PROGRAMMING SEMINAR SERIES

Seminar 1.4: Cost-Benefit Analysis, Part 1

Michael Wilson
Ryan Souza
HOUSEKEEPING/ZOOM
STRATEGIC FRAMEWORK FOR DATA-DRIVEN AND EVIDENCE BASED PRACTICE

Program Inventory & Literature Review
Logic Models & Process Maps
Contracting Practices
Data Strategy & Dashboards
Program Evaluation & Cost Benefit Analysis

Seminar Series 1: Programming
Seminar Series 2: Data Strategy and Evaluation
PROGRAMMING SEMINAR SERIES OVERVIEW

• Give counties approaches to look at their justice involved populations through a lens of evidence, shared interventions, and a system-wide view.

• Offer tools that help to operationalize and embed evidence in program design and funding.

• Apply concepts of cost efficacy to program design and assessment.
<table>
<thead>
<tr>
<th>Core Components</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Inventory</td>
<td>Oct 2020</td>
</tr>
<tr>
<td>• How do we build a program inventory and make it useful?</td>
<td></td>
</tr>
<tr>
<td>Assessing and Applying Evidence</td>
<td>Dec 2020</td>
</tr>
<tr>
<td>• How do we look at evidence and ask critical question?</td>
<td></td>
</tr>
<tr>
<td>Program Design and Contracting</td>
<td>Feb 2021</td>
</tr>
<tr>
<td>• How do we connect evidence to contracting and program design?</td>
<td></td>
</tr>
<tr>
<td>Cost Benefit, Part 1</td>
<td>Apr 2021</td>
</tr>
<tr>
<td>• What are the key concepts in developing a cost-benefit model?</td>
<td></td>
</tr>
<tr>
<td>Cost Benefit, Part 2</td>
<td>June 2021</td>
</tr>
<tr>
<td>• How do we use cost-benefit analysis to inform policy and practice?</td>
<td></td>
</tr>
</tbody>
</table>
SEMINAR 1.4: COST-BENEFIT ANALYSIS
SEMINAR OVERVIEW

• What is cost-benefit analysis and why is it important
• Overview of criminal justice cost-benefit analysis
• Methodology for county level cost-benefit analysis
WHAT IS COST-BENEFIT ANALYSIS

• The process of comparing the costs involved in doing something to the advantage or profit it may bring
  • An approach to policy making
  • A systematic tool for monetizing public policy outcomes
  • A method to weigh options
  • A way for finding out what will achieve the greatest results at the lowest costs
  • Provides an apples-to-apples comparison across policy choices
KEY TERMS

• Present value – today’s value of a future stream of money or benefits
• Discount rate – the rate at which future dollars are valued
• Sensitivity analysis – a method for quantifying uncertainty in estimates
• Cost avoidance vs cost savings – many benefits do not result in quantifiable taxpayer savings
• Benefit-cost ratio – the expected benefit for each dollar invested
WHY USE COST-BENEFIT ANALYSIS

**Strengths**
- Inform policy
- Efficient use of resources
- Common measurement

**Challenges**
- Limited data in some areas
- Uncertainty in some estimates
- Need to decide cost/benefits to include
CBA USE IN CRIMINAL JUSTICE

Washington State Institute for Public Policy

• Pioneers in creating a statewide cost-benefit model and summary of available rigorous research

Pew-MacArthur Results First Initiative

• Working with jurisdictions to implement a cost-benefit approach to invest in policies and programs that are proven to work

CSAC

• Partnered with multiple California counties to implement and county specific criminal justice cost-benefit model
## CBA Example

<table>
<thead>
<tr>
<th>Program/Practice Name</th>
<th>Benefits per Participant</th>
<th>Cost per Participant</th>
<th>Net Benefit per Participant</th>
<th>Benefit Cost Ratio</th>
<th>Recidivism Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY REPORTING CENTER</td>
<td>$10,094</td>
<td>$2,869</td>
<td>$7,225</td>
<td>$3.52</td>
<td>-24.06%</td>
</tr>
<tr>
<td>DRUG COURT</td>
<td>$8,335</td>
<td>$5,680</td>
<td>$2,655</td>
<td>$1.47</td>
<td>-19.86%</td>
</tr>
<tr>
<td>ELECTRONIC MONITORING (in lieu of jail)</td>
<td>$6,823</td>
<td>$1,650</td>
<td>$5,173</td>
<td>$4.14</td>
<td>-7.67%</td>
</tr>
<tr>
<td>OUTPATIENT DRUG/ALCOHOL TREATMENT (Matrix)</td>
<td>$838</td>
<td>$1,763</td>
<td>$925</td>
<td>$0.48</td>
<td>-1.99%</td>
</tr>
<tr>
<td>REASONING AND REHABILITATION</td>
<td>$4,553</td>
<td>$216</td>
<td>$4,337</td>
<td>$21.08</td>
<td>-10.83%</td>
</tr>
<tr>
<td>RISK-NEED-RESPONSIVITY</td>
<td>$8,063</td>
<td>N/A</td>
<td>$8,063</td>
<td>N/A</td>
<td>-19.21%</td>
</tr>
<tr>
<td>WAGE$$</td>
<td>$3,827</td>
<td>$199</td>
<td>$3,628</td>
<td>$19.23</td>
<td>-9.1%</td>
</tr>
</tbody>
</table>
OVERVIEW OF CRIMINAL JUSTICE COST-BENEFIT ANALYSIS
CRIMINAL JUSTICE CBA: BIG PICTURE

• Estimate the cost of crime in your jurisdiction

• Examine programs/policies that impact crime

• Apply the cost of crime to programs/policies to estimate their monetary benefits to taxpayers and society
FOUR MAIN SECTIONS
OF THE COST-BENEFIT MODEL

- Program effectiveness and costs
- Recidivism analysis
- System resource use
- System costs
PROGRAM EFFECTIVENESS AND COSTS

- Local rigorous evaluation
- Match programs from the program inventory to those found in the cost-benefit model
- Calculate the marginal costs per participant for each of the programs found in the cost-benefit model

Recidivism Reduction with Confidence Intervals

Drug Court

- Upper 95%
- Average Estimate
- Lower 95%
RECIDIVISM ANALYSIS

• Establish a baseline to predict program outcomes in your jurisdiction

• Matches a cohort to the types of programs offered in the jurisdiction

• Identifies how many people have new convictions, as well as when

Cumulative Recidivism Rate for New Conviction

RNR Supervision

Baseline  RNR Supervision

0%  10%  20%  30%  40%  50%

1  2  3  4  5  6  7  8  9  10  Follow-up Year

Recidivism Rate
SYSTEM RESOURCE USE

• Informs how often an event happens in the criminal justice system and for how long
• Estimates the probability of a certain set of sentencing outcomes
• Estimates the average length of time spent in each part of the system
SYSTEM AND SOCIETAL COSTS

Police

Courts, District Attorney and Public Defender

Probation

Jail

Prison

Parole and PRCS

Victimization
SUMMARY

• Program effectiveness estimates

• Monetizing changes in crime
  • What is the value of avoiding one recidivist?

• Using economic analysis to combine program effectiveness and the costs of the criminal justice system
How interested in are stakeholders in making sure programs are fiscally beneficial (i.e., are there more benefits than costs)?
CRIMINAL JUSTICE COST-BENEFIT ANALYSIS METHODOLOGY
CBA FRAMEWORK

• Use standard economic tools that been developed to monetize crime
  • Including adjusting for inflation, discounting future dollars, victimization cost estimates, and accounting for uncertainty

• Measuring recidivism using a standardized tool

• Marginal compared to average costs
  • Only certain variable costs are impacted by smaller changes in caseloads
PROGRAM EVALUATION AND CBA

• Cost-benefit analysis relies on estimated impacts of programs on recidivism

• Local evaluations can provide this information
  • Very few rigorous local evaluations
  • Evaluations need to be updated as programs and system change

• Meta-analysis provides a summary of the research base
  • Effect sizes from the literature can be used when local evaluations are not available
MATCHING LOCAL PROGRAMS TO ESTABLISHED RESEARCH FINDINGS

- The program inventory can be used to match local programs to the established research base to estimate program effectiveness.
- Program summaries are available to help counties match their specific programs to the research base.
  - This will provide an estimated level of effectiveness that can be used in the cost-benefit model.
ESTIMATING PROGRAM COSTS

• Cost per participants makes up half of the cost-benefit equation
• Contracted rates
• Overall annual expenditures and number of program participants
  • Expenditures divided by number of participants
  • Staff time, training, materials, and other program costs
• Weighted cost estimates for programs that can not be disaggregated
RECIDIVISM DATA ANALYSIS ELEMENTS

Cohort

- The goal is to create cohorts that will most closely match those receiving programs and follow them for 5+ years.
- CII or another identifier
- Risk for future re-offense category.
  - Mutually exclusive categories of High, Moderate, and Low risk.

Follow-up

- Each new conviction event occurring after each offender’s release date or community supervision placement date must be matched to the individual in each cohort.
- Case/Docket ID
- Date of conviction
- Most serious (“primary” or “governing”) offense level for each conviction (misd or felony)
RECIDIVISM EXAMPLE

Cohort
Probationer 1 was placed on felony probation January 1, 2010
Assessed as low risk

Follow-up Period
Probationer 1 had four subsequent convictions
- January 2, 2010 (F)
- February 13, 2014 (M)
- March 1, 2016 (F)
- January 12, 2018 (M)
RECIDIVISM EXAMPLE

Cohort

- Part of the General Probation Cohort, but not a part of the High/Moderate Risk Cohort
- Any conviction from January 2, 2010 to Dec 31, 2017 would be counted in the cohort to provide 7 years of follow-up
  - Conviction 1: Doesn’t count since its likely a sentencing anomaly
  - Conviction 2: Counts as a misdemeanor conviction in Year 4
  - Conviction 3: Counts as a felony conviction in year 6
  - Conviction 4: Does not count since outside of the 7-year follow-up
RECIDIVISM ANALYSIS

- Analytic platform to standardize data gathering, merging and analysis
- Uses freely distributable Microsoft database application
- Lives locally, so no data transfer of offender records
- Exports merged data to simplify further analysis
- Measures recidivism multiple ways in order to correctly monetize the impacts of recidivism
RESOURCE USE DATA ELEMENTS

- Recent year of felony and misdemeanor convictions
  - Include type of most serious offense (felony or misdemeanor)
  - Sentence type (prison, jail, probation, etc.)

- Recent year of jail releases to estimate length of stay by felony and misdemeanor

- Recent year of probation closures to estimate length of stay by felony and misdemeanor
### Felony Conviction Probability

#### Dispositions

- **100 People Convicted of a Felony**
  - **10 Receive no Jail Post Sentence**
    - **5 Supervision Only**
      - **5 Fines/Fees/Treatment/Other**
    - **5 Supervision Only**
  - **80 Receive Jail time, Post Sentence**
    - **10 Jail only**
    - **70 Receive Probation or Mandatory Supervision**
  - **10 Sentenced to Prison**
    - **9 granted Post Release Community Supervision or Parole**
    - **1 Not Released, or Released Outright**

#### Percent of Felonies

<table>
<thead>
<tr>
<th>Disposition</th>
<th>Percent of Felonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jail Only, Post Sentence</td>
<td>10%</td>
</tr>
<tr>
<td>Probation or Mandatory Supervision Only</td>
<td>5%</td>
</tr>
<tr>
<td>Jail and Supervision</td>
<td>70%</td>
</tr>
<tr>
<td>Other Dispositions</td>
<td>5%</td>
</tr>
<tr>
<td>Prison</td>
<td>10%</td>
</tr>
<tr>
<td>---Post Prison Supervision</td>
<td>90%</td>
</tr>
</tbody>
</table>
AN EXAMPLE

Person 1 was convicted on 3 counts of Misdemeanor Drug Possession March 3, 2019 on Docket 1432.
• He received 30 days in jail, 2 years on probation

Person 1 was convicted on 1 count of Felony Assault on November 12, 2019 on Docket 1787.
• He received 180 days in jail, an additional 2 years on probation

Person 2 was convicted on 1 count of 2nd degree Murder (Homicide) on December 20, 2019 on Docket 1787.
• He received 10 years in State Prison and would be eligible for Parole
# Length of Stay - Jail

## 1 Year of Jail Releases

Broken out by severity of most serious convicted charge in the booking

*(Felony or Misdemeanor)*

<table>
<thead>
<tr>
<th>Person ID</th>
<th>Booking ID</th>
<th>Case ID</th>
<th>Booking and Release Reason</th>
<th>Entry Date</th>
<th>Exit Date</th>
<th>Sentence Date</th>
</tr>
</thead>
</table>
LENGTH OF STAY-SUPERVISION

1 Year of Supervision Completions

Broken out by severity of most serious convicted charge
(Felony or Misdemeanor)

Entry Date  Exit Date  Person ID  Case ID  Supervision Type
MEASURING MARGINAL COSTS

• Marginal costs — How much more does it cost for a small increase in the caseload

• Marginal costs exclude fixed costs and focus on drivers that change in the short or medium term with increases in people served

• Estimating benefits based on marginal costs provides a more conservative estimate of cost avoidance and more accurately estimates the impact to the system of small changes in recidivism
MARGINAL COST ESTIMATE METHODOLOGY: TOP-DOWN APPROACH

1. Isolate costs directly related to providing the service or activity
2. Determine what expenditure categories are fixed and what are variable
3. Divide operating expenditures by the number of units served
MARGINAL COST ESTIMATE METHODOLOGY: BOTTOM-UP APPROACH

Iowa: Estimating Judicial Time

- Determined the judicial time per crime class
- Multiplied the time by the average wages and benefits
- Estimated the percent of each crime class to estimate the overall weights

Another study estimated the marginal cost of drug court hearings by the hourly cost of the personnel involved

- $3.50 per minute multiplied by an extra 9.7 minutes for a drug court hearing
TAXPAYER COST AREAS

- Police
- Courts, District Attorney and Public Defender
- Probation
- Jail
- Prison
- Post-prison supervision

• These also get broken out by local and state costs to identify the perspective
HOW CAN COSTS TO VICTIMS BE ESTIMATED?

WHAT ARE TANGIBLE AND INTANGIBLE LOSSES?

Victimization estimates:


COUNTY EXAMPLES
## Cost Benefit Model Results

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Description</th>
<th>Benefits Per Participant</th>
<th>Cost Per Participant</th>
<th>Cost-Benefit Ratio</th>
<th>Recidivism Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education - High School Diploma or GED</td>
<td>GED preparation, Independent Study Programs and Special Education.</td>
<td>$7,622</td>
<td>$1,544</td>
<td>4.87</td>
<td>-9%</td>
</tr>
<tr>
<td>Employment Services</td>
<td>Employment services in the form of soft skills, resume preparation, job searches and job training. Includes interactive journalized curriculum.</td>
<td>$1,714</td>
<td>$1,083</td>
<td>1.58</td>
<td>-2%</td>
</tr>
<tr>
<td>Helping Women Recover</td>
<td>Program that integrates theories of women's psychological development, trauma, and addiction to meet the needs of women with addictive disorders.</td>
<td>$6,554</td>
<td>$1,012</td>
<td>6.48</td>
<td>-8%</td>
</tr>
<tr>
<td>Matrix Model</td>
<td>Intensive outpatient treatment approach for substance abuse and dependence.</td>
<td>$8,196</td>
<td>$1,208</td>
<td>6.78</td>
<td>-10%</td>
</tr>
<tr>
<td>Reasoning and Rehabilitation</td>
<td>Cognitive behavioral therapy intended to help participants develop social skills, moral reasoning, and problem-solving skills. The focus of R&amp;R II involves assisting clients develop problem solving skills through moral reasoning.</td>
<td>$7,312</td>
<td>$227</td>
<td>32.15</td>
<td>-9%</td>
</tr>
<tr>
<td>Thinking for a Change (T4C)</td>
<td>Cognitive-based program designed to improve social skills, cognitive self-change skills, and problem-solving skills. The goal of T4C is to have the participants comprehend that their thinking controls their behavior.</td>
<td>$7,312</td>
<td>$248</td>
<td>29.49</td>
<td>-9%</td>
</tr>
</tbody>
</table>

- **Benefits Per Participant**: The program’s monetary impact for reducing recidivism
- **Program Cost**: The operational cost to provide the program
- **Cost-Benefit Ratio**: The amount of benefits for every dollar in costs invested
- **Recidivism Reduction**: The estimated recidivism reduction based on Solano County's baseline recidivism rate
## Yolo County Cost-Benefit Results

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Benefits per Participant</th>
<th>Costs per Participant</th>
<th>Benefit to Cost Ratio</th>
<th>Recidivism Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Behavioral Therapy</td>
<td>$5,759</td>
<td>$1,229</td>
<td>$4.69</td>
<td>-9%</td>
</tr>
<tr>
<td>Drug Court</td>
<td>$13,332</td>
<td>$12,485</td>
<td>$1.07</td>
<td>-21%</td>
</tr>
<tr>
<td>Electronic Monitoring (PRCS)</td>
<td>$587</td>
<td>$653</td>
<td>$0.90</td>
<td>-6%</td>
</tr>
<tr>
<td>Electronic Monitoring Sheriff</td>
<td>$7,249</td>
<td>$906</td>
<td>$8.00</td>
<td>-13%</td>
</tr>
<tr>
<td>Literacy Training</td>
<td>$6,004</td>
<td>$465</td>
<td>$12.92</td>
<td>-9%</td>
</tr>
<tr>
<td>Mental Health Court</td>
<td>$8,874</td>
<td>$20,936</td>
<td>$0.42</td>
<td>-14%</td>
</tr>
<tr>
<td>Swift Certain and Fair</td>
<td>$2,480</td>
<td>$2,434</td>
<td>$1.02</td>
<td>-4%</td>
</tr>
</tbody>
</table>
RESOURCES
MATERIALS, GUIDES AND TEMPLATES

Materials available:

California County Adult Criminal Justice Cost Benefit Model Guide

Adult Criminal Justice Cost-Benefit Model Program Summaries

Programming Series Info:
https://www.counties.org/framework-seminar-series

Support Hub Website:
https://www.counties.org/csac-support-hub
LOOKING AHEAD
Data Dashboards

This seminar provides an introduction to designing data dashboards, a key tool in making your data more accessible and flexible. We first discuss the process of designing a data dashboard that will allow you to track the key population characteristics, interventions, and outcomes that are important for your agency or county. We will then present and discuss several data dashboards concepts that can be adapted for your purposes.
Cost-Benefit, Part 2

A presentation of CSAC team learnings from 10 California counties across various areas of cost benefit analysis will include an overview of relative recidivism rates, program costs, system cost drivers, and system usage. We will discuss how these findings can be interpreted and applied to local decision-making, particularly in resource-constrained environments.
Contact:
Ryan Souza, Program Director
RSouza@counties.org
(m) 916-628-1404