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# Demystifying Risk Assessment

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## Key Principles and Controversies

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## I. Introduction

As the national push to stem the tide of mass incarceration grows, state and local jurisdictions have increasingly adopted risk assessment tools in an effort to improve decision-making at key points, such as pretrial release, sentencing, or probation and parole case management.

Today, as many as 60 risk assessment tools are in use in jurisdictions across the United States. These tools are diverse in form, length, and content. The simplest tools rely exclusively on criminal records, while others add a short defendant interview, integrating the results into a single risk score. Still other tools constitute more comprehensive risk and need assessments that require a long interview. Beyond risk classification, these longer tools offer the benefit of assessing the severity of treatable needs that are often linked to criminal behavior (“criminogenic needs”). Ultimately, diversity in the current marketplace of risk assessments should be viewed positively, as different types of tools may be more appropriate depending on the “decision point” to which they are applied (e.g., pretrial release versus correctional supervision) and the specific goals of the jurisdiction adopting the tool.

A growing body of research suggests that high quality risk assessment yields more accurate estimates of risk for future crime, when compared with professional judgment alone.<sup>1</sup> Yet despite showing strong promise for improving decision-making and mitigating the effect of cognitive biases, risk assessment tools are controversial. Specifically, debates have emerged regarding: (1) the lack of transparency of some proprietary tools; (2) the potential for risk assessment to reproduce existing racial or ethnic biases in the justice system; and (3) the inherent challenges of applying risk classifications to individual cases based on group behavior.<sup>2</sup>

Several recent articles compare the accuracy of some prominent risk assessments and propose practical criteria for tool selection,<sup>3</sup> but to date there are few, if any, pieces that address the key “big picture” questions:

1. **What is risk assessment?** How is “risk” generally defined in the field? What is data-driven risk assessment? What kinds of risk factors are commonly found in risk assessment tools and how are risk classifications created?
2. **What are some strengths and downsides?** Can risk assessment reduce unnecessary incarceration, facilitate treatment, or otherwise improve criminal justice systems? What are the limitations of current risk assessment tools and their use?
3. **Why all the debate?** What underlies current controversies regarding the use of risk assessment in criminal justice?
4. **How can the benefits of risk assessment be maximized?** What are key principles to consider for the effective, legal, and ethical application of risk assessment tools in the criminal justice field?

This essay seeks to grapple with these questions, with an eye toward bridging the worlds of research and practice. Our goal is to provide an easy-to-read overview of the

latest social science (to the extent this is possible in a field that is rapidly evolving). Our intended audience is primarily practitioners and policymakers who want to gain a better understanding of the field and have real questions about whether and how to incorporate risk assessment into their daily practice.

## II. What Is Risk Assessment?

### Defining Risk

In general, “risk” refers to the likelihood of an adverse outcome. In contemporary societies, examples of adverse outcomes include death (medicine), dropout (education), financial losses (investment), and future criminal behavior (criminal justice).

### Formal Risk Assessment

Formal risk assessment tools use large datasets regarding past trends to predict future outcomes. Risk assessment has long been entrenched in a variety of social policy arenas. What all assessments have in common is the statistical linking of likely causal factors (e.g., prior school failure) to a future outcome (e.g., likelihood of high school dropout). Despite the recent attention paid to their use in criminal justice, actuarial models are not new to this field. Statistical models that assess the relationship between criminal history, demographic factors, and re-arrest were applied to making parole decisions in Illinois as early as the 1930s.<sup>4</sup>

Within criminal justice, risk assessment has most commonly been used to predict any new criminal activity (regardless of the charge type or severity).<sup>5</sup> This definition has important limitations, especially for decision-makers at the pretrial stage who may be particularly concerned with failure-to-appear in court or risk of future violence while a current case is pending.<sup>6</sup> A robust body of scientific evidence now suggests that the likelihood of new criminal behavior can be reliably assessed based on a limited set of factors, summarized in Table 1 on pages 5-6. The table lists the most prominent predictors of recidivism risk in the left-hand column, and then presents common ways in which each factor is measured in the right-hand column.

**Table 1. Central Predictors of Recidivism Risk**

<b>Risk Factor</b>	<b>Common Measures</b>
Criminal History	Prior adult and juvenile arrests; Prior adult and juvenile convictions; Prior failures-to-appear; Other currently open cases; Prior and current charge characteristics (e.g., presence of firearms, violence, drug charges, etc.).
Demographics	Younger age; Male gender.
Antisocial Attitudes	Patterns of antisocial thinking, which typically reflect the following primary constructs: (1) Lack of empathy; (2) Externalization of blame; (3) Entitlement; (4) Attitudes supportive of violence.
Antisocial Personality Pattern	Impulsive behavior patterns; Lack of consequential thinking.
Criminal Peer Networks	Peers involved in drug use, criminal behavior and/or with a history of involvement in the justice system.
School or Work Deficits	Poor past performance in work or school (lack of a high school diploma; history of firing or suspension); Alienation from informal social control via work or school (e.g., chronic unemployment).

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**Table 1. Central Predictors of Recidivism Risk**

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Family Dysfunction	Unmarried; Recent family or intimate relationship stress; Historical lack of connection with family or intimate partner.
Substance Abuse	Duration, frequency and mode of current substance use; History of substance abuse or addiction; Self-reported drug problems.
Leisure Activities	Isolation from pro-social peers or activities.
Residential Instability	Homelessness; Frequent changes of address.
<p>Note: Factors and sample items developed based on extensive review of several comprehensive, risk-need assessment systems, including the Level of Services Inventory-Revised (1990); the COMPAS (2007); and the Ohio Risk Assessment System (2009).</p>	

As shown in Table 1, the most prominent predictors of recidivism include a mix of both “static” and “dynamic” risk factors. Static factors are those that are unchangeable either by virtue of being historical in nature (e.g., prior criminal history) or by being largely immutable characteristics of an individual (e.g., male sex). Dynamic factors are those that can be changed, such as current unemployment, substance abuse, negative peer influences, or antisocial attitudes.

The distinction between static and dynamic factors has important implications for criminal justice practice for a variety of reasons. For one, static factors—

in particular criminal history and age at arrest—are typically the strongest predictors of new criminal behavior and a short tool containing only these factors can often yield a relatively accurate risk classification. However, short static factor tools are insufficient to the larger goals of many decision-makers who are interested in reducing risk in the future. Reducing risk requires actually knowing the dynamic risk factors—does the individual in front of me have a drug problem? Are they homeless? For this reason, tools with dynamic factors tend to be more useful in contexts where it is possible to engage in risk reduction strategies (e.g., linking defendants to treatment).

### **The Theory Behind Risk Assessment**

Risk-Need-Responsivity theory was developed in the late 1980s by Canadian psychologists Don Andrews and James Bonta. A rehabilitative approach to crime prevention, this theory is grounded in research suggesting that rehabilitation, and consequently recidivism reduction, is achievable through appropriate intervention.

This theory is composed of three core principles:

- 1. The Risk Principle:**  
Risk for new criminal behavior can be predicted and that correctional interventions should focus on higher risk offenders.
- 2. The Need Principle:**  
Therapeutic interventions should be directed towards an individual's "criminogenic" needs, which are defined as dynamic needs that can be statistically tied to recidivism.<sup>7</sup>
- 3. The Responsivity Principle:**  
Correctional treatment should be adapted to the specific risk factors, needs, strengths, and other attributes of the individual.

## Risk Assessment Science and Current Practice

Social science often confirms what justice practitioners already know. For example, many prosecutors intuitively understand the importance of criminal history in predicting future offending. In other cases, however, science contradicts common assumptions. For instance, validation research in the criminal justice field has consistently shown that the presence of a diagnosis for mental illness is not a significant factor in predicting future criminal behavior, contrary to long-held assumptions in the field. Empirical research also challenges the use of current offense severity as a proxy for risk of future crime. Put simply, a felony defendant is not more likely to be re-arrested than a misdemeanor. On balance, actuarial—or data-driven—risk models have tended to outperform the judgments of individual practitioners, including clinical professionals, in accurately assessing risk. Thus the rationale behind expanding the use of formal risk assessment tools is that they offer the potential for helping justice agencies make more informed decisions.

Most assessment tools—whether they are brief tools relying exclusively on static factors or interview-based tools that include numerous risk and needs domains—are developed and tested in a similar manner. The first step is typically to start with the factors we have outlined in Table 1. The next step is to decide what additional questions might be worth asking (e.g., questions regarding perceptions of the justice system or more specific criminal background questions may be relevant depending on the context and purpose of the assessment).

Next comes testing. An empirical analysis is conducted to assess the statistical association of each selected factor on the outcome of interest (e.g., re-arrest over a certain time period). In other words, item “weights”—or the number of points assigned to each item—will be established based on the relative strength

of each risk factor in actually predicting recidivism. For example, a prior criminal conviction might be more influential than unemployment in predicting re-arrest in a test model, and will therefore be assigned a greater number of risk points in the final tool.

Finally, having weighted each factor in the tool based on its association with recidivism, risk categories will be created based upon logical “cut points” in the scoring. If the average rate of re-arrest in a sample of test cases jumps between a total score of 3 and 4, for example, this would be a logical “cut point” for a new risk category. When risk categories are accurately assigned, defendants in the higher risk groups will consistently show higher re-arrest rates.

Once a pilot version is developed, the tool is then validated. Validation simply means that the items, risk scores, and risk categories in a tool are confirmed to have a statistically significant relationship with recidivism (a statistically significant relationship is one that cannot be attributed to chance). Technically, the validation of a tool is supposed to be conducted using a fresh sample of cases, rather than the sample used to create the tool in the first place. In general, the more validation tests conducted on diverse samples of defendants, the more reliable the risk assessment tool is as a national model.

It is important to note that a validated tool is not necessarily a highly accurate tool. Predictive accuracy is typically measured by the rate at which the tool correctly classifies an individual’s risk (e.g., low, moderate, high, etc.). Any statistically validated tool will still produce false positives (individuals are predicted to re-offend but don’t) or false negatives (individuals are predicted not to re-offend but do). In simple terms, having good predictive accuracy doesn’t mean that a tool is perfect, but does mean that errors are kept relatively low.

Increasingly, tool developers are releasing Area Under the Curve (AUC) statistics, which provide a useful measure of a tool's predictive accuracy. AUC statistics range from .50 to 1.00, with a higher AUC indicating a lower rate of error in classification. By current industry standards, an AUC of .70 or higher is considered "good." An AUC in the .60 to .70 range is considered "acceptable." Given the real life consequences of criminal justice decisions, practitioners should pay close attention to AUC statistics.

### III. Can Risk Assessment Tools Improve Criminal Justice?

An individual defendant's likelihood to commit a new crime can be an important aspect of pretrial release, sentencing, community supervision, and parole decisions. Indeed, judges, prosecutors, correctional officers, and other practitioners routinely assess risk as part of their daily practice.

Because data-driven tools have been shown to improve the accuracy of risk assessments, they may improve decision-making in a variety of contexts—e.g., Is an individual a good candidate for community-based pretrial supervision? What terms of probation are appropriate in a given case? These questions, and many more, hinge on an assessment of risk. The scientific consensus is that validated risk tools with high predictive accuracy (i.e., high AUC scores) can increase the accuracy of these decisions.

In particular, risk assessment tools can help reduce recidivism by clarifying when intensive supervision or treatment is truly needed. This is a compelling justification for their use, since recidivism rates among justice-involved populations remain frustratingly high. In a national study consisting of a cohort of more than 400,000 state prisoners released in 2005, for example, 41 percent were re-arrested within a year following release.<sup>8</sup> A recent study among misdemeanor offenders in New York City serving short jail sentences has documented similarly high rates of re-arrest.<sup>9</sup> Conversely, well-implemented alternatives to incarceration such as police diversion or problem-solving courts have been shown to result in moderate, but nonetheless significant, reductions.<sup>10</sup>

However, alternatives to incarceration do not work equally well for all individuals. Meta-analyses examining over 400 studies have concluded that interventions are most effective when focused on higher-risk populations.

Indeed, intensive intervention can actually increase offending among those at lower risk.<sup>11</sup> The potential negative effects of intervention—including well-meaning treatment programs—are especially pronounced the longer and more intensive the intervention is. A recent study of one validated risk assessment tool, the LSI-R, bore this out by showing that the placement of low-risk drug court participants in long-term residential treatment doubled their likelihood of re-arrest over a two-year follow-up period.<sup>12</sup>

In sum, the literature suggests that accurate knowledge regarding criminal risk can help safely reduce the use of incarceration. A key case study that bears this out is the state of Virginia, where the use of a validated risk tool in multiple jurisdictions allowed for the diversion of 25 percent of nonviolent, prison-bound offenders over a three-year period without increasing crime.<sup>13</sup>

## IV. What Are the Limitations?

Actuarial risk assessment tools have a number of scientific and practical limitations.

### Probability, Not Perfection

No tool can predict the behavior of any individual with 100 percent accuracy. Indeed, the oft-used term “risk prediction” is misleading when applied to risk assessment tools. What these tools actually do is place individuals in a risk category (e.g., minimal, low, or high) based on the behavior of other individuals with similar characteristics. A hypothetical “high-risk” individual might have a 50 percent chance of re-arrest over a one-year period, compared with an individual in the “low-risk” category, who might have a 15 percent chance of re-arrest. These are probabilities rather than certainties. The need to tolerate some uncertainty should not come as a shock to practitioners in the criminal justice field, given the complexity of criminal behavior. At the end of the day, risk assessment is an aid—rather than a replacement—for professional discretion.

### Type of Risk

Risk assessment tools may not always be designed to assess the outcome that is most relevant to specific decision-makers. For example, a judge may be interested in risk of a new violent offense or, more specifically, a new domestic violence offense when making a pretrial release decision. Currently, many tools do not produce this type of nuance.

Additionally, only a few tools or risk assessment systems offer the ability to predict failure to appear in court, which in many jurisdictions is the most relevant question at the pretrial stage. In general, overall recidivism (any re-arrest, regardless of charge) is the easiest outcome to predict reliably. At the other end of the spectrum, failure-to-appear assessments often yield the least impressive accuracy.

## Culpability

Perhaps the least acknowledged limitation of risk assessment tools is their silence on the critical matters of moral culpability and legal proportionality. An individual's risk for re-arrest may not align intuitively with the seriousness of the current case. Individuals arrested on a low-level misdemeanor are often a high risk of re-arrest. The converse is also true; defendants charged with serious offenses may be classified as low risk. While both possibilities present challenges, the former may present a greater puzzle for the justice system. A great many defendants with relatively minor cases may be high-risk for future offending due to underlying problems like substance use, unemployment, and housing instability. A dynamic risk-needs assessment tool may aid in identifying needs, but that does not assist in crafting a sentence that is proportionate to the current offense.

## V. What Are the Major Controversies Today?

In recent days, risk assessment tools have generated a good deal of controversy, including prominent legal cases, media coverage, and even an opinion from former U.S. Attorney General Eric Holder.<sup>14</sup> What follows is a look at some of the concerns that have been raised.

### Individualized Justice

There is a legitimate concern that making risk classifications based on group behavior is a poor fit in a justice system founded on the notion of individual rights and individualized justice.<sup>15</sup> The counter-argument is that evidence-based risk assessments, and especially those assessments that measure needs as well as risk, improve the ability of the justice system to respond to each defendant's unique needs and attributes, thereby creating more just individual outcomes while protecting victims.<sup>16</sup>

### Transparency

Although there is a near consensus in the field regarding the main drivers of recidivism risk, the relative weight given to each of these factors—and the specific measures that are used—can differ significantly from one tool to the next. Often for proprietary reasons, risk assessment developers are not transparent about the weights, items, and algorithms that they are using. This lack of transparency can create a variety of challenges. Non-transparent tools may be more likely to trigger due process concerns from defendants and defense counsel.<sup>17</sup> They may also make collaborative buy-in from stakeholders regarding the use of risk assessment generally more challenging.<sup>18</sup>

## Racial Bias

There has recently been significant debate in the academic and popular press regarding the potential for actuarial risk assessment to perpetuate racial disparities, based on correlations between common risk factors (e.g., unemployment, lack of education, criminal history) and race.<sup>19</sup> Indeed, a recent study of the use of one prominent risk assessment tool in a large, urban jurisdiction, published in *ProPublica*, found that African-American defendants were more likely to be classified as high-risk for re-offense and were thus more exposed to detention when compared with white defendants.<sup>20</sup> The *ProPublica* article and a subsequent response did not resolve the more nuanced question of whether the observed race differences were due to factors external to the criminal justice system (e.g., unequal educational opportunities, employment discrimination, historic effects of neighborhood segregation) or due to racial and ethnic bias in arrest, sentencing and incarceration practices. These questions continue to be explored in the academic literature.<sup>21</sup>

Because many criminal history factors (e.g., number of prior arrests or convictions) are both correlated with race and commonly considered in sentencing decisions, there is a strong possibility that racial disparities in sentencing would persist even if there were no risk assessment tools. Indeed, risk assessment proponents argue that actuarial tools can effectively mitigate racial disproportionalities arising from implicit biases in laws, police practices, or the discretionary patterns of individual decision-makers. In Colorado, for example, an actuarial risk assessment tool effectively eliminated a pattern of disparity where judges were more likely to place African-American juveniles in secure detention compared with white juveniles with similar case characteristics.<sup>22</sup>

To date, the debate regarding race and risk assessment has been subjected to only limited rigorous

study using data from real criminal cases. An important exception is a recent study of the “PCRA,” a risk assessment tool used in federal courts, which found little to no discrepancy by race in the predictive accuracy of the tool and no significant disparate impact of the tool between black and white defendants.<sup>23</sup> These results counter the findings from ProPublica, but further research is clearly needed.

## VI. What Are Key Principles to Help the Field?

A threshold challenge for individual jurisdictions is establishing a shared understanding of the ultimate intent behind risk classification. How will the instrument be used? At what point in the process? To achieve which goals?

Answering these kinds of questions is the first step toward successful implementation. For instance, if the goal of a jurisdiction is to increase the pretrial release of low-risk individuals, the menu of appropriate assessment tools will be quite different than if the intent is to link higher-risk offenders to appropriate therapeutic intervention programs post-sentence.

In most cases, successful implementation of a formal risk assessment will require collaboration from multiple stakeholders, including judges, prosecutors, defense attorneys, and others (e.g., victim advocates and social workers). Lack of buy-in among key stakeholders has been shown to undermine the adoption of evidence-based practices more broadly, and risk-based decision making more specifically. For instance, a recent study of the use of a risk assessment system to set bail in Cook County, Illinois showed a greater than 80 percent override of the tool's recommendation on the part of arraignment court judges.<sup>24</sup> Beyond working to achieve consensus on adopting a risk-based approach, what follows are some lessons from the field about how to implement a risk assessment tool successfully.

### Reflection

Once a particular tool is adopted, the next question is how the information will be applied to decision-making. Risk assessment tools should not be thought of as a replacement for professional discretion, but rather as one of many aids to informed decision-making. Others might include legal proportionality

(i.e., the “going rates” for a particular charge) and the treatment or supervision resources in a particular jurisdiction. In short, higher risk classification suggests the need for greater resource allocation in a particular case, but this finding should be considered in context. Practitioners should use their knowledge of their reform goals, local agency culture, and target population to create guidelines for the effective application of risk assessment results. For example, if a risk-based model is adopted with the goal of creating off-ramps from incarceration for lower-risk defendants, it is incumbent on jurisdictions to identify the kinds of alternative programs that will be made available and which specific risk categories will be targeted.

### **Researcher-Practitioner Collaboration**

Given the underlying complexities of risk assessment tools and the importance of adapting risk assessments to local contexts, jurisdictions are urged to develop collaborative working groups that include both researchers and practitioners. Research-practice partnerships can enhance discussions regarding the appropriateness of specific tools. The active involvement of researchers can also facilitate local validation studies to assess predictive accuracy and racial equity of selected tools. Ongoing monitoring is key to the sustainability of risk based decision-making and provides an opportunity for jurisdictions to course correct should implementation issues arise.

Another way in which research-practice partnerships can be particularly fruitful is in the ground-up development of a risk tool specific to a certain jurisdiction or subpopulation. While tools that have been nationally tested carry the advantage of adaptability to diverse populations, localized tools are better able to account for differences in criminal risk based on geographic, social and political context. Taking a “one-size-fits-all” approach to risk assessment may

undermine successful implementation. For example, a tool validated in one jurisdiction may not be responsive to the unique risk factors and needs that are present in another jurisdiction, or a tool validated on a general pretrial population may not be responsive to the unique needs of certain defendant populations (e.g., veterans).

### **Accuracy and Transparency**

The purpose of risk assessment is simply to forecast the probability of recidivism in individual cases, with the accuracy of such predictions varying from one tool to the next, as well as from one jurisdiction to the next. If resource constraints dictate selecting a preexisting tool, practitioners are strongly encouraged to look beyond whether a tool has ever been validated and focus specifically on two performance indicators: (1) whether the type of risk assessed by the tool (re-arrest, failure to appear, new violent offense, future domestic violence) aligns with what the jurisdiction is trying to achieve; and (2) the predictive accuracy of the tool (as indicated by AUC statistics). Jurisdictions selecting preexisting tools should select one that is characterized both by strong classification accuracy and transparency. Transparency means that the weights for each risk factor in the tool are apparent to the user, as are the formulas employed to calculate the raw risk score and final risk categories. This allows jurisdictions to understand the factors driving risk in their population and supports local validation and adaptation. Conversely, proprietary risk assessment systems which only provide users with a final risk score or category will prevent this type of local control.

### **Racial Equity**

Finally, prioritizing transparency when selecting a risk assessment tool will help safeguard the assessment process from potential racial bias by allowing the jurisdiction to track disparities in risk factors, total

risk scores, and risk classifications. Detection of racial disparities in the predictive accuracy of a selected tool (i.e., different AUC statistics by race) would suggest the tool is not appropriate, while correlations between risk factors and race may suggest other empirical or policy revisions that could be made to improve implementation. For example, if unemployment status were strongly correlated with race in a particular jurisdiction, it could be removed from an assessment tool, provided it did not substantially compromise its overall predictive accuracy (empirical revision) or it might suggest the need for diversion or alternative-to-incarceration programs focused on employment needs (policy solution).

## VII. Closing

While critical debates regarding the appropriate application of actuarial models to criminal justice are likely to continue for some time, there is a growing professional consensus that the careful and ethical implementation of risk assessment tools can facilitate improved criminal justice outcomes. This paper has attempted to demystify risk-based decision-making by distilling the science underlying risk assessment and identifying some of the important benefits and limitations. Jurisdictions considering the adoption of a risk assessment tool are urged to consult the growing literature regarding the characteristics and performance of specific assessment systems and to take a localized, collaborative approach to implementation.

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6. Some pretrial risk assessment tools (e.g., the Arnold Foundation Public Safety Assessment) include classifications along multiple dimensions of risk, including general recidivism risk, risk for violence, and risk for failure to appear. A longstanding interest in predicting new violent behavior, and in particular domestic violence, has produced quality models with some but not complete overlap with general recidivism models. A thorough review of domestic violence risk assessment can be found in a recent issue of the Domestic Violence Report: <http://www.civresearchinstitute.com/online/article.php?pid=18&iid=1210>.
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17. E.g., see *Wisconsin v. Loomis*, 2016 WI 68, 120 (2016).
18. Tools that are not transparent preclude stakeholder input on the ethical or legal implications of the tool's design (for example, some tools include prior arrests, while others only include prior convictions; some tools include, while others exclude, gender and age as risk factors).
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