



# High Cost of Recidivism

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## Supplement

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## What is cost-benefit analysis?

Cost-benefit analysis (CBA) is a method of economic analysis that weighs pros and cons for alternative courses of action. The approach is systematic: each pro and con for all the possible actions is weighted by the value of its importance to allow for direct comparison. Once all the values have been assigned, the analyst can then assess whether the benefits outweigh the costs. If there are multiple alternatives, the options can be compared to determine which has a greater benefit and better return on investment.

A key advantage of some CBAs, including the Results First model, is the ability to respond to uncertainty. Because the model predicts uncertain future outcomes and returns on investment, CBA uses a method called Monte Carlo analysis to run numerous simulations, each with plausible but different inputs. After thousands of simulations with different combinations of inputs, the range of costs and benefits demonstrates the likelihood of a positive return.

Businesses and private organizations have used CBA for decades to answer investment questions. Because of the capability to address uncertainty and rank various policies and programs, use of the tool in government is expanding. Perhaps the largest advantage of CBA for government is the inclusion of social benefits and costs of interventions. The social benefits and costs allow for public policy to examine not only budget lines but the effects of policies on the entire community. These key components—costs and benefits—are briefly discussed below.

### Costs

Marginal costs are the changes due to one unit or event. Marginal costs are different than average costs, which are the total costs divided by total output. Average costs include the fixed costs, such as administrative expenses, debt payments, and other overhead costs, that do not change when production or workload changes. However, if the increase or decrease in workload is large, the administrative or fixed costs may change. These large changes can be accounted for during calculation of marginal costs.

Consider the reduction of one arrest: for each arrest, a law enforcement officer must take time to process the person and the appropriate paperwork. The reduction of one arrest provides the officer more time for other services (valued at his or her salary), but it will not change the need for a police station, officers, or supervisors.

Marginal costs must be measured over time to appropriately measure long-term implications that do not appear with minimal changes. Analysts often calculate marginal costs by examining expansion or contraction of entire departments or agencies or by calculating the average time and resources spent on individual cases or services. Although the theory behind marginal costs is simple, government spending is seldom allocated or distributed based on marginal costs.

### Benefits

Most events have benefits as well as costs. Any benefits that occur to any individual within the scope of the CBA are counted. In the criminal justice context, the benefits are reduced crime: one fewer robbery results in fewer taxpayer costs for each part of the criminal justice system, as well as fewer costs to victims. The victim costs may be tangible, such as lower medical bills and avoided property loss, or intangible, such as the costs of pain and suffering and other societal benefits (*e.g.*, fear of crime).

This supplement explains the costs and benefits included in the Illinois Results First model. Transparency regarding the state-specific inputs encourages the Illinois criminal justice stakeholders to contribute to refining and improving the Illinois Results First model. As additional information becomes available and SPAC incorporates new data, the results are likely to change. The current results are the best estimates based on available cost and victimization data.

## **What is the Pew-MacArthur Results First model?**

The Pew-MacArthur Results First Initiative is a project of The Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation. The initiative works with states to implement and customize an innovative cost-benefit analysis tool that helps them invest in policies and programs that are proven to work.

The model, supported by the Results First Initiative, was initially developed by the Washington State Institute for Public Policy. The model combines analyses of recidivism patterns and population estimates with a rigorous meta-analysis of criminal justice program evaluations. The meta-analysis determines the average change in recidivism from evidence-based programs implemented with fidelity. By using state-specific costs and recidivism trends and national research on the effectiveness of programming, the model can project long-term changes in benefits and costs due to investments in specific programs and policies.

Illinois, through SPAC, is one of a number of states using and adapting the Results First model to inform policy and budget decisions. Although the model can be expanded to other program areas, including child welfare, juvenile justice, mental health, and substance abuse, SPAC has customized the inputs only for adult criminal justice.

## **What specifications has SPAC added?**

The model's criminal justice component has four main sections with default inputs that are adjusted with Illinois-specific information: costs, recidivism, resource use, and program information. To explain the modifications, this section discusses the resource use and recidivism inputs. The following section discusses the costs.

To calculate the resource use, SPAC first determined the frequency of different crime types in Illinois. The second step was adjusting the crime trends for unreported or multiple-victim offenses. Third, the model incorporated the state-specific recidivism patterns. Finally, SPAC adjusted the model with the number of inmates in state prisons.

The resource use by each type of crime is calculated from analysis of the state's Criminal History Record Information. Cohorts of individuals released from prison and sentenced to probation were examined from 2000 to 2003 and then followed for nine years. After analyzing each year's recidivism patterns, the 2002 cohort was used to produce the presented results. The other cohorts were substantially similar, but the 2002 cohort provided the most reliable number of cases with the longest follow-up period.

## Resource use by crime type

	Murder	Felony Sex Crimes	Robbery	Aggravated Assault or Battery	Felony Property	Felony Drug and Other	Misdemeanors
<b>Crime Probability:</b> most serious recidivism offense	0.6%	1.2%	3.9%	7.7%	24.6%	39.6%	22.5%
<b>Trips:</b> average number of adjudications through system	1.92	2.27	3.01	3.16	3.12	2.32	1.54
<b>Offenses:</b> average number of offenses per trip	1.64	1.40	1.31	1.30	1.20	1.23	1.15

The above table displays the likelihood that a recidivism event's most serious offense will fall in each crime category. For example, the likelihood that a murder is the most serious recidivism offense is very small, at 0.6%, because murders are infrequent. Misdemeanors, on the other hand, are frequent but not the most likely because recidivists commit other offenses or have their crimes elevated to felony level because of their criminal history. The number of trips, or cycles through the criminal justice system, is the average number of felony or misdemeanor convictions associated with that individual throughout the nine-year study for each crime category. The third row, the number of offenses, shows the average number of counts ending in a conviction. These additional adjudications or offenses can occur in any of the crime types.

Once an individual is convicted of a crime, the criminal justice system may expend resources on supervising or incarcerating that individual. After calculating the probability of supervision or incarceration using the state's Criminal History Record Information system and data from Illinois Department of Corrections, SPAC calculated the average resource use by crime type. For offenses other than murder, the resource use is the actual average length of stay in prison or on probation and the actual time spent on mandatory supervised release (MSR). For murder, the analysis used admissions rather than average length of stay at exit because of policy changes. The murder penalties have been raised and offenders are subject to truth-in-sentencing, which sufficiently lengthens the total time served so that recent exits do not reflect current resource use. For MSR, formerly known as parole, and probation, the number of years may be lower than expected due to the number of individuals violating the terms of supervision and receiving prison sentences or discharged unsuccessfully.

Number of Years of Use		Murder	Felony Sex Crimes	Robbery	Aggravated Assault or Battery	Felony Property	Felony Drug and Other	Misdemeanors
Probation Sentences	<b>Jail:</b> pre-probation	0.28	0.37	0.31	0.28	0.27	0.24	0.14
	<b>Probation:</b> average term	3.39 <sup>a</sup>	2.79	2.38	2.10	2.17	2.04	1.48
Prison Sentences	<b>Jail:</b> pre-prison	1.95	0.61	0.65	0.31	0.23	0.21	0
	<b>Prison:</b> average prison term	29.3	4.5	3.3	2.0	1.5	1.2	0
	<b>Mandatory Supervised Release</b>	2.0	0.9	1.6	1.2	1.4	1.4	0

<sup>a</sup> Probation sentences for murder, which includes involuntary manslaughter or other homicide offenses, are extremely rare and seldom used in the model.

### ***Adjustment for unreported and multiple victim crimes***

Some crime is not reported to law enforcement. Further, some crime may have multiple victims per offender. To adjust for these cases, the model uses the National Crime Victimization Survey (NCVS, 2011) and estimates the number of victimizations per offense. For example, all murders are reported, while about 52% of property offenses and only 31% of sex crimes are reported. In addition, property offenses generally have multiple victims per offense, whereas most murders involve just one victim.

First, SPAC grouped Illinois' reported crimes into large, nationally-recognized crime categories for inclusion in the model.<sup>1</sup> Second, the model uses national survey results to estimate unreported crime. The NCVS permits the model to account for the estimated number of crimes that actually occur in the state, even those that are not reported to police. Finally, the model accounts for cases where there are multiple victims per offense and multiple offenders per crime.

The use of these historical crime data represents the deterrent effect of convictions and supervision or incarceration, as the historical numbers of crime includes the deterrent effect of the system.<sup>2</sup> Using all of these inputs, the model calculates the estimated number of victimizations per convicted offender. Some of the key inputs are displayed here:

	<b>Murder</b>	<b>Felony Sex Crimes</b>	<b>Robbery</b>	<b>Aggravated Assault or Battery</b>	<b>Felony Property</b>
Statewide Crimes Reported 2011	721	8,936	20,254	30,564	77,746
Percent of Crimes Reported: 2011	100%	31%	66%	67%	52%
Estimated Victimization per Convicted Offender	1.00	7.62	3.90	3.20	6.48

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<sup>1</sup> For example, federal reporting standards do not include all of Illinois' felony sex crimes. The federal theft definition is overly inclusive, including some of Illinois' misdemeanor offenses. SPAC adjusted the number of reported crimes to reflect the different definitions. The model also uses estimates of the number of other offenses that can be attributed to a conviction.

<sup>2</sup> However, the model does not calculate specific estimations of the deterrent effect. Other criminal justice researchers have reported estimates of the size of deterrence. *See, e.g.,* Travis, J., et al. (2014). The Growth of Incarceration in the United States: Exploring Causes and Consequences, *National Research Council of the National Academies*.

### ***Recidivism patterns (nine years)***

SPAC analysis shows the recidivism rates for a 2002 cohort of individuals released from prison and those sentenced to probation. These cohorts were analyzed separately and together to form the baseline recidivism patterns for Illinois. The year 2002 was chosen to permit at least nine years of tracking recidivism with robust data. Further analysis was done measuring alternative cohort years; however, the recidivism rates were not significantly different. The cumulative recidivism patterns follow:

<b>Year from Release</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Adult Prison	19.7%	36.9%	47.5%	53.9%	58.5%	61.4%	63.8%	65.6%	66.2%
Adult Probation	18.5%	30.3%	37.5%	42.4%	46.1%	48.8%	51.0%	52.7%	53.4%
<b>Combined Recidivism</b>	19.0%	33.1%	41.7%	47.2%	51.3%	54.1%	56.4%	58.1%	58.8%

Importantly, this cost-benefit tool uses a different definition of recidivism than the definition commonly used in Illinois’ criminal justice research. The tool defines recidivism as a conviction for a new crime. The conviction can either be a misdemeanor or felony conviction. This differs from the standard Illinois definition, where recidivism is a return to state prison within three years.

In addition to the cumulative recidivism rate, the model addresses the timing of recidivism and the number of re-offenses throughout the nine-year period of analysis. The resulting hazard distribution accounts for multiple recidivism events and the potential for some offenders to travel through the system multiple times during the nine years of study.

### ***Illinois corrections and probation populations***

The 2002 cohorts included 18,825 inmates released from prison and 60,454 individuals sentenced to probation. The probation cohort included intensive probation sentences but excluded deferred prosecution or withheld judgment cases, as well as other alternative, non-prison felony sentences. As of June 30, 2013, IDOC held 48,748 inmates, which is used as the starting point for estimating changes in the prison population.

## **What costs are included in the CBA?**

The model has three types of costs: system, victim, and economic costs. These costs, both system and victim costs, are per victimization—the costs associated with one additional conviction event. For system costs, the model uses a “probability tree” to estimate how offenders move through the system based on conviction data from Illinois. The probabilities are estimated from:

- a. The likelihood of particular crime types (based on reported crime in Illinois);
- b. The likelihood of other offenses unreported (based on the National Crime Victimization Survey); and
- c. The likelihood and timing of recidivism (based on Illinois criminal justice data).



Once the probabilities are calculated, the model uses the specific marginal costs and benefits that would change with additional arrests, prosecution, and punishment. For victims, the costs result from lost wages, hospital bills, and pain and suffering. These costs vary by crime type.

### System costs

	Murder	Felony Sex Crimes	Robbery	Aggravated Assault or Battery	Felony Property	Felony Drug and Other	Misdemeanors
Police Costs per Arrest	\$1,037	\$1,037	\$1,037	\$1,037	\$1,037	\$1,037	\$1,037
Courts and Legal Costs per Arrest	\$179,736	\$22,140	\$11,636	\$5,753	\$237	\$237	\$237
Adult Jail per Person per Year	\$15,256	\$15,256	\$15,256	\$15,256	\$15,256	\$15,256	\$15,256
Adult Probation per Person per Year	\$1,800	\$1,800	\$1,800	\$1,800	\$1,800	\$1,800	\$1,800
Adult Prison per Person per Year	\$22,201	\$22,201	\$22,201	\$22,201	\$22,201	\$22,201	\$22,201
Adult Post-Prison Supervision per Person per Year	\$2,079	\$2,079	\$2,079	\$2,079	\$2,079	\$2,079	\$2,079
<b>Notes:</b> Adult jail costs are estimated from a SPAC survey in 2013. Adult prison costs are the per capita IDOC costs in 2014 to account for security costs. The IDOC security costs are included to address the most significant marginal expense (security) even though security costs are constant unless IDOC changes staffing significantly. Adult supervision costs are from IDOC in 2012. Adult probation costs are from AOIC in 2013. For calculations, all prices are inflated to 2014 value.							

Police, court, and prosecutor costs are primarily derived from Washington State’s marginal cost estimates. The courts and prosecutorial costs (estimated as two-thirds of the court and legal costs) are adjusted to account for the differences between starting judicial salaries for trial judges in Washington and in Illinois. The Washington marginal costs of policing are adjusted to reflect the cost difference in law enforcement officers, arrests, and policing budgets between Washington and Illinois. Although police costs do vary by crime type, the average marginal cost is sufficient for the model’s calculations.<sup>3</sup>

The Results First model combines these marginal annual costs with system use estimates discussed above. The combination results in costs that reflect actual system use by crime: although the costs of jail or prison are the same for murder or property offenders, the lengths of stay will vary and the overall costs reflect that variation over time.

<sup>3</sup> SPAC tested hypothetical variations in police costs by crime type (*i.e.*, 10 times the cost for murder and ½ the cost for felony drug or misdemeanors) and found substantially the same outcomes. In this hypothetical scenario, for example, the rarity of murder events offsets the higher marginal costs, resulting in only small changes in the model’s calculated average cost of a conviction.

SPAC estimated the proportion of the marginal spending that is provided by state or local dollars:

	State Spending	Local Spending
Police	8%	92%
Courts	33%	67%
Prosecutors and Public Defenders	10%	90%
Adult Jail	0%	100%
Adult Probation	25%	75%
Adult Prison	100%	0%
Adult Post-Prison Supervision	100%	0%

### Victimization costs

	Murder	Felony Sex Crimes	Robbery	Aggravated Assault or Battery	Felony Property	Felony Drug and Other	Misdemeanors
Tangible Victim Costs	\$737,517	\$5,556	\$3,299	\$8,700	\$1,922	\$0	\$0
Intangible Victim Costs	\$8,422,000	\$198,212	\$4,976	\$13,435	\$0	\$0	\$0
<b>Total Victimization Costs</b>	<b>\$9,159,517</b>	<b>\$203,768</b>	<b>\$8,275</b>	<b>\$22,135</b>	<b>\$1,922</b>	<b>\$0</b>	<b>\$0</b>

Victimization costs are from economic research following the methodology of a seminal study by the National Institute of Justice.<sup>4</sup> The costs include tangible costs, which are the physical harms such as medical expenses, cash or property theft or damage, and lost earnings due to injury or related consequences. Intangible costs are the pain and suffering resulting from being a crime victim.

The victimization costs for murder do not—and cannot—place a dollar value of any individual life. However, a theoretical and statistical value can be imputed to reflect tangible losses, such as lost earnings and end-of-life medical expenses, and intangible losses, such as pain and suffering, based on jury awards and settlements in wrongful death suits.

Some crimes do not create victimization costs. The model excludes costs for crimes against society, such as drug crimes. Finally, the misdemeanor category is such a large category that the wide range of victimization costs is excluded.

### Economic costs

SPAC included the deadweight cost of taxation: the dollar of welfare lost per tax dollar. Using the best national research, SPAC varied this cost between \$0.00 and \$1.00, with an average of \$0.50 per tax dollar spent. The input choices of \$0, \$0.50, and \$1.00 are from an evaluation by Heckman et al. (2010) and were determined to be appropriate by the Washington State Institute for Public Policy.<sup>5</sup> The U.S. Office of Management and Budget uses a lower cost, \$0.25 per

<sup>4</sup> McCollister, K.E., French, M.T., and Fang, H. (2010). The Cost of Crime to Society: New Crime-Specific Estimates for Policy and Program Evaluation. *Drug and Alcohol Dependence*, 108, 98-109.

<sup>5</sup> Heckman, J. J., Moon, S. H., Pinto, R., Savelyev, P. A., and Yavitz, A. (2010). The Rate of Return to the High/Scope Perry Preschool Program. *Journal of Public Economics*, 94(1-2), 114-128. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3145373/>.

dollar of federal taxation.<sup>6</sup> Because the federal estimate does not measure state revenue sources such as property or sales taxes, the Washington State estimates were used.

The deadweight cost of taxation reflects economic losses that occur with each tax dollar raised to pay for program costs as well as the overall criminal justice system. The losses are from economic inefficiencies. Taxes collected to fund public programs add to the costs for goods, services, and labor, which in turn reduce demand for those items. There is substantial uncertainty around the appropriate estimate of the deadweight cost of taxation; however, the inclusion is appropriate to allow for a full discussion of the total social costs and benefits of public services.

## What costs are excluded from the CBA?

For any cost-benefit analysis, some costs and benefits may be omitted. Omissions may be due to the inability to estimate the program's impact or a lack of generally accepted monetary valuations of the program's impact. SPAC has endeavored to include all costs and benefits for which the best current research suggests a measurable impact. This section, however, highlights some possible limitations or concerns.

First, the research used by the Results First model does not indicate a measurable impact of the secondary impacts of crime. The model includes the primary impacts of crime, such as the tangible medical and property costs and the intangible pain and suffering costs. However, the model excludes secondary impacts on victims' employment, housing, and familial needs because approximations of these variables have not been established by research. Additional research and study, in Illinois and nationally, may justify inclusion in the future.

Offenders also experience collateral consequences of crime and incarceration. Specifically, the effects of crime on offenders' employment, housing and family stability, and health due to criminal justice involvement are not included. For example, society cannot benefit from the productive labor or collected taxes from offenders when they are incarcerated or committing crimes. The model excludes these costs. However, the model does incorporate the cost of public programs used to address the collateral consequences (*i.e.*, program and IDOC costs) and effects when the consequences are not addressed (*i.e.*, the high recidivism rate).

Second, cost-benefit analysis struggles with the intergenerational and long-term effects of crime. Studies have shown negative effects of parental arrest or incarceration on children's education, employment, and health. These consequences are not included in the Results First model other than the costs discussed above. While evidence exists for these intergenerational effects, SPAC follows the Results First model and excludes these costs.

Third, the victimization costs and benefits do not vary by age. The model counts a sex crime or murder of a young victim as the same as that of an older victim. To some, this approach may be the most appropriate to avoid valuing any individual's victimization as more or less valuable as any other's. To others, this approach may not account for the special attention our criminal code focuses on certain victims. The average victimization cost, however, uses the costs of a wide range of victims and is based on the best research currently available.

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<sup>6</sup> OMB-Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, U.S. Office of Management and Budget. Available at: <http://www.whitehouse.gov/sites/default/files/omb/assets/a94/a094.pdf>.

Finally, the social discount rate minimizes the costs of long-term effects of crime. The social discount rate values a benefit that accrues in the future as less than its value today. Some scholarship challenges that the concept, or any dollar figure, can be applied to life. For example, using a discount rate assumes that a life saved (a murder prevented) in the future should be valued less than a life today. Some scholarship further argues that life simply cannot be valued. SPAC acknowledges these moral and ethical questions but offers this cost-benefit analysis as the best, most justifiable approach to better inform public policy developed to address issues in the criminal justice system.

## What is the high cost of recidivism?

Just one year of recidivism in Illinois costs the state \$2 billion per cohort of offenders released from prison and sentenced to probation. This calculation applies the \$118,746 per conviction to the one-year recidivism rate (19%) of the 90,000 individuals either sentenced to probation or released from prison. Over five years, the costs accumulate to \$16.7 billion as each year more individuals are placed on probation or released from prison and recidivism occurs. This is the high cost of recidivism.

The cost of a conviction permits SPAC to model changes in recidivism rates over time. This approach allows the Results First model to compare the costs and benefits of different criminal justice policies and programs in Illinois. To demonstrate, SPAC modeled a hypothetical recidivism reduction two alternative ways: first by reducing the recidivism rate by five percentage points, second by examining a five percent reduction of the rate (a percent-of-a-percent approach). Both methods are described below.

### *Reduce recidivism five percentage points*

If recidivism fell five percentage points over five years:

Year from Release	1	2	3	4	5
Combined Recidivism	19.0%	33.1%	41.7%	47.2%	51.3%
5 percentage point reduction	14.0%	28.1%	36.7%	42.2%	46.3%

Because the percentage change is consistent each year, the model calculates the savings in the first year.<sup>7</sup> In this case, there would be 4,557 fewer convictions and \$541 million in costs avoided. This percentage point reduction method has been used by other states that are implementing the Results First model and is the method SPAC uses in the *High Cost of Recidivism* report.

### *A five percent reduction of the recidivism rate*

Alternatively, SPAC modeled a 5% reduction of the recidivism rate of the current cohort for a five year period. Note that this method is a percent-of-a-percent, meaning that the first year's

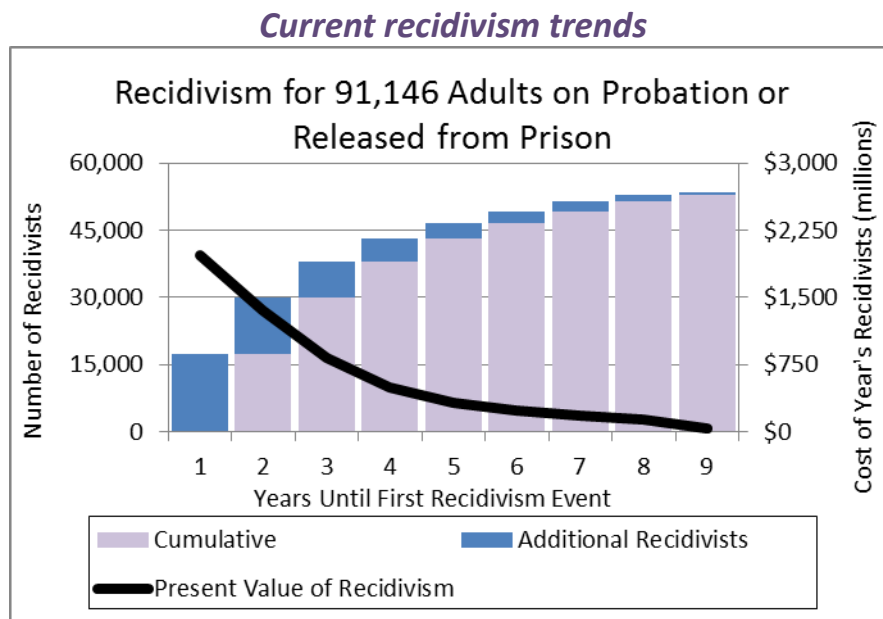
<sup>7</sup> The model's savings are technically the net present value of the costs accrued over the lifetimes of the affected persons. Some of costs such as prison can occur over several years. The future costs are discounted by a discount rate of between 2% and 5%.

reductions would be smaller than later years, when the current cumulative rate is larger. This method may be more plausible because the impact increases over time rather than appearing all in the first year. However, the model is, in fact, estimating a hypothetical recidivism reduction and therefore the simpler percentage point method is appropriate. The percent-of-a-percent method results in the following recidivism rate over five years:

Year from Release	1	2	3	4	5
<b>Combined Recidivism</b>	19.0%	33.1%	41.7%	47.2%	51.3%
<b>5% reduction</b>	18.1%	31.3%	39.7%	45.0%	48.6%

The following chart shows that the Results First model can estimate the number of recidivism events and associated costs for up to nine years. By the end of nine years, 49% of the individuals (about 54,000 individuals) recidivate.

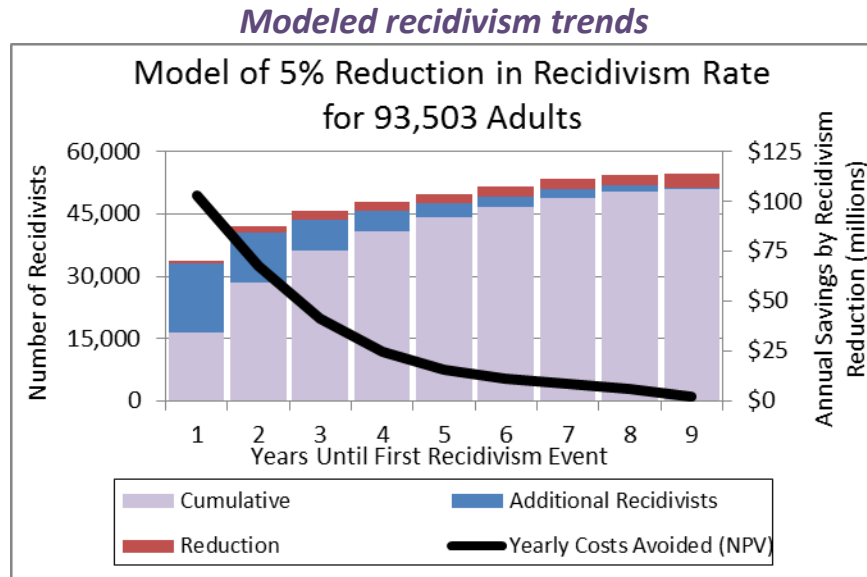
The shaded dark blue regions represent the number of individuals who recidivated for the first time in that year. The lightly-shaded purple regions illustrate the previous years' recidivism totals. Finally, the dark line is the net present value of the costs of each year's additional recidivism events (in millions of dollars). The costs that accrue in future years are discounted at a 5% social discount rate to reflect the current value of the costs.



Year from release	Current Trends for Cumulative Recidivists	Number of Cumulative Recidivists	Number of Additional Recidivists	Number Below Current Trends	Costs Avoided by End of Year (present value)
Year 1	17,393	16,523	16,523	870	\$103,265,403
Year 2	30,022	28,521	11,998	631	\$68,012,671
Year 3	38,052	36,150	7,629	402	\$41,185,756
Year 4	43,176	41,017	4,868	256	\$25,029,146
Year 5	46,646	44,314	3,296	173	\$16,140,692
<b>Five Year Totals</b>	46,646	44,314	44,314	2,332	\$253,633,669

If the recidivism rate fell 5% each year for five years, there would be 2,332 fewer reconvictions over that time, which would avoid \$254 million in costs to taxpayers, victims, and society.

On the chart below, the dark red sections represent the number of recidivists below the current trend—a small number compared to the total recidivism events each year.



## How does the model address uncertainty?

The Results First cost-benefit model uses Monte Carlo simulations to account for uncertainty. Any cost-benefit analysis must deal with risk and the speculation about future effects of investments and outside factors. The use of Monte Carlo simulations tests for the average estimate's sensitivity to variation of inputs. It provides users with best- and worst-case ranges of outcomes and the probability that the benefits will outweigh the costs. This method ensures that, despite the uncertainty and unknown nature of some inputs, the outcomes may be expected to fall within a feasible range of possibilities.

To conduct Monte Carlo simulations, a cost-benefit model calculates the total net benefits multiple times, each time allowing uncertain inputs to vary. For example, the expected costs of arrests or the extent of a program's effectiveness are selected at random from a designated distribution during each simulation. Over one thousand simulations, the model can then show realistic best- and worst-case scenarios. Importantly, the model reports back the average of these calculations.

In the Results First model, certain inputs vary in the Monte Carlo simulations. The costs of criminal justice programs and victimization costs range between 20% above and below the point estimate. The programs' effectiveness scores fall within a normal distribution from the average effect size. Additional inputs vary in a triangular probability distribution in the simulations:

- Program costs
- Crime victimization costs
- Criminal justice system costs

- Criminal victimizations per conviction
- Deadweight cost of taxation

The results for the value of a conviction are distributed between \$80,000 and \$147,000. The average net cost of a conviction of 1,000 simulations is \$118,746. As the frequency chart shows below, most of the simulations fall around the peak of the distribution, around \$118,000.

