Drug Court Cost-Efficiency Analysis: Methods and Findings

Gray Barton, BA.
Fred Cheesman, Ph.D.
Michael Finigan, Ph.D.
Christian Henrichson, MPP.
John Roman Ph.D.

Research Questions

- 1. What is cost efficiency analysis?
- 2. How should drug court costs be calculated?
- 3. What benefits are associated with drug court and what are their dollar values?
- 4. How should costs and benefits be compared?
- 5. What do we know about the cost efficiency of adult drug courts?
- 6. How can drug courts use the results of cost efficiency analyses effectively?

Relevant Issues/Considerations

- 1. Drug Court is a scarce and precious resource that should be used in a manner that maximizes its benefits and minimizes its costs to participants and society in general.
- 2. Drug Courts are public programs served by taxpayer funds, that receive inputs from a variety of public agencies and produce outputs that benefit a variety of public agencies
- 3. Monetary benefits that may be generated by drug court over the business-as-usual alternative are often enjoyed by agencies other than the drug court itself (e.g., state corrections).

Relevant Issues/Considerations

- 1. A comprehensive drug court cost efficiency analysis requires results of a valid impact analysis of recidivism and other outcomes and consequently a valid counterfactual (e.g., business-as-usual alternative to drug court), as well as careful process evaluation to identify cost centers and potential benefits.
- 2. Monetizing the value of drug court benefits is often difficult.
- 3. Cost efficiency analysis is laden with assumptions that must be tested to ensure the integrity of the analysis.



What is the potential value of cost efficiency analysis to drug courts?

 Gray Barton, Executive Director for the Office of Problem-Solving Courts MD



Research Question 1: What is cost efficiency analysis?

 Cost-efficiency analysis seeks to compare the costs of developing, implementing and operating a program or policy relative to the outcomes it produces or the value of those outcomes.



Types of cost-efficiency analyses (Levin and McEwan, 2001)

- Cost-effectiveness
- Cost-benefit
- Cost-utility
- Cost-feasibility

Cost-effectiveness

- The evaluation of alternatives according to both their costs and their effects with regards to producing some outcome that is not measured in monetary terms.
- Example: Caulkins, Rydell, Schwabe, and Chiesa (1997): Mandatory Minimum Drug Sentences: Throwing Away the Key or the Taxpayers' Money?
 - Compared the impact of three different control strategies on cocaine consumption, per million dollars spent.

Cost-effectiveness

Table 3.3

Comparing Programs According to Alternative Evaluation Criteria

	Changes in Outcome Per Million Dollars Spent on Each Program			
Outcome		Conventional Enforcement	Longer Sentences	
Cocaine consumption (kilograms) User expenditure on cocaine	-103.6	-27.5	-12.6	
(\$ million)	-8.64	0.20	0.12	
Number of cocaine user-years	-586	-253	-118	
Number of heavy-cocaine-user-years	587	-81	-38	

SOURCE: Runs of the revised cocaine-control model documented in Rydell and Everingham (1994).

⁹One user-year accumulates for every person who is in the user pool for one year; two user-years accumulate if a person stays two years in the user pool or if two people stay one year each; and so on. Heavy-user-years accumulate analogously with respect to the heavy-user pool.

Cost-benefit

- The evaluation of alternatives according to their costs and benefits when each is measured in monetary terms.
 - Primary method used to assess cost-efficiency of drug courts and will be the focus of this presentation

Research Question 2: How should drug court costs be calculated?

- Types of costs
 - Variable, Fixed, and Step-fixed (Henrichson and Galgano, 2013: Levin and McEwan, 2001)
 - **Fixed:** Fixed costs remain fixed over a given period and are not usually affected even if the workload changes. Examples of fixed costs include rent, utilities, and central administration.

Types of Costs

- Step-fixed: Step-fixed costs remain constant for a certain range of workload, but can change if the workload exceeds or falls below that range. The most common examples of step-fixed costs are staff salaries and benefits.
- Variable: Variable costs are those that vary directly with workload and change immediately as workload increases or decreases. Examples of variable costs include over-time, supplies, and fuel.



Types of Costs

Figure 2. Examples of variable, fixed, and step-fixed costs

VARIABLE	FIXED	STEP-FIXED
Overtime	Rent	Staff salaries
Supplies	Utilities	Fringe benefits, such as health care and pension contributions
Contracted services	Central administration (human resources, fiscal, legal, etc.)	Possibly some fixed costs when staffing levels change by a large amount
Client subsidies	Debt service	
Travel	Equipment	
Fuel		
Food		

Marginal vs. Average Cost

- Marginal Costs: Economists define marginal costs as the amount total costs change when a unit of output (i.e., workload) changes by one unit.
 - In the context of drug courts, it is the amount of change in a drug court's total operating budget when workload (e.g., number of drug tests, status hearings, and/or case manager contacts) changes because of changes to policies or programs



Marginal vs. Average Cost

- How are marginal costs different from average costs?
 - Average costs includes fixed costs that may not be affected by policy changes; marginal costs do not.
- Calculating Marginal costs
 - Top-down formula
 - (Change in total cost)/ (Change in total output)=
 Marginal cost
 - Use with single output and detailed budget information available



Calculating Marginal Costs

- Bottoms-up formula
 - Time spent on output (hours) x Cost per hour=Marginal Cost
 - Use when activity is funded by several sources
 - Use when inputs to an activity come from several sources



Examples of Marginal Costs

Justice System Costs in State of Washington, 2009

Source: WSIPP's Benefit-Cost Tool for States: Examining Policy Options in Sentencing and Corrections.

August 2010.

	Marginal	Average
	Cost	Cost
Arrest	\$670	\$4,182
Probation (per year)	\$1,861	\$3,657
Jail (per year)	\$21,469	\$28,900
Prison (per year)	\$13,921	\$31,446

Six Steps of TICA

	Description	Tasks
Step 1:	Determine flow/process (i.e., how program participants move through the system)	Site visits/direct observations of program practice Interviews with key informants (agency and program staff) using a drug court typology and cost guide (See guide on www.npcresearch.com)
Step 2:	Identify the transactions that occur within this flow (i.e., where clients interact with the system)	Analysis of process information gained in Step 1
Step 3:	Identify the agencies involved in each transaction (e.g., court, treatment, police)	Analysis of process information gained in Step 1 Direct observation of program transactions
Step 4:	Determine the resources used by each agency for each transaction (e.g., amount of judge time per transaction, amount of attorney time per transaction, number of transactions)	Interviews with key program informants using program typology and cost guide Direct observation of program transactions Administrative data collection of number of transactions (e.g., number of court appearances, number of treatment sessions, number of drug tests)
Step 5:	Determine the cost of the resources used by each agency for each transaction	Interviews with budget and finance officers Document review of agency budgets and other financial paperwork
Step 6:	Calculate cost results (e.g., cost per transaction, total cost of the program per participant)	Indirect support and overhead costs (as a percentage of direct costs) are added to the direct costs of each transaction to determine the cost per transaction. The transaction cost is multiplied by the average number of transactions to determine the total average cost per transaction type. These total average costs per transaction type are added to determine the program and outcome costs.

Transactional Costs

- Used in Transactional and Institutional Cost Analysis (TICA; Crumpton, Carey, and Finigan, 2004)
- Dominant approach to drug court cost efficiency analysis
- Bottoms-up approach
- How are transactional costs different from marginal costs?



What drug court costs should be included in a cost efficiency analysis?

- From Finigan, Carey, and Cox, 2007, Table 1, P. 19
- Table 1. Investment and Outcome Transactions for Drug Court, Traditional Court and Outcome Processes for Both Groups

Drug Court	Comparison "Business-as-Usual"	Outcomes: Both Drug Court and Comparison
Arrest Booking 1st Arraignment	Arrest Booking 1st Arraignment	Arrests Bookings Court Hearings
Public Defender Orientation InAct Treatment Orientation	Public Defender Orientation InAct Treatment Orientation	o 1st Arraignmento Grand Jury
STOP Court Hearings (drug court hearings) Physical exam at InAct treatment agency Alcohol, drug and mental health assessment at InAct treatment agency Individual and group treatment sessions Urinalyses Jail as a sanction Exit Interview Graduation Hearing for New Dates Stipulated Facts Trial Review Hearing Jail Time (for those terminated after a stipulated facts trial)	Court Hearings O Grand Jury O STOP court hearing O 2 nd Arraignment O Custody Hearing O Hearing for New Dates O Assignment Call Hearing O Drug Call Hearing O Plea O Sentencing O Motion to Suppress Hearing O Trial O Substitution of Counsel Hearing O Probation Violation Hearing O Clean Court Hearing Jail Time	 2nd Arraignment Hearing for New Dates Assignment Call; Drug Call Plea Sentencing Motion to Suppress Trial Substitution of Counsel Probation Violation Clean Court Community Court Pre-plea Pre-trial Conference Further Proceedings Jail Time Probation Time
Probation Time (for those terminated after a stipulated facts trial)	Probation Time Treatment	Prison Time Parole Time Post-Prison Supervision Time Victimizations O Property Crimes O Person (Violent) Crimes



What drug court costs should be included in a cost efficiency analysis?

- From Finigan, Carey, and Cox, 2007, Table 14, P. 42
- Table 14. Criminal Justice System Costs Invested in Drug Court per Participant

What drug court costs should be included in a cost efficiency analysis?

Table 14. Criminal Justice System Costs Invested in Drug Court per Participant

Drug Court participant transactions (Mean number)	Mean number of transactions	Unit cost per transaction	Mean investment cost per participant (n = 6,502)
Arrest	1 arrest	\$202,96/arrest	\$203
Booking	1 booking	\$299,15/booking	\$299
Drug Court (DC) hearings	15 hearings	\$51,22/hearing	\$768
DC Treatment	253 days	\$6.84/day	\$1,731
Non-DC treatment post termination	14 days	\$19.34/day	\$271
Jail time post termination and sanctions	9 days	\$112.99/day	\$1,017
Probation post termination	213 days	\$4.13/day	\$880
Total cost per DC participant			\$5,168

Cost Centers for Drug Court Participants in Virginia

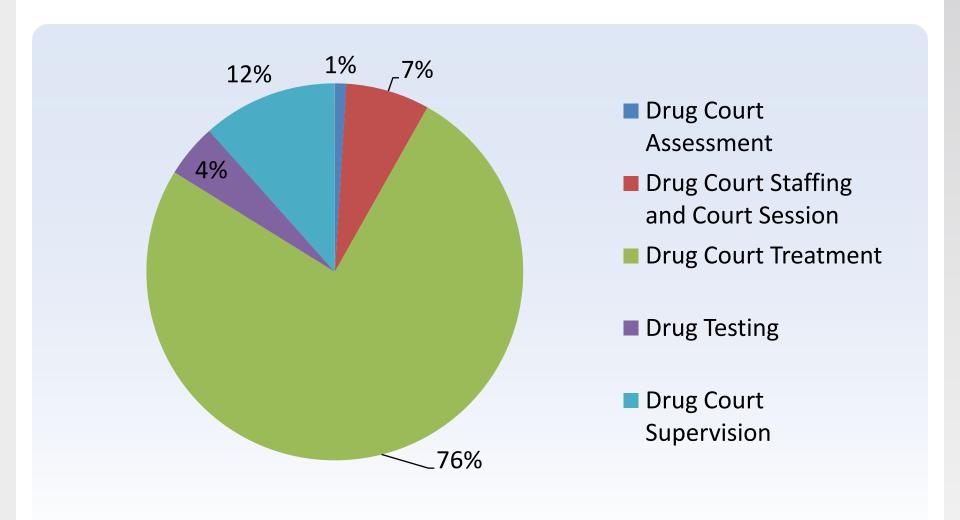
- The average cost of a drug court per participant in Virginia includes six basic transactions (Cheesman, Kunkel, Graves, Holt, Lee and Jones, 2012):
 - 1. The cost to screen and assess a defendant for drug court;
 - 2. The cost of all drug court staffing sessions and court sessions;
 - 3. The cost of intensive outpatient substance abuse treatment while in drug court;
 - 4. The cost of frequent drug testing during the defendant's participation in drug court;
 - 5. The cost of probation and, in some programs, law enforcement supervision; and
 - 6. Drug court fees collected.

Table 11: Average Total Cost of Drug Court per Participant by Transaction in Virginia

Transaction	Unit Cost	Average # of Events for all DC Participants Per Person	Average Cost per DC Participant Per Person Per Event (n = 748)
Drug Court Assessment	\$183.20	1	\$183.20
Drug Court Staffing and Court Session	\$19.99	67	\$1,343.03
Drug Court Treatment	\$50.81	278	\$14,113.27
Drug Testing	\$6.76	126	\$854.27
Drug Court Supervision	\$15.19	142	\$2,160.85
Subtotal			\$18,654.62
Fees	(\$753.80)	1	(\$753.80)
Total			\$17,900.82



Figure 2: Average Cost of Drug Court Transactions as a Percentage of Total Cost in Virginia





Comparing costs between drug court and the business-as-usual alternative

- From Finigan, Carey, and Cox, 2007, Table 16, P. 44
- Table 16. Difference in Investment Cost for Drug Court and Business-as-Usual Process per Transaction



Table 16. Difference in Investment Cost for Drug Court and Business-as-Usual Process per Transaction

Transactions	Investment cost per DC partici- pant (n = 6,502)	Investment cost per non-DC offender (n = 4,600)	Cost difference (benefit) ¹⁸
Arrest (1)	\$203	\$203	\$O
Booking (1)	\$299	\$299	\$0
Court time	\$768	\$714	-\$54
Treatment*	\$2,001	\$2,746	\$745
Jail time*	\$1,017	\$1,243	\$226
Probation time*	\$880	\$1,355	\$475
Total cost	\$5,168	\$6,560	\$1,392

^{*}These cost differences are significant at $p \le .05$.

Research Question 3: What benefits are associated with drug court and what are their dollar values?

Benefits= Avoided Costs



Calculating Benefits

- From Finigan, Carey, and Cox, 2007, Table 17, P. 45
- Table 17. Average Number of Transactions for Each Group After the Eligible Arrest

Table 17. Average Number of Transactions for Each Group After the Eligible Arrest

Outcome transactions (mean number)	Drug Court participant outcomes (n = 6,502)	Non-Drug Court outcomes (n = 4,600)
Arrests*	4.2	5.9
Bookings*	2	2.9
Court time (in minutes)*	19.6	27.6
Jail time (days)*	46	75
Treatment (days)	72	92
Probation time (days)*	529	661
Prison time (days)*	80	105

^{*} These outcomes were significantly different between the two groups (p<.01).

Table 13: Comparison of Transactional Outcome Costs of Drug Court Participants versus the Comparison Group, 3 years post-placement in Virginia

Transaction	Unit Costs	Average Number of Recidivism Outcome Events After Drug Court Entry Per Drug Court Person Over 3 Years	Drug Court Participants Per Person (n = 748)	Average Number of Recidivism Outcome Events After Drug Court Entry Per Comparison Person Over 3 Years	Comparison Group Per Person (n= 807)
Misdemeanor Arrests	\$210.97	1.37	\$289.03	1.95	\$411.39
Felony Arrests	\$210.97	1.99	\$419.83	3.46	\$729.96
General District Court					
Costs	\$140.11	1.37	\$191.95	1.95	\$273.22
Circuit Court Costs	\$586.62	1.99	\$1,167.37	3.46	\$2,029.71
Jail days	\$76.21	42	\$3,200.82	137	\$10,440.77
Prison days	\$68.84	71	\$4,871.81	320	\$22,038.37
Probation days	\$0.58	313	\$181.54	413	\$239.54
Total			\$10,322.35		\$36,162.95



Avoided Cost of Victimization

- Calculated using NIJ's Victim Costs and Consequences: A New look (1996); updated using the inflation calculator to adjust 1993 dollars to 2012 dollars.
 - http://www.nij.gov/pubs-sum/155282.htm\
 - The inflation calculator can be found on the Bureau of Labor Statistics website:
 - http://www.bls.gov/data/inflation_calculator.htm.



Table 14: Comparison of Transactional Recidivism Victimization Costs of Drug Court vs. the Comparison Group, 3 years post-placement, in Virginia

	Unit Costs	Drug Court Participants Per Person	Drug Court Participants Per Person (n = 748)	Comparison Group Per Person	Comparison Group Per Person (n=807)
Property	\$12,881	1	\$12,881.00	1.4	\$18,033.40
Person	\$41,728	0.28	\$11,683.84	0.44	\$18,360.32
Total			\$24,564.84		\$36,393.72

Other Outcome Costs

- The Multisite Adult Drug Court Evaluation (MADCE) measured additional outcomes along with those related to offending (Roman, 2013)
 - Social productivity
 - Service use
 - Financial support use

Outcomes Measured by MADCE

	Table 1: Outcomes Measured by MADCE			
Outcome Category	Outcome Sub-Category	Impacts		
1. Social productivity	A. Employment	Earnings		
	B. Education	Schooling		
	C. Services and support provided	Child support payments, community		
		service		
2. Criminal justice system	A. Monitoring	Probation officer meetings, drug tests,		
	B. Police	electronic monitoring		
	C. Courts	Arrests		
	D. Corrections	Hearings		
	E. Drug court	Jail and prison (sanctions or otherwise)		
		Case management, administrative costs		
3. Crime and victimization		Crimes committed		
	A. Drug treatment	Emergency room, detoxification,		
4. Service use	B. Medical treatment	residential care, outpatient, methadone		
	C. Mental health treatment	Hospital stays unrelated to drugs		
	D. Other	Stays in mental health facilities unrelated		
		to drugs		
		Halfway houses, public housing, homeles		
		shelters		
5. Financial support use	A. Government	Welfare, disability, other entitlements		
	B. Other	Money from family and friends		



Research Question 4: How should costs and benefits be compared?

 What are the ways to compare costs and benefits to be able to draw a valid conclusion about the cost efficiency of a given drug court?



MADCE Approach to Calculating Costs and Benefits

- Sum the costs and benefits for each participant(Roman, 2013): Net Benefits
 - All services provided and all outcomes experienced by each person were identified and then converted relevant benefits into dollars
 - Each recidivism event was weighted by the price of the crime to victims plus the price of processing the case
 - Positive outcomes (e.g., wage increases), negative outcomes (e.g., lost wages), and all costs associated with treatment and criminal case processing were summed
 - The resulting summation could be positive or negative depending on the offender's trajectory



MADCE Approach to Calculating Costs and Benefits

Advantages

- Recognizes the natural variability in outcomes and enables the researcher to calculate a "variance" for an estimate of summed costs and benefits
 - Variance estimates allow the researcher to quantify their level of certainty or uncertainty with the estimate.
 - "Confidence intervals" and tests of significance can consequently be calculated for the estimate
- "False dichotomy" between costs and benefits is avoided. Distinction is often arbitrary.



Estimated Net Benefits Calculated for MADCE

Table 2. Net Benefits by Category for Drug Court Participants and Comparison Probationers

Category	Drug Court Participants	Comparison Probationers	Net Benefit
Social productivity	\$20,355	\$18,361	\$1,994
Criminal justice	-\$4,869	-\$5,863	\$994
system			
Crime and	-\$6,665	-\$18,231	\$11,566
victimization*			
Service use*	-\$15,326	-\$7,191	-\$8,135
Financial support	-\$4,579	-\$3,744	-\$835
use			
Total	-\$11,206	-\$16,886	\$5,680

^{*}Difference is statistically significant (p < 0.01).



Comparing costs between drug court and the business-as-usual alternative

- From Finigan, Carey, and Cox, 2007, Table 18, P. 47
- Table 18. Outcome Costs and Savings for 5 Years from Petition Hearing

Table 18. Outcome Costs and Savings for 5 Years from Petition Hearing

Outcome transactions	Drug Court Participant outcome costs (per participant)	Non-Drug Court outcome costs (per participant)	Difference in cost (per participant)	Drug Court outcome savings over 10 years (n = 6,502)
Arrests*	\$852	\$1,197	\$345	\$2,243,398
Bookings*	\$598	\$868	\$269	\$1,750,566
Court time*	\$569	\$802	\$232	\$1,510,545
Jail time*	\$5,198	\$8,474	\$3,277	\$21,305,168
Treatment	\$1,392	\$1,779	\$387	\$2,514,974
Probation time*	\$2,185	\$2,730	\$545	\$3,544,630
Prison time*	\$5,402	\$7,091	\$1,688	\$10,977,002
Total outcome costs without victimizations	\$16,197	\$22,941	\$6,744	\$43,846,283
Victimization (per- son) *	\$11,716	\$13,913	\$2,197	\$14,283,464
Victimization (property) *	\$10,624	\$13,901	\$3,278	\$21,310,825
Fotal outcome costs plus victimizations	\$38,537	\$50,755	\$12,218	\$79,440,571

^{*}These cost differences are significant at p < .01.



Table 15: Total Criminal Justice System and Victimization Costs for the Drug Court and Comparison Groups in Virginia

	Drug Court	Comparison	Total
Placement	\$1,441.76	\$4,651.21	(\$3,209.44)
Drug Court	\$17,900.82	\$0.00	\$17,900.82
Post-Entry			
Costs (other			
than drug			
court)	\$10,913.55	\$36,753.96	(\$25,840.41)
Victimization	\$24,564.84	\$36,393.72	(\$11,828.88)
TOTAL	\$54,820.97	\$77,798.89	(\$22,977.91)

Research Question 5: What do we know about the cost efficiency of drug courts?

Are drug courts cost efficient?

Research Question 6: How can drug courts use the results of cost efficiency analyses effectively?

- Policy
- Individual drug court performance

Recommendations

- Get a copy of the upcoming NIJ Research in Brief describing the MADCE cost efficiency assessment methodology
- Read Carey, Mackin, and Finigan (2012)in *Drug Court Review*: Characteristics of cost-effective drug courts
- It's worth the effort to carefully identify drug court transactions internally and with external agencies
- Use the taxpayers perspective when identifying drug court costs and benefits
- Consider using marginal costs in an analysis of drug court cost efficiency
- Consider using net benefits to reach conclusions about drug court cost efficiency

Resources

Dedicated in memory of NIJ's economist Ed Zedlewski, Ph.D. (1941-2013)

- Carey, S., Mackin, J., and Finigan, M. (2012). What works? The Ten Key Components of drug court: Research-Based Best Practices. *Drug Court Review*, 8, 6-42.
 http://d20j7ie7dvmqo0.cloudfront.net/sites/default/files/nadcp/DCR best-practices-in-drug-courts.pdf
- Cheesman, F., Kunkel, T., Graves, S., Holt, K., Lee, C., and Jones, T. (2012). Virginia Adult Drug Treatment Courts: Cost Benefit Analysis. Williamsburg, VA: National Center for State Courts. http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/RD3692012/\$file/RD369.pdf
- Crumpton, D., Carey, S., and Finigan, M. (2004). Enhancing Cost Analysis of Drug Courts: The Transactional and Institutional Cost Analysis Approach.
 Portland, OR: NPC Research.
 http://www.npcresearch.com/Files/Transactional%20and%20Institutional%20Cost%20Analysis%20(TICA)%20in%20the%20Drug%20Court%20Setting.pdf
- Finigan, M., Carey, S., & Cox, A. (2007). The Impact of a Mature Drug Court Over 10 Years of Operation: Recidivism and Costs: Final Report.
 Portland, OR: NPC Research.
 http://www.npcresearch.com/Files/10yr_STOP_Court_Analysis_Final_Report.pdf
- Hendrichson, C. and Galgano, S. (2013). A Guide to Calculating Justice-System Marginal Costs.
 New York Vera Institute of Justice.
 https://www.bja.gov/Publications/Vera Calculating-Justice-System-Marginal-Costs.pdf
- Levin, H. and McEwan, P. (2001). Cost-Effectiveness Analysis. Thousand Oaks, CA: Sage Publications.
- Miller, T., Cohen, M., and Wiersema, B. (1996). <u>Victim Costs and Consequences: A New Look</u>. Washington, DC: National Institute of Justice.
- Roman, J. (2013). Cost-benefit analysis of criminal justice reforms. NIJ Journal, 272. http://www.nij.gov/nij/journals/272/cost-benefit.htm