The Prediction of Violence; Detection of Dangerousness

Michael A. Norko, MD
Madelon V. Baranoski, PhD

Contemporary evidence on the correlates of violence and the accuracy of predictions of violent outcomes is derived from a large body of research dating from approximately 1990. Substance abuse and several demographic variables have clearly been demonstrated to be significant risk factors for violence. The data on the link of various specific symptoms of psychiatric disorders to violence are inconclusive, though suggestive, because of conflicting research findings. Mental disorder does, however, represent a modest risk factor for violence. Actuarial predictions of future violence based on static nonpsychiatric characteristics achieve greater statistical accuracy than purely clinical methods, but the former are insensitive to effects of treatment and do not inform clinical intervention in an established way. Future research directions are encouraging in attempting to identify dynamic actuarial risk factors that will be both accurate and mutable. Substantive critiques of violence prediction and limitations of this body of research present a useful framework for evaluating both assumptions and conclusions about the prediction of violence in a psychiatric population. [Brief Treatment and Crisis Intervention 8:73–91 (2008)]

KEY WORDS: prediction, dangerousness, violence, inpatient treatment, mental health, mental disorder.

“Prediction is very difficult, especially if it’s about the future.”

The paradigm of the prediction of dangerousness arose within the mental health professions in the late 20th century. It did not arise as a result of clinical experience or wisdom, or of empirical evidence, or even of the quest for testable hypotheses about human behavior and its antecedents. It arose out of pragmatic needs for criteria to make distinctions between patients appropriate for inpatient or outpatient treatment, or for voluntary or involuntary treatment, when those became real choices in the 1960s and 1970s. Dangerousness was put forward by those advocating for the liberties of those suffering mental illness as the surest criterion for such weighty decisions (Norko, 2000). The criterion of dangerousness and the duty of clinicians to predict its expression in violence became affirmed in legal decisions from the 1960s to 1980s (Baxstrom v. Herold, 1966; Barefoot v. Estelle, 1982; Estelle v. Smith, 1980; Hawks v. Lazar, 1974; Jones v. US, 1983; Jurek v. Texas, 1976; Lake v. Cameron, 1966;
As a reaction to the rise of this new paradigm, forensic psychiatrist Bernard Diamond cautioned that: “Neither psychiatrists nor other behavioral scientists are able to predict the occurrence of violent behavior with sufficient reliability to justify the restriction of freedom of persons on the basis of the label of potential dangerousness” (Diamond, 1974, p. 452). Diamond was clearly not alone in his concern about the development of this new paradigm (Shah, 1978; Stone, 1975), such that by 1982 the American Psychiatric Association adopted its model commitment law, de-emphasizing the control of dangerousness and reemphasizing clinical concerns such as ability to provide treatment, capacity for informed consent, and risk of deteriorating health (American Psychiatric Association [APA], 1983).

### TABLE 1. Selected Studies Supporting Link Between Mental Illness and Violence

<table>
<thead>
<tr>
<th>Study</th>
<th>Major Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swanson et al. (1990)</td>
<td>Major mental disorders creates $5 \times$ risk of violence</td>
</tr>
<tr>
<td>Link et al. (1992)</td>
<td>Patient groups $2-3 \times$ more violent than nonpatient groups (when symptomatic); psychotic symptoms predict violence, even in nonpatient groups</td>
</tr>
<tr>
<td>Hodgins (1992)</td>
<td>Sweden birth cohort study: odds ratio (OR) = 4 for major mental disorder and violence</td>
</tr>
<tr>
<td>Link and Stueve (1994)</td>
<td>Violence predicted by three specific psychotic symptoms: threat, control, and override</td>
</tr>
<tr>
<td>Swanson et al. (1996)</td>
<td>Replicates Link and Stueve (1994) using Epidemiological Catchment Area study data</td>
</tr>
<tr>
<td>Link et al. (1998)</td>
<td>Threat and control/override symptoms independently predict violence</td>
</tr>
<tr>
<td>Tiihonen, Isohanni, Rasanen, Kioranen, and Moring (1997)</td>
<td>Finland birth cohort: OR = 7 for male schizophrenia and violence</td>
</tr>
<tr>
<td>Hoptman et al. (1999)</td>
<td>Dual diagnosis of schizophrenia and SA and thought disorder correlated with violence</td>
</tr>
<tr>
<td>Swanson et al. (2000)</td>
<td>Paranoid and threat/control-override (TCO) symptoms significantly associated with risk of violence</td>
</tr>
<tr>
<td>McNeil et al. (2000)</td>
<td>Among civil inpatients, command hallucinations created $2.5 \times$ increase in violence</td>
</tr>
<tr>
<td>Brennan, Mednick, and Hodgins (2000)</td>
<td>Denmark birth cohort: OR = 4.6 for male schizophrenia and violence, 23 for female schizophrenia and violence</td>
</tr>
<tr>
<td>Arsenault, Moffitt, Caspi, Taylor, and Silva (2000)</td>
<td>New Zealand birth cohort: alcohol dependence (OR = 1.9), marijuana dependence (OR = 3.8), and schizophrenia-spectrum disorders (OR = 2.5) each strongly related to violence</td>
</tr>
<tr>
<td>Gray et al. (2003)</td>
<td>Brief Psychiatric Rating Scale score significantly correlated with inpatient violence</td>
</tr>
<tr>
<td>Wallace, Mullen, and Burgess (2004)</td>
<td>Australia birth cohort: Schizophrenia OR = 3.6-6.6 for various cohorts over 25-year period</td>
</tr>
<tr>
<td>Beck (2004)</td>
<td>Delusions present in half of cases of serious violence, most of TCO type; but delusional violence uncommon in absence of SA history</td>
</tr>
<tr>
<td>Swanson et al. (2006)</td>
<td>Serious violence risk associated with higher positive symptom score and lower negative symptom score (on Positive and Negative Syndrome Scale)</td>
</tr>
<tr>
<td>Teasdale et al. (2006)</td>
<td>For males, threat delusions increase risk of violence</td>
</tr>
</tbody>
</table>


As a reaction to the rise of this new paradigm, forensic psychiatrist Bernard Diamond cautioned that: “Neither psychiatrists nor other behavioral scientists are able to predict the occurrence of violent behavior with sufficient reliability to justify the restriction of freedom of persons on the basis of the label of potential dangerousness” (Diamond, 1974, p. 452).
Such concerns were largely ignored in the ensuing years although research efforts were focused extensively on attempting to find empirical support for the newly existent paradigm. Along the way, the construct of “prediction of dangerousness” was altered to “assessment of risk,” such that the latter term has had nearly exclusive currency since the mid-1990s owing to its more accurate expression of the research advances (Steadman, 2000). Those research advances, particularly since approximately 1990, constitute a large body of empirical data on the subject of risk assessment in mental health care.

The Contemporary Evidence Base

The contemporary period of research on mental illness and violence began in 1990 when the first large epidemiological study on the subject was published (Swanson, Holzer, Gangu, & Jono, 1990). Prior to that, the data were the result of methodologically flawed correlation studies of rates of mental illness in prison populations and arrest rates of individuals with mental illness (Link, Andrews, & Cullen, 1992; Norko & Baranoski, 2005).

The evidence base on mental illness and violence falls into three categories: studies that support the link between mental illness and violence, studies that do not support that link, and studies that demonstrate the importance of nonmental health variables in relation to violence. Each of these areas will now be described in turn.

Table 1 represents a selected bibliography of significant studies illustrating data that support the link between mental illness and violence. Epidemiological studies demonstrate correlations between major mental disorders and violence (Swanson et al., 1990), especially during periods of active psychotic illness (Link et al., 1992) and particularly when the psychosis is characterized by threat/control-override (TCO) delusions (Link & Stueve, 1994; Link, Steuve, & Phelan, 1998; Swanson, Borum, Swartz, & Monahan, 1996). Clinical studies have also supported the TCO link to violence (Swanson et al., 2000; Beck, 2004). Various clinical studies have demonstrated a correlation between violence and active symptoms of acute psychotic disorders (Beck, 2004; Gray et al., 2003; Hoptman, Yates, Patalinjuk, Wack, & Convit, 1999; McNeil, Eisner, & Binder, 2000; Swanson et al., 2006; Teasdale, Silver, & Monahan, 2006).

In contrast, Table 2 represents a selected bibliography of significant studies that showed no link between mental illness and violence. Most significantly, results from a MacArthur study designed to correct a number of flaws of previous research fail to support a connection between serious mental disorder and violence (Appelbaum, Robbins, & Monahan, 2000; Steadman et al., 1998; Steadman et al., 2000). In fact, the data support a conclusion that both schizophrenia and the presence of TCO delusions are negatively correlated with violence (Steadman, 2000). A more focused examination of these data, separating gender and type of delusions, however, reveals that threat delusions increase violence risk for males, whereas control-override delusions decrease risk for males, and all TCO delusions decrease violence risk for females (Teasdale et al., 2006). In other clinical studies, symptoms of mental disorder – except substance abuse (SA) – fail to statistically distinguish violent and nonviolent individuals within a population of patients (Fulwiler, Grossman, Frobes, & Ruthazer, 1997; Swanson, Borum, Swartz, & Hiday, 1999). In a recent enhancement of clinical studies to include short temporal follow-up and analysis, psychiatric symptoms (including TCO delusions) observed in 1 week were not associated with increased violence in the next week (Skeem et al., 2006).

Table 3 lists selected studies revealing the correlation between nonmental health factors
and violence. Epidemiological studies reveal a significant statistical correlation between violence and male gender, young age, low socioeconomic status (SES), and low educational level (Swanson et al., 1990; Link et al., 1992). The contribution to the variance in the overall rate of violence by gender and age is greater than that of mental health variables, the latter being roughly equivalent to the effect of a 4-5 years difference in the educational level (Link et al., 1992). Clinical studies support the significance of youth (Swanson et al., 1999, Swanson et al., 2006), anger (Appelbaum et al., 2000; Skeem et al., 2006), and suspiciousness and impulsivity (Appelbaum et al., 2000). A clinical study aimed at assessing “ecological” variables found an odds ratio of 2.7 for patients living in neighborhoods of “concentrated poverty” (Silver, Mulvey, & Monahan, 1999)—a finding closely related to studies that found a higher rate of violence in lower SES status groups. The combination of SA and medication non-compliance was significantly correlated with violence among patients subject to outpatient commitment in North Carolina (Swartz et al., 1998). Homelessness, violence in the environment, SA, and victimization were identified as factors associated with violence in a multistate sample (Swanson et al., 2002). In a developing trend to assess the time-dependent nature of variables, SA and violence have been found to predict continued SA and violence over the course of 1-2 day periods (Mulvey et al., 2006).

With a data base of mixed results, what can be concluded about the correlates of violence? Three conclusions can reasonably be drawn:

1. SA, alone and in combination with mental disorders, has consistently correlated with violence.
2. Sociodemographic factors contribute significantly more than mental health factors to violence.
3. Research findings are inconsistent and conflicting on the relationship between psychosis (and other symptoms of mental illness) and violence.

With these findings regarding the correlates of violence, it is not surprising that the data on prediction accuracy favor models based more extensively on nonmental health variables (actuarial models) than on those more reliant on

<table>
<thead>
<tr>
<th>Study</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulwiler et al. (1997)</td>
<td>In urban assertive community treatment patients, mental illness is not associated with violence unless accompanied by history of SA</td>
</tr>
<tr>
<td>Steadman et al. (1998)</td>
<td>Prevalence of violence for nonpatient controls without SA statistically equivalent to patients with major mental disorder without SA</td>
</tr>
<tr>
<td>Swanson et al. (1999)</td>
<td>No association found between violence and paranoia, level of psychosis, or diagnosis among seriously mentally ill patients under outpatient commitment orders</td>
</tr>
<tr>
<td>Appelbaum et al. (2000)</td>
<td>Replicates Link and Steuve (1994) if use patients’ self-report of TCO symptoms and retrospective analysis, but no association between violence and delusions (when latter judged by interviewer and using prospective design)</td>
</tr>
<tr>
<td>Steadman et al. (2000)</td>
<td>TCO symptoms and schizophrenia diagnosis are both negatively correlated with violence</td>
</tr>
<tr>
<td>Teasdale et al. (2006)</td>
<td>Women experiencing TCO delusions less likely to be violent; men experiencing control-override delusions less likely to be violent</td>
</tr>
<tr>
<td>Skeem et al. (2006)</td>
<td>Among high-risk group of patients, psychiatric symptoms not associated with violence in the next week</td>
</tr>
</tbody>
</table>
traditional clinical concerns. Actuarial models of risk assessment are, by definition, evidence based because they assess factors that have correlated with violence in empirical studies. These models derive their strength from the relative permanence of historical factors as predictors of long-term risk. The effort by Steadman et al. (2000) to include 134 possible risk factors culled from the literature was an attempt to include the full range of potential variables (including clinical ones) into an empiric analysis of factors associated with violence using the MacArthur study data. The results strongly favored historical variables (or trait variables such as psychopathy) as correlates of violence. With the exception of SA, traditional clinical variables did not demonstrate significant correlations (unless one includes the constructs of anger and “violent fantasy” as clinical symptoms). Thus, the “clinical variables” did not survive the final cut in the resulting actuarial model.

Actuarial models for which there is significant research support include the following:

1. Psychopathy Checklist-Revised (PCL-R); Dolan and Doyle (2000); (Hare, 1991).


3. Iterative Classification Tree (Monahan et al., 2000; Monahan et al., 2005; Steadman et al., 2000).

Some researchers have argued that the superior accuracy of actuarial approaches in risk assessment demands that it be used over clinical approaches (Harris & Rice, 1997; Harris et al., 2002). However, none of these approaches include common mental health variables (other than SA) amenable to clinical intervention. Thus, although these models have the advantage of superior statistical accuracy, they are not particularly helpful to clinicians in the real life tasks they commonly face, such as decisions to commit or release individual patients (Dvoskin & Heilbrun, 2001). Because actuarial measures are based largely on historical data and enduring character traits, they are effective and reliable indicators of life-long risk without indicators of fluctuating variation in risk. Further, they are designed to create an actuarial profile of “risky persons.” As such the actuarial risk assessments do not address the clinical (and legal) implications of violence.

<table>
<thead>
<tr>
<th>Study</th>
<th>Major findings of other variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swanson et al. (1990)</td>
<td>Male gender, young age, low socioeconomic status</td>
</tr>
<tr>
<td>Link et al. (1992)</td>
<td>Male gender, young age, educational level</td>
</tr>
<tr>
<td>Swartz et al. (1998)</td>
<td>Medication noncompliance + SA in patients subject to outpatient commitment</td>
</tr>
<tr>
<td>Swanson et al. (1999)</td>
<td>SA, youth, history of criminal victimization</td>
</tr>
<tr>
<td>Silver et al. (1999)</td>
<td>Concentrated poverty of residence neighborhood of patients</td>
</tr>
<tr>
<td>Appelbaum et al. (2000)</td>
<td>Suspicious attitude, anger, impulsivity</td>
</tr>
<tr>
<td>Swanson et al. (2002)</td>
<td>Homelessness, violence in the environment, SA, victimization</td>
</tr>
<tr>
<td>Swanson et al. (2006)</td>
<td>Young age, childhood conduct problems</td>
</tr>
<tr>
<td>Skeem et al. (2006)</td>
<td>Anger in 1 week correlated with violence in next week in group of “high-risk” psychiatric patients</td>
</tr>
<tr>
<td>Mulvey et al. (2006)</td>
<td>SA and violence predict very proximate future SA and violence (next 1–2 days)</td>
</tr>
</tbody>
</table>
concerns of imminent risk, effective modulating of risk through treatment, and individual risk trajectories that may substantially deviate from the risk profile. The actuarial assessments describe the “risk climate,” in contrast to the clinician who deals with daily “risk weather.”

Despite the heralded superiority of actuarial measures, research also indicates that clinical risk assessment has greater than chance validity (Monahan, 1997). Selected studies demonstrating such validity in clinical risk assessment are listed in Table 4. In general, risk assessments based on clinical factors achieve modest validity with multiple studies demonstrating above chance sensitivity, specificity, and positive predictive power. Mossman’s (1994) meta-analysis demonstrated that 47 of 58 published data sets demonstrated better than chance validity for clinical predictions of violence. Mulvey and Lidz (1998) noted importantly that knowing the predictors of violence had been more useful in the era of long-term hospitalization. When most patients are managed in outpatient settings, however, it is important to know not just who is at risk for violence but when and under what circumstances that risk will become a reality and how accurate such predictions may be. The authors reported mixed results on clinicians’ ability to make accurate conditional judgments about future violence.

Another interesting finding is that inpatient violence may be more significantly related to clinical variables than to historical/actuarial variables (Arango, Barba, Gonzalez-Salvador, & Ordonez, 1999; Gray et al., 2003; McNeil, Gregory, Lam, Binder, & Sullivan, 2003). McNeil et al. (2003) offer the observation that clinical factors may be most relevant to violence for acutely ill individuals, whereas historical data may be most relevant for treated patients and for the assessment of long-term risk. This idea may also explain the clinically counterintuitive findings of the MacArthur data that clinical factors correlated negatively with violence, given that all the patients in the MacArthur study population were treated patients discharged from inpatient settings. Collectively the data suggest that psychiatric treatment is effective in reducing violence attributable to mental illness; leaving the risk that arises from lifestyle, characterological, social, and demographic factors.

There are some further limits about clinical risk assessment to be noted. Mossman (1994) also noted that among the data sets he reviewed, past behavior was a better indicator of future violence than clinical judgment—an observation consistent with findings of superior accuracy in actuarial methods. Hoptman et al. (1999) noted the better than chance predictions of psychiatrists but also found that the psychiatrists had used a number of factors in their predictions that did not correlate with violence in the study (race, education, arrests for violence, hostility, and inability to follow ward routine) and failed to use some of the factors that turned out to be actual predictors (dual diagnosis of schizophrenia and SA and thought disorder.) Odeh et al. also noted that clinicians assessing risk tended to use clinical variables not significantly correlated with violence over a 2-year period (Odeh, Zewiss, & Huss, 2006). The important observation of McNeil et al. (2003) noted above may help explain the Mossman and Odeh findings. Another point to be considered has been raised by Dvoskin (2002), in that the data on clinical risk assessment do not include studies of clinical predictions made by psychiatrists and psychologists with specific forensic training.

Finally, there is an important third category of clinical assessment methodology to be considered—structured clinical judgment (Douglas, Ogloff, & Hart, 2003). This refers to instruments that guide the clinician through an assessment of a variety of factors that have evidentiary support and then guide the final
judgment about how to score the overall results, preferably into risk categories rather than numerical scores. The Historical/Clinical/Risk Management 20 Item (HCR-20) (Webster, Douglas, Eaves, & Hart, 1997) is an example of such an instrument. It uses 10 historical factors (an actuarial approach), combined with 5 clinical and 5 risk management factors (a guided clinical approach), much like the Violence Screening Checklist (McNeil & Binder, 1994) noted in Table 4. The HCR-20 is conceptually robust in attempting to combine actuarial and clinical elements, and its validity in assessment of risk of violence is supported by numerous studies (Dolan & Doyle, 2000; Douglas et al., 2003; Gray et al., 2003; McNeil et al., 2003; Webster et al., 1997)

### Contemporary Critiques of Risk Assessment

Despite clear progress in the empirical understanding of the correlates of violence, there

---

### TABLE 4. Selected Studies Demonstrating Validity of Clinical Risk Factors in Risk Assessment

<table>
<thead>
<tr>
<th>Study</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lidz, Mulvey, and Gardner (1993)</td>
<td>Clinical predictions significantly above chance for males (63% sensitive, 60% specificity), but not for females; clinical prediction better than chance even when clinicians not predicting on basis of history, age, or gender</td>
</tr>
<tr>
<td>McNeil and Binder (1994)</td>
<td>Five-item scale including clinical, historical, and demographic factors (Violence Screening Checklist or VSC) resulted in 57% sensitivity, 70% specificity</td>
</tr>
<tr>
<td>Mossman (1994)</td>
<td>In meta-analysis of 58 data sets, 47 demonstrated better than chance validity of clinical prediction of violence, with combined AUC = 0.73</td>
</tr>
<tr>
<td>Mulvey and Lidz (1998)</td>
<td>Clinicians generally right in predicting seriousness and location of violence, but overestimate role of medication noncompliance and SA; clinicians tend to focus on conditions they can address with treatment</td>
</tr>
<tr>
<td>Arango et al. (1999)</td>
<td>Inpatient violence related to clinical variables, not sociodemographic variables or psychiatric history; model based on uncooperativeness, poor judgment, poor insight into psychotic symptoms, and violence in week prior to admission achieved 80% positive predictive power (PPP)</td>
</tr>
<tr>
<td>Hoptman et al. (1999)</td>
<td>Psychiatrists' prediction of assault in maximum security forensic facility achieved 54% sensitivity, 79% specificity, and 71% correct classification</td>
</tr>
<tr>
<td>Skeem, Mulvey, and Lidz (2000)</td>
<td>Clinicians moderately accurate in predicting violent behavior (55% PPP) based on alcohol use, but do not discriminate well between drinkers who are/are not violent</td>
</tr>
<tr>
<td>McNeil et al. (2003)</td>
<td>VSC and clinical scale of HCR-20 significantly associated with inpatient assault</td>
</tr>
<tr>
<td>Gray et al. (2003)</td>
<td>Brief Psychiatric Rating Scale best predictor of physical aggression over 3 months among patients admitted to inpatient service, followed by “HCR-15” (i.e., no “R”)</td>
</tr>
</tbody>
</table>
are substantial limitations of the science, especially in application to individual patients or evaluees. A number of such critiques make an important contribution to our literature on this subject. In general, the critiques fall into two broad categories—the first dealing with the clinical utility of risk assessments with statistical significance and the second with clinical value of refining risk assessment measures that do not provide clinically useful data.

A compelling example of the first category of these critiques is offered by Mossman (2000). By using the analogy of the airport metal detector, Mossman made the observation that the accuracy of the instrument used in making predictions does not equate to the “correctness” of the predictions made and that the latter is clearly affected by the base rate of weapon carrying at airports and the sensitivity at which the detector is set (Mossman, 2000). The chosen sensitivity of the instrument depends, in turn, on the chosen preference for false-positive errors in relation to false-negative errors. In fact, he demonstrates that accuracy may be an insufficient concept to use in evaluating the utility of the instrument.

In applying this analysis to risk assessment methodology, Mossman (2000) argues that modestly accurate predictions — equaling or exceeding the results of our best current actuarial or clinical methods with an AUC = 0.83 (see below) - are not clinically useful. That is, although 83% of the population will be accurately identified as either at risk or not, in the dichotomous separation of high- and low-risk groups, low-risk groups will still have too high a risk to be ignored completely or treated substantially differently from the high-risk groups. In a three-way classification of low-risk, high-risk, and unclassified groups, there is greater separation between the rates of violence in the low- and high-risk groups, but most of the group is then unclassified and there is insufficient difference in the violence rates among the unclassified and high-risk groups to support differential management of individuals in the two groups. To make such an instrument truly useful to clinicians deciding upon different management options, the instrument would have to be “nearly infallible,” with an AUC = 0.99. (AUC refers to the statistical term of “area under the curve,” created by examining the trade-off between sensitivity and specificity when cutoffs are adjusted based on population and desired outcomes. As an example, the ocular pressure used to define risk of glaucoma may be adjusted depending on the population served; in persons at high risk, a lower cutoff pressure may be used in comparison to the general population. Receiver Operating Characteristic analysis, which produces the AUC, can be calculated for the different cutoffs and provide a curve which estimates the percentage of false-positive [specificity concern] and false-negative [sensitivity concern] detections across the different cutoffs).

Finally, Mossman (2000) points out that the determination of high-risk status should not be a necessary condition of clinical intervention. “If a clinician has a well-founded belief that a patient needs and deserves certain treatments, that belief alone should motivate the clinician and justify making arrangements for the patient to get those treatments” (Mossman, 2000, p. 280).

In a similar way, Szmukler (2001) has offered a mathematical analysis demonstrating that low base rates of a phenomenon undo the utility of even reasonably impressive receiver operating characteristic results. Analyzing an instrument with an AUC = 0.76 and a realistically optimal true-positive rate = 0.7, Szmukler calculates the positive predictive power of the instrument at various base rates of violence. At a 20% base rate, the instrument has a positive predictive power of 0.37, meaning that the instrument is wrong 6 out of 10 times it is used to predict violence in this population (Szmukler, 2001).
The accuracy of even robust measures drops precipitously when the base rate of violence decreases. That is, an instrument established in research on a population with one base rate of violence will vary in accuracy of prediction depending on the base rate of violence in which it is applied. As Szmukler (2001) points out that for very serious violence, occurring with a base rate of 1%, such an instrument would be wrong 97% of the time.

Freedman (2001) has noted problems in the research literature related to the use of the PCL-R, a foundation instrument in the world of actuarial prediction of violence. First, he notes that the PCL-R manual does not identify a validated cutoff score for psychopathy but that it suggests that a score of 30 or greater is high and “can be used to state that an individual is a psychopath” (Freedman, 2001, p. 90). Despite these instructions, studies utilizing the PCL-R have adopted cutoff scores as low as 9.2 to identify psychopathic personality and compare it to individuals with lower scores. Secondly, he notes the very high percentage of false-positive errors in studies using the PCL-R. Freedman lists 11 studies using the PCL-R, with false-positive rates ranging from 50 to 75%. He argues that, given such high false-positive rates (worse than chance performance), “the PCL-R should not be used in forensic or clinical settings where life and liberty decisions are at stake” (Freedman, 2001, p 94). The observations of Freedman relate to the difference between significant statistical findings and distinctions that are clinically significant and useful.

A prototypic example of the second category of critiques of the risk assessment research that deals with the clinical merit of risk assessment research is the argument posed by Dvoskin and Heilbrun (2001). The authors note that although the accuracy of actuarial approaches to risk assessment may be definable and even laudable, the challenge facing clinicians is effective management of risk, not accurate prediction of violence. The authors argue that the more fluid concept of risk management requires appraisals that can reflect the effects of treatment and modulation of risk in response to changing circumstances. The risk factors that account for the greater accuracy of actuarial measures are static variables, not given to change with treatment/management interventions. A risk appraisal, they argue, should change with data derived from clinical progress. In order to resolve this dilemma, they propose that we examine this issue from the perspective of “risk communication.” In any communication about risk, the mental health professional should make clear the decision-making rationale describing the results of predictive tools in probabilistic language and discussing risk reduction by describing risk factors and the intervention strategies for each. Finally, they suggest that different methods be used depending on the issue being communicated. If the area of interest is the probability of risk, then actuarial methods should be used. If the question revolves around the imminence of the risk, then a clinical assessment of the individual’s history in comparison to present circumstances is called for. And if the issue is related to the severity of outcome, the individual’s history of prior violence is the relevant information to be communicated.

With similar concerns about lack of clinical relevance in risk assessment, Douglas and Skeem (2005) have identified the need for new research directions. Despite the significant progress that has been made in risk assessment in the last 20 years, the science continues to lag behind the demands of clinical practice in two important ways: empirical investigation of dynamic risk variables is virtually absent from the literature and there is a significant need for studies of intraindividual change and its relation to risk management and treatment. They identify the next great research challenge as
developing sound methods to identify causal dynamic risk factors for violence; such factors must precede and increase risk, change spontaneously or with intervention, and predict change in the likelihood of violence when altered. They offer the following factors as likely candidates for such dynamic risk factors: impulsiveness, negative affectivity, anger, negative mood, psychosis, antisocial attitudes, substance use and related problems, interpersonal relationships, treatment alliance and adherence, and medication compliance (Douglas & Skeem, 2005). Finally, they suggest that the following techniques offer promise for empirical research on dynamic risk:

1. HCR-20 (Structured professional judgment)
2. Level of Service Inventory-Revised (structured professional judgment with algorithm to make decision)
4. Dynamic Risk Appraisal Scale
5. Violence Risk Scale
6. Structured Outcome Assessment and Community Risk Monitoring
7. Violent Behavior Analysis, and a variant - Analysis of Aggressive Behavior

Mullen (2000a) has extended the critique of risk models to argue that assignment to risk categories may in itself be countertherapeutic because the attribution of risk or dangerousness to a patient is an example of social labeling that must be understood in terms of cultural context. Importantly, he notes that such attribution is “inescapably a construct”—one that shifts blame to clinicians and forces them to engage closely in control of their patients for the benefit of the wider community (Mullen, 2000a, p. 2066). He sees the need to draw boundaries around this practice for mental health professionals in service of “ethical imperatives.” He has taken the difficult and noteworthy step of articulating a set of criteria for the ethical practice of risk assessment by mental health professionals. These consist of the following:

1. The existence of empirical evidence to guide decision making about risk.
2. The recognition of mental health variables as prominent in the individual/situation evaluated and as relevant to the probability of future damaging behaviors.
3. The basing of the assessment on relevant characteristics of the individual, which have been determined at least in part by direct examination of the individual whenever possible.
4. The expression of risk as a probability, with the limits of that expression made clear.
5. Consideration of the implications for the individual.
6. The intention of the assessment to provide better treatment and care to the individual patient, rather than to confine or coerce the patient.

Mullen (2000b) has amplified the last two criteria emphasizing that merely deriving correlations between measurable factors and violent behavior is not a sufficient goal for research. What is required is the “articulation of the causal nexus that may underlie the predictive correlations,” and an emphasis on the “therapeutics of risk management”:

“Risk assessments, I would assert, are the proper concern of health professionals to the extent that they initiate remedial interventions that directly or indirectly benefit the person assessed. Decreasing a mentally disordered individual’s chance of injuring others is a benefit to them as well as to the future victim. Such prevention is part of a health professional’s legitimate activity if, and only if, it is part of therapy for a mental...
disorder or for psychological or emotional dysfunction. Confining and containing offenders as punishment, or simply to prevent further offending, may be legitimate for a criminal justice system but should have no place in a health service.” (Mullen 2000b, p. 308)

Lindqvist and Skipworth (2000) identify the labeling effect associated with risk assessment, whereby patients may be inaccurately associated with a high actuarial risk score based on historical factors—a phenomena they coin “guilt by statistical association.” (p. 320). Even correctly identified high-risk group members are in danger of having the “dangerousness” label applied as if it were an “immutable quality” rather than a set of properties and predispositions open to some modification. They argue that if risk research is to be applicable and ethically acceptable, it must be grounded in clinical studies that link risk assessment to specific management strategies aimed at ameliorating risk. The authors point out a dearth of research that asks the question: “What is the rehabilitative task?” They emphasize that factors that should be studied are dynamic risk variables and dynamic treatment factors because static factors do not make for useful targets of rehabilitative efforts. And they identify a number of dynamic factors available for study, including active symptoms of the disorder, family problems, socioeconomic circumstances, substance misuse, and anti-therapeutic system dynamics that stigmatize, expel, and incarcerate the individual (Lindqvist & Skipworth, 2000).

Finally, Rogers has identified additional and unique concerns about the proper application of statistical methods and research results to clinical forensic practice (Rogers, 2000). He identifies a number of critical limitations with current research. First, risk studies have emphasized only risk factors; research has largely ignored the effect of protective factors and moderator/mediator effects. A balanced risk assessment, however, requires attention to protective factors as well as risk factors. Evaluations focused only on risk are thus “inherently inaccurate.” In addition, such evaluations portray a biased view with counter-therapeutic effects on individual forensic patients, with stigmatizing and negativistic effects on forensic populations in general, and with lopsided effects on resource allocations. Second, it is not a simple matter to know which base rate ought to be applied to any particular risk assessment, making it difficult to state the accuracy of predictions based upon the methodology of assessment. Third, risk probabilities are easily misunderstood and thus easily misused by courts. The meaning of false-positive rates may not be appreciated by courts in making serious decisions about a person’s future. Finally, there is often a substantial “floor effect” to clinical and forensic measures of risk, such that these populations will always be characterized as having some risk. In situations where there is little public tolerance for even small risk for some behaviors, the assignment of any risk may be interpreted as significant enough to warrant deprivation of liberty.

**Methodological Limits to the Study of Risk of Violence**

In addition to those critiques culled from the literature, other conceptual and methodological factors limit successful investigation of violence risk. Methodological issues inherent in social research complicate the investigation of the risk for violence. Community and population-based studies lack the control and rigor of laboratory research.

The study of violence is first challenged by defining violence itself. With the exception of coroner report studies of violent fatalities,
operational definitions of violence have limited validity and reliability. Even studies that use a well-defined variable with reliable sources, such as court records of convictions for violent offenses, are limited by nonrandom and immeasurable biases in the reporting. For example, the validity of a conviction for a violent offense is threatened by legal maneuvers that reduce or alter the arrest charge at any point between arrest and conviction. A serious assault charge can be reduced to a charge for a minor assault or a nonviolent offense as the result of a plea bargain. The alteration of the initial charge is not a random event and introduces additional bias because legal maneuvers are related to other factors, such as social class, mental illness, and education. In addition, a legal outcome is not paramount to absolute truth: sometimes guilty persons go free and innocent ones are convicted. Self-report or clinician/family report of violence can also vary nonrandomly in relation to those factors. Clinician bias about who can and cannot be violent affects screening, exploration, and reporting of violent behaviors. To the extent that clinical records provide data, the results will be biased.

Unreliable reporting of violence is inherent in the definition of violence itself. What is violent to one person or family may be considered routine or a justified form of discipline to another. Violent behavior associated with SA may be considered to be a component of the substance use although not considered violent by the family. Some families can avoid scrutiny and hide the effects of violence better than others. The factors that create the difference in definition and reporting (social class, education, culture, and psychiatric condition) are themselves often identified as risk factors, thereby confounding the association. The difficulty in defining and reporting violence interferes with every aspect of the investigation of violence from establishing the base rate to evaluating outcomes. For example, if violent behavior is underreported in families of higher social class, then the correlation between increased violence and lower social class is invalid. If violent outbursts by a family member with a mental illness are viewed as part of the illness and not violence per se by the family, then the lack of correlation between mental illness and violence is suspect.

The methodological difficulties go beyond the definition and measure of violence. Studies of violence have no control over the risk factors that occur. The correlational studies cannot establish cause. For example, the association between SA and violence is a robust and consistent finding. Yet none of the methodologies establish that use of substances per se causes violent behaviors. The social environment associated with acquiring illicit drugs, the effect of substances on psychiatric symptoms, the relationship between reported drug use and low SES and low education may all be mechanisms that explain the relationships. None of the current methodologies can parse these factors in an experimental design.

Longitudinal follow-up requires subject tracking and cooperation. Those lost to follow-up may represent a different subgroup critical to determining a valid correlation. For example, the association between mental illness and violence is often studied in treated patients with mental illness for the very reason that this group is available to investigators. Patients who drop out of treatment become unavailable to measure and may be the most impaired group. Their rate of violence and how it affects the correlation is unknown.

Critiques of research on violence often cite the low base rate of violence and suicide as a limitation to predicting violence. The low base rate in even the most violent of subgroups (e.g., 18% in a substance abusing sample from Swanson’s epidemiological study (Swanson et al., 1990)) makes a simple prediction of non-violence the most accurate for any member of the group. However, a low base rate itself does
not interfere with accurate detection or prediction as long as the marker or indicator occurs at the same rate as the target outcome. Consider the detection of the rare disorder Phenylketonuria (PKU) in infants. The base rate of the disorder is low but so is the rate of occurrence of the indicator used to detect it. The sensitivity and the specificity are both high. Thus, the marker is a strong indicator of the disorder, and the lack of the marker is a strong indicator that the baby is free of the disorder.

The close fit between the marker and the disorder in the PKU example does not exist between indicators of violence and violent outcomes. The best clinical markers or actuarial markers occur at a much higher rate than the measured violence. For example, there are many more patients with suicidal thoughts, even with plans, than there are suicides. Using actuarial indicators, there are many more young men addicted to substances than there are violent attacks of others. Both the clinical and the actuarial indicators sort too many into the “violent” category. At times, the markers lack sensitivity instead and miss persons who are violent because of major psychiatric disorders. Consider the PCL-R as an indicator for future violence. The measure has acceptable sensitivity when the underlying disorder is psychopathy but has low sensitivity for persons with psychotic disorders (e.g., when a mother kills her children in the midst of a postpartum psychotic depression). When both sensitivity and specificity are low and vary depending on subgroups, the potential for accurate assessment is compromised.

The low base rate problem and unacceptable sensitivity and specificity of indicators, however, result from a fundamental error in relating risk factors to violent outcome. Simply stated, the studies and the analyses confuse detection of risk factors with prediction of violence. The confusion has most affected the interpretation of clinical assessment of risk. When studies measure the effectiveness of clinical risk assessments or actuarial risk assessments, what is the question? The designs of many studies seek to relate the assessment to later violence, or, in retrospective studies, to previous violence. The studies describe the level of accuracy of the assessment in separating the violent from the nonviolent. Therein lies the confusion. The analysis that produces sensitivity and specificity is a relatively simple $2 \times 2$ table (a step in the receiver operating characteristic analysis that produces the AUC) in which what is detected is compared to reality. This is a form of signal detection theory, in which the basic assumption is that there is a fixed reality. The task is to detect that reality. The analysis measures the accuracy of the detection. Whether assessing hearing acuity, exposure to tuberculosis, colorblindness, or metal on passengers at airports, the assumption, task, and analyses are the same (see Figure 1). The impact of accuracy and error depend on the task.

Across all such situations, the goal is to increase the accuracy of detection: increase true positive and true negatives and decrease the error, thereby increasing sensitivity and specificity.

Signal detection theory and analysis are elegant for assessing the accuracy of a measure to detect reality, but the application of this theory and analysis to risk assessment and the prediction of violent outcomes is invalid. Consider the metal detectors at airports. They are effective at detecting metal, and their effectiveness, as
Mossman (2000) indicated, can be changed to be more sensitive or less depending on the level of threat. Because of their accuracy at detecting metal, they are considered useful in preventing hijackings. However, they are useless at “predicting” hijackings of planes. Why? Because once metal is detected, interventions take place to prevent negative outcomes. The task of the metal detector is to assess what is there, not to predict what will occur.

When this theory and analysis is applied to prediction and more specifically to prediction of violence, the underlying assumption of the test—that the reality present at the time of the assessment has not altered—is violated. Indeed, the explicit goal of clinical or actuarial assessment is to use the assessment to reduce the occurrence of violence, that is to change the predicted reality. In other words, the goal of clinical and actuarial assessment is not to increase the rates of true positives, in terms of high-risk patients. Indeed the very act of assessment begins the process of converting the high-risk true positive into a low risk and hopefully false positive (see Figure 2).

The goal of clinical practice is to reduce the occurrence of violence, which in signal detection theory increases false positives. Because the model of signal detection is based on detection, not prediction, but is then applied to predicted outcomes of violence, the estimates of accuracy of assessment are wrongly construed. When clinicians successfully intervene to reduce the potential for violence, they decrease the accuracy of assessment according to this model.

However, signal detection theory can be applied appropriately. The correct analogy is that metal detectors are used at airports not because metal detectors accurately predict hijackings but because they are reliable detectors of metal. The appropriate assessment question in mental health is whether clinicians can detect signs of risk not whether they can accurately predict violent outcomes. Just as metal detectors detect weapons so that hijackings can be prevented, psychiatric evaluations detect mental illness and impairments of functional capacity so that psychiatric violence can be prevented.

A second limitation of a risk-driven model in clinical practice is that the accuracy of an individualized assessment is always uncertain unless violence occurs. Since there is no way to prove for any one individual that a specific intervention prevented a predicted incident, the efficacy of an intervention for a specific risk factor may be underestimated because the lack of a violent outcome mislabels the factor. For example, consider the studies that have identified that schizophrenia and TCO symptoms are negatively correlated with violence. Since psychotic symptoms are both detectable and largely treatable, it may indeed be that violence associated with these factors was prevented in a treated population. The risk-driven models misinterpret the findings and label the presence
of these symptoms as not risk-associated. Since it is unethical to follow a client identified at high risk without intervention, the opportunity for feedback concerning assessment of those at high risk is precluded. There is no learning from one’s assessment, and the effects of a period of nonviolence can serve to diminish (possibly inappropriately) the sense of risk over time.

What empiricism contributes is statistical differences in rates of violence for persons classified as high and low risk according to specific risk factors. Certain psychiatric symptoms and nonmental health variables may be linked to increased violence but no actuarial or clinical risk measure informs commitment, treatment, or release decisions directly. No actuarial or clinical assessment score informs the question of who will do what when. Even the valuable direction for future research as outlined by Douglas and Skeem (2005) will not overcome all these obstacles. The shortcomings in risk measures and their limited relevance to clinical questions may not be the result of research failure. Rather, the difficulty may reflect the limitation of a risk-driven model for determining psychiatric care.

The development of risk models has focused on factors associated with risk. Some of these factors are psychiatric but most are not. In managing risk, psychiatry has the expertise and the legal tools to manage symptoms of mental illness that reach a level of dangerousness and/ or impaired function. For other factors associated with risky lifestyle (e.g., social environment of high drug use, history of gang-related violence, poverty, and violent neighborhoods), psychiatry has neither the expertise nor the tools or the legal authority to modify risk. In a risk-driven model, the distinction between psychiatric risk and nonpsychiatric risk is lost. Once the person is a client, all risk becomes psychiatric by virtue of patienthood. Yet only a portion of an individual’s risk is attributable to psychiatric disorder, and even the presence of serious psychiatric disorder does not determine all of an individual’s behavior. Risk-driven models of care recognize neither the limits nor the power of psychiatry and shift our focus from the traditional underpinnings of all health care—to relieve suffering and improve functioning.

Conclusions/Recommendations

The clinician faced with a risk assessment task draws on a wealth of clinical knowledge and experience as well as a significant body of literature on the correlates of violence and the accuracy of violence risk assessments. But the data are often conflicting; no technique clearly outweighs all the others for all purposes, and all of our efforts are impeded by the methodological difficulties of social research. Fortunately, there are at least a few clear conclusions to be drawn from the literature, as outlined above, and some positive suggestions for promising future research directions. There are also several models available for conceptualizing and organizing the approach to the task.

Dvoskin and Heilbrun (2001) suggest that risk should be separated into three separate components: likelihood (probability), imminence, and severity of outcome. Probability is best defined by actuarial methods; imminence by patterns of violence, statements, plans and life circumstances; and severity by prior history of violence. They recommend an approach in which risk-relevant needs and deficits of the individual are first identified, then interventions are delivered to target those needs and enhance protective factors, and the success of the interventions is gauged by observations of behavior and response to treatment and assessment of the individual’s performance and function. If the goal of the assessment is to communicate risk to a court or other requesting
party, then the clinician may rely on an applicable actuarial tool, noting the limits of the tool and its application to the individual. If the issue is a clinical matter, such as a release decision, then clinical risk management strategies should be pursued, in which the assessment of the risk may change over time in response to interventions (Dvoskin & Heilbrun, 2001).

Dvoskin amplifies the clinical risk management approach further as an “anamnestic method.” In this approach, the clinician follows a systematic approach and identifies the individual’s personal history as victim and perpetrator of violence and describes the incidents and patterns of violence; explores personal characteristics that make violence likely for the individual (e.g., skill deficits); teaches cognitive, emotional, behavioral, and interpersonal skills; and helps the individual to develop a relapse prevention plan, including avoidance, contingencies, and harm reduction (Dvoskin, 2002).

Mullen (2000a) offers a similar overall strategy. The assessment of an individual’s current state of mind and risk status involves the assessment of preexisting vulnerabilities, protective and aggravating influences in the social/interpersonal environment, presence of mental disorder, and SA. Situational triggers for violence must also be identified. With this information, the clinician is able to direct remedial action to the factors that are conducive to an escalating predisposition to violence.

Regardless of the specific methodology the clinician chooses in accomplishing the tasks of risk assessment or risk management, the limits of the research data must be understood, the limits of the risk-driven approach itself must be appreciated, and the concern for the individual and the goals of clinical care must be appropriately regarded.

The nature of research is to derive principles and findings that apply to others who are like the group studied. The more generalizable the results, the broader the usefulness of the findings. To that end research methodologies seek to reduce individual differences in favor of more common factors. In contrast to researchers, clinicians treat individuals. Particularly in psychiatry and mental health, the individual differences inform both the diagnosis and the treatment. In the assessment and management of risk, the measures that help to profile the person along a continuum of all other psychiatric patients in terms of potential for violence can be a very useful first step. But the most effective clinical decisions will be those based on the individual’s own trajectory comprised of history, function, pattern of mental disorder and response to treatment, and unique markers related to the current situation. The most efficacious evaluation of psychiatric treatment will be in the assessment of how the client’s life, general function, and symptoms have improved.

Acknowledgments

Conflict of Interest: None declared.

References


Lake v. Cameron, 364 F.2d 657 (D.C. Cir.1966).


NORKO AND BARANOSKI


