**Methodology to the Pretrial Cost-Benefit Model**

In 2013, the Public Welfare Foundation funded the development of a cost-benefit model for pretrial. The goal of the model was twofold: to monetize the pretrial outcomes of failure to appear and pretrial misconduct and demonstrate the impact of "business as usual" pretrial practice; and to allow jurisdictions to model the potential impact of future policy decision making.

Most cost-analyses of pretrial compare the costs of jail beds relative to the costs of pretrial supervision. This is certainly part of the equation, but it is also important to estimate the costs to taxpayers and crime victims from pretrial misconduct and failures to appear while the defendant otherwise could have been in jail. This cost-benefit model is designed to estimate the tradeoff between jail beds and public safety, as well as incorporate the most recent research on the impacts of pretrial detention on sentencing, short-term rates of new criminal activity and failure to appear, and long term recidivism.

Jurisdictions can estimate the overall economic impact of changing their own pretrial policies by proposed local changes, comparisons to neighboring jurisdictions, or implementing a national standard. The economic impact estimate includes the marginal costs of changes in jail beds, changes in the costs of pretrial supervision, changes in the number of new crimes, changes in failure to appear, changes in long-term recidivism, and changes in sentencing outcomes. All of these impacts are measured in the common metric of dollars and cents of a given year.

When tailored to the jurisdiction, the cost-benefit model initially compares "business as usual" in a given pretrial system with a risk-based approach and provides monetized outcomes for the system as it currently exists. Stakeholders in the jurisdiction can then change the "policy levers" in the model to determine what impact a policy change would have on the overall economic benefits. Figure 1, below, shows preliminary results in a hypothetical county with approximately 7,500 annual pretrial bookings, and demonstrates the economic impact of increasing the number of low risk defendants released quickly (one day or less) and reducing the number of high risk defendants released. In this example the system costs are reduced, mostly through the use of fewer jail beds, and the costs from new crimes are also reduced from detaining the high risk defendants. The costs of failure to appear are much lower than the costs of crime, and while failures to appear are also reduced in this example the impact barely appears on the table and graph.

Figure 1.
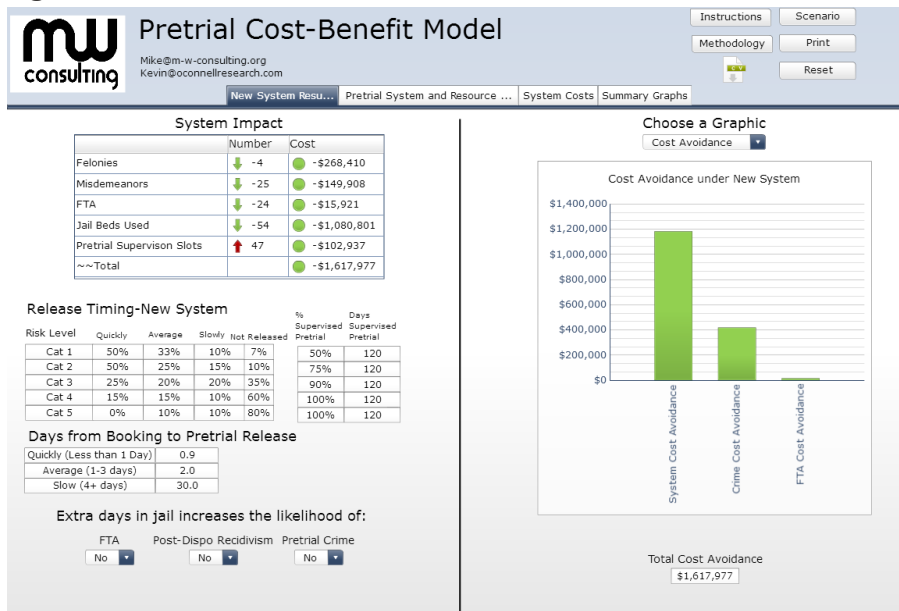
The sections below discuss the methodology for how the model computes the monetary impacts of the pretrial policy scenarios. In order to use this model, jurisdictions need to gather data on their pretrial system as well as general cost and system use data for the criminal justice system as a whole. The pretrial data is used to estimate the baseline number of jail beds used for the pretrial population as well as the estimated number of crimes and failures to appear for released defendants. The criminal justice system cost information is used to estimate the costs of failures to appear as well as new criminal offenses. The model then estimates the change in costs from different release decisions, incorporating both taxpayer costs from system usage differences as well as victimization costs from changes in the number of new criminal offenses.

Risk Assessment

This pretrial model is designed to allow jurisdictions to enter their own pretrial data, broken out by up to five risk levels. From a cost perspective, the use of risk information is very useful in comparing the fiscal implications of pretrial release versus incarceration. As risk level increases, so does the likelihood of crime and failure to appear, and therefore the potential cost. When this is compared with the cost of incarceration, policymakers can make a more accurate assessment of where the benefits of incarceration might outweigh the costs. For example, it is more costly to release the highest risk defendants because of the estimated harm they will cause from new criminal offenses. For the lowest risk defendants, the costs of detention will likely far outweigh the estimated costs of new criminal offenses.

Significant research is available on factors that influence pretrial misconduct and failure to appear. This research can be applied both to individual pretrial decision making and

calculations of pretrial costs. Risk information should be gathered using validated assessment tools such as the Arnold Foundation's Public Safety Assessment (PSA). This tool has shown promising results in many jurisdictions and is currently being implemented around the country. The tool is based on factors that can normally be found in administrative data; criminal history, current age, and current charge. The use of a validated actuarial risk assessment tool can guide decision making at arrest, booking, first appearance, and any subsequent review of bail to determine who is at higher risk of failure to appear and pretrial misconduct. Generally, low risk individuals are good candidates for release on one's own recognizance, moderate risk individuals are candidates for pretrial supervision, and high risk individuals should be detained as allowed by law (Lowenkamp & VanNostrand, 2013).

While used in many jurisdictions, surety bonds paid to secure a defendant's release have not been shown empirically to maximize pretrial success (Pretrial Justice Institute, 2012). Most jurisdictions use a charge-based "bond schedule" to assign a bond amount without consideration of individual risk. Defendants can then pay a deposit to the court or pay a fee to a commercial bail bondsman to secure their release. Under most circumstances, the court returns the deposit if the defendant returns to court, but bondsmen do not return any fees collected. This system is often presented as free of cost to taxpayers, and therefore a good value. However, this system does not account for the defendant's actuarial risk, and therefore could contribute to the costs of pretrial failure.   In addition, individuals who are technically eligible for release on financial bond may not have the resources to pay, resulting in unnecessary jail bed use. The Pretrial Justice Institute's (2012) study of defendants in Colorado found that those released on unsecured bond (e.g. no money needed to be paid prior to release) had the same outcomes pretrial as those released on a secured financial bond. The impact of financial bond can be indirectly entered into the model through the release timing calculations. Future versions of this model may attempt to directly estimate the impact of secured bonds on pretrial costs and benefits.

Duration of detention
In addition to the outcome of pretrial decisions, the length of time a defendant spends incarcerated pretrial is a key variable affecting cost impacts. Recent research by Lowenkamp, VanNostrand, and Holsinger (2013a) provides additional insight into the fiscal impact of pretrial decision making.   The authors examined post-dispositional reoffending amongst pretrial defendants and found that detaining low risk defendants for more than 24 hours was associated with a higher likelihood of committing a new crime up to 24 months post-disposition (Lowenkamp, VanNostrand, and Holsinger, 2013a). In addition, defendants who were detained pretrial were more likely to be incarcerated post-disposition, and more likely to receive a longer sentence than similarly situated defendants who were released pretrial (Lowenkamp, VanNostrand, and Holsinger, 2013b). This means that extra detention days not only increase jail costs, but can also impact future costs for prisons, police, courts, and victims. Though these

conclusions are derived from only one study, it is the largest pretrial study of its kind and warrants consideration.

The present pretrial cost-benefit model places the length of time-to-release into three categories: quick (0-1 day), average, and slow. The range of days in the time-to-release categories can be adjusted. These three time-to-release categories are compared to the length of time spent in jail during the pretrial period for those not released in order to estimate the avoided jail bed days as well as the time at risk in the community. These estimates are used to predict the number of new criminal offenses and failures to appear by risk level of various release decisions. For example, if a jurisdiction decides to release fewer high risk defendants from jail the number of additional jail beds needed can be compared to reduced crime and failure to appear from those defendants remaining in jail. The pretrial cost-benefit model also incorporates the latest pretrial research from Lowenkamp, VanNostrand, and Holsinger (2013b) and includes the impact on the likelihood of new criminal offense and failures to appear when the time spent in jail is greater than one day. As this research continues to develop, the impact and the timing of the impact can be easily adjusted for each of the five risk categories included in the model. The model is also capable of incorporating the impact of long term recidivism reductions and reduced jail and prison sentences associated with pretrial release. The model does this by summarizing the research by Lowenkamp, VanNostrand, and Holsinger (2013b). Specifically, if these levers are turned on, the model increases the likelihood of FTA, pretrial crime, and post-disposition recidivism (24 months) for low risk (category 1) defendants who stay for more than one day by 24%, 55% and 33% respectively. Medium risk defendants (category 2 and 3) who stay more than one day have an increase in pretrial crime and 24 month recidivism by 10% and 15% respectively. Finally, high risk defendants (categories 4 and 5) who stay more than one day have a decrease in their FTA rate of 26%.

The variable percentage of defendants released by quick, average, and slow time frames must be estimated by using administrative records from a recent sample of jail commitments that have been released. The defendants in the sample should be first grouped into risk categories. For each risk category, the number of days held in jail prior to pretrial release should be counted and the mean length can be estimated. Last, the defendants would be grouped into one of the three categories of pretrial length of stay (quick, average, and slow).

Using the same risk categories as described above and data on pretrial failures, the public safety outcomes of released defendants can be estimated by risk level. The likelihood of failure to appear and new criminal offense by risk level can be divided by the number of days in the community between release and disposition to estimate the daily likelihood of failure to appear and new criminal activity. For example, if a moderate risk defendant has a 10 percent chance of failure to appear and is at risk in the community for 50 days, the daily likelihood of failure to appear is 10 percent divided by 50 days or 0.2 percent. This calculation assumes a linear

distribution for the timing of failure to appear and new criminal offense. This assumption can be adjusted in future iterations of the model if new research suggests a different distribution.

Criminal Justice Cost Calculations

When crime occurs there are direct costs to taxpayers through police involvement, court and attorney involvement, community supervision and incarceration. There are also both tangible and intangible costs to crime victims. Depending on the type of crime and jurisdiction where the crime took place, costs and the amounts of resources used will vary greatly. Because of the large variations in costs and system response to crime it is important for each jurisdiction to estimate their specific system costs and use.

The aggregate monetary value of the impact of pretrial scenarios is estimated using a standard equation for present value]:

$$(1) \quad PVBen_{ro} = \sum_{t=1}^{N_{ro}} \frac{Ben_{ro}}{(1+Dis)^{t-1}}$$

Where,

PVBen_{ro} is the present value benefit or avoided cost for resource *r* for offender type *o* for time periods 1 to the number of periods for resource *r* and offense *o*. For example, *r* could represent an arrest and *o* could represent a felony.

Ben_{ro} is the benefit or avoided cost of resource, *r*, for offense, *o*, measured in 2015 inflation adjusted dollars. For 2015 and beyond, inflation is expected to grow at 2.16% based on the annualized inflation rate of the past 10 years. All costs are converted to 2014 dollars using the consumer price index (http://www.bls.gov/cpi/cpid1507.pdf).

Dis is the discount rate. It is used to discount future benefits into the current time period. For this analysis, it is assumed to be 0.035, based on application in other crime policy benefit-cost analyses (see Washington State Institute for Public Policy, 2015).

N_{ro} is the time period associated with the resource and offense. For this model it is five years.

The per-unit monetary values of the jurisdiction's criminal justice system provide the basis for comparing the cost impact of different pretrial system scenarios. These per-unit values contribute to ***Ben_{ro}*** in the equation 1. The criminal justice system is modeled by the per-unit costs of arrest, conviction, probation, jail, prison, and parole. These per-unit costs also vary by the type of crime committed. The pretrial model captures differences by two crime categories: felonies and misdemeanors.

When estimating system costs, it is important to estimate the marginal or incremental change in costs, not the average costs. Average costs include fixed costs such as utilities, administrative staff, and capital costs. By contrast, marginal costs assume changes in operational costs based

on small, short-term changes in service units (like average daily population or caseloads). Accordingly, operational budgets for these estimates could exclude staff salaries and benefits; but expenses for materials, supplies, transportation, drug testing, assessments, and similar expenses should be included. The average cost is more easily obtained, but will overstate the true costs of small changes in caseloads. For example, one of the most influential values is the per-person cost of a jail bed. Studies that examine the savings from avoided jail beds often mistakenly use the average cost of a jail bed to calculate the overall savings from a policy. (Henrichson & Galgano, 2013). For this reason, it is important to estimate the marginal or incremental cost savings from small changes in the overall jail population.

Other per-unit costs of the criminal justice system should be estimated similarly to jail costs using the marginal basis. The cost per arrest is generally based on local police or county sheriffs' annual operational costs and the annual number of arrests. Different costs for felonies and misdemeanors would be estimated to the extent that data allow for such analysis. The per unit cost of conviction should be based on judicial annual operational costs (for judges, court staff, prosecutors and public defenders) and the annual number of criminal case disposed. This data can be gathered from local budget data from each of the relevant agencies. To calculate the marginal costs the fixed and administrative costs can be subtracted from each of the agency budgets and then divided by the caseloads to estimate an overall marginal cost for each agency. The costs of crime vary by the severity of the offense, with serious felonies being much more costly than misdemeanors, to both taxpayers and crime victims. In this pretrial cost-benefit model, the costs described above are broken out by felony and misdemeanor to account for part of the cost differences in crime severity.

Taxpayer costs are not the only costs incurred from crime. Victimization costs are also substantial and in some cases they are much larger than taxpayer costs. Victimization costs include lost property, lost productivity, mental health care, social services, medical care, and reduced quality of life. Two prominent national studies have estimated these costs (Cohen & Piquero, 2009; McCollister, French, & Fang, 2010). The estimates from these two studies were averaged together for use in the pretrial model. McCollister, French and Fang (2010) estimated victimization costs by two categories, monetary and quality of life. Monetary costs include medical, mental health care, lost property, and reduction in future earnings of crime victims. Quality of life costs place a dollar value on pain and suffering of crime victims using jury awards for pain and suffering and lost quality of life.

In order to calculate the overall cost of crime, the quantity of resource use for each component of the criminal justice system must also be estimated. A misdemeanant who stays in jail for ten days will be much less costly than a felon who spends years in state prison. The model uses court and other system usage data to capture the quantity of criminal justice resource use by component.

The quantity of resource use is the product of the proportion of resource use by type and the average time duration for sentence length to each resource component. The portions of resources used by type of resource for all felony and misdemeanor convictions, as well as sanction duration, would be found by analyzing a sample of criminal case records or client records from the various agencies in the criminal justice system.

To estimate the overall cost to taxpayers and victims of crime, the likelihood of using each resource is multiplied by the cost of that resource and the length of use of that resource. For example, where 26 percent of all defendants convicted of felonies receive prison sentences with no prison sentences given for defendants convicted of misdemeanors, the 26 percent would be multiplied by the average prison time served for all felonies. As described above, a discount rate, *Dis*, is applied to the annual per-unit price of resources like prison and parole that are used in future years.

A weighted average of victimization costs is also calculated using conviction data or the Uniform Crime Reporting (UCR) arrest statistics (US Department of Justice: http://www.ojjdp.gov/ojstatbb/ezaucr/) and the victimization costs discussed above. While victimization costs associated with a misdemeanor are possible, no reliable estimates of these costs are published, and so victimization costs for misdemeanors are assumed to be zero. Combining the costs of each part of the system with the likelihood of use and length of use for each part of the criminal justice system, the cost of crime can be estimated for both misdemeanors and felonies. Jurisdictions should gather a recent year's worth of conviction data based on UCR crime categories, or UCR arrest data if conviction data is unavailable, to enter into the model in the Cost of Crime tab under the Jurisdictional Felonies table.

The pretrial calculations described above also estimate the change in failures to appear from various pretrial policies and practices. It is necessary to estimate the system costs of failures to appear in order to compare the tradeoff between failures to appear and jail beds. See, for example, Rosenbaum et al. (2012). The model estimates the per unit cost of failure to appear using the length of time spent on serving and processing average failure to appear cases and the wages and benefits of the staff involved. Time (in minutes) and hourly salary for several workload components to failure to appear cases should be estimated, specifically: issuing bench warrants, executing arrest warrants, entering the charge, clearing the warrant, processing booking, and processing financial bond. The probability that each of these workload components will be used should also be noted, though the default of 100 percent may be assumed. The average number of jail bed days used for failures to appear also needs to be calculated and multiplied by the marginal cost of a jail bed. A sample of client records for persons committed to jail with failure to appear charges would be used to count the length of days detained based on entry and exit dates, and then calculate the mean number of days for the sample.

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