benefits of DTC participation increase with time. In fact, the current findings suggest that sustained behavioural changes are a likely outcome of DTC participation.

Third, programs that provide services for one year to eighteen months are associated with improvements in recidivism compared to shorter or longer programs. It is therefore reasonable that services provided to DTC participants should be structured to range between one year and eighteen months.

Finally, methodology, as indicated in previous research (Latimer, 2001), has a significant impact on the reported effects of DTC effectiveness. In this meta-analysis, two study design characteristics emerged as important – random assignment and comparison group selection. It is understandable that random assignment is a difficult approach to use in a criminal justice setting, particularly as DTCs are typically voluntary programs and criminal justice professionals prefer to have influence over who ultimately participates. However, the choice to use drop-outs and/or non-completers clearly influences the results and should be avoided. Nonetheless, even when those who are eligible but do not participate are used as a comparison group (which appears to be the most rigorous method beyond random assignment), drug treatment courts still appear to have a positive impact on reducing recidivism.

While there are other issues that were not the subject of this research, such as the cost-effectiveness of DTCs, the results of this meta-analysis, which includes data on more than 17,000 offenders within 66 individual programs, provides clear support for the use of drug treatment courts as a method of reducing crime among offenders with substance abuse problems.



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