Clinical Predictions of Dangerousness: Two-Year Follow-up of 408 Pre-Trial Forensic Cases

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The past decade has witnessed a number of serious attempts at empirically investigating the ability of mental health professionals, especially of psychiatrists, to discriminate between those individuals who will not act dangerously and those individuals who eventually will act dangerously.¹⁻³ These investigations have concentrated on the assessment of patients in hospitals for the criminally insane since it is in this context mental health professionals are called on routinely to offer their opinion regarding future post-release dangerousness. Based on data arising from these studies, less-thanfavorable conclusions have been drawn regarding the accuracy of dangerousness assessments and the associated clinical skills of the predicting psychiatrists. The problem of "over-prediction" has been widely documented in the literature so that, to use Monahan's recent summary of the findings, "psychiatrists and psychologists are accurate in no more than one out of three predictions of violent behavior over a several-year period among institutionalized populations that had both committed violence in the past (and thus had high base rates for it) and who were diagnosed as mentally ill."4

With the publication of these results has come, needless to say, a surge of criticism regarding the role of psychiatry in the courtroom, nowhere more thoroughly and persuasively argued than in the work of Ennis and Litwack.³ As convincing an argument, however, has been leveled at the interpretation of these results and the manner in which they are purported to apply to the task of clinically predicting dangerousness. Shah⁶ and, more recently, Monahan⁷ are very clear in their conceptions of the issue. Each maintains that the conclusions of investigations in this area that seek to discredit the clinical ability of the mental health professional to predict future dangerousness in individuals may not be altogether justified given (a) the "yes" versus "no" requirement of the prediction task imposed on the clinician to date in the area of dangerousness represents a far more stringent demand than does

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any other form of medical or psychological prognosis that the clinician may be asked to offer; (b) "dangerousness" is a societal construct, the definition of which should rest in the legal-political domain and not as it currently does, more by default than by choice, with the mental health disciplines; (c) accuracy of clinical predictions should not be considered as an absolute phenomenon but rather as more or less acceptable depending on the practical use to which the prediction is put. Once again, it is argued, these margins of acceptability should be determined by a legislative body.

It is within this framework adopted by Shah, Monahan, and others we wish to offer the results of the present study. It is our contention that the relationship between the clinical prediction of dangerous behavior and outcome at follow-up has not been validly tested using the most reliable methodology possible, nor do we claim that the present study has succeeded to do so with any final degree of satisfaction. It might be worth noting that certain aspects of the study incorporate some methodological refinements not yet found in the relevant literature.

Unlike previous investigations of this kind, we were able to take advantage of a relatively unselected sample of subjects, individuals undergoing court-ordered psychiatric assessments on the Brief Assessment Unit (BAU) of the Metropolitan Toronto Forensic Service (METFORS). All persons seen on the BAU have been charged with a criminal offense, however the seriousness of the charge may vary from "theft under \$200" to "murder." These persons may or may not be considered as mentally disordered; although competency to stand trial is in doubt prior to the psychiatric assessment, many patients leave METFORS having been assessed as fit. For the most part, the assessment is carried out at the pre-trial stage of the justice process so that conviction is not a foregone conclusion, but in the event of conviction, of course, court dispositions can range from probation to serving time in a penitentiary. In addition to employing a sample of this nature, a four-point rating scale was used by the clinicians as a vehicle for offering their opinion on dangerousness as opposed to the usual "yes" or "no" choice. Finally, the decision as to what constituted "dangerousness" at follow-up and to what degree was left in the hands of external raters to obtain some objective and fairly reliable outcome measures with which to compare prediction.

We are encouraged, therefore, with certain aspects of the study that are, we think, directed toward a more reliable way of testing the accuracy of clinical predictions of dangerousness. Where possible, we attempt to define the limitations of the results as they apply to clinical decision making working within the larger sociolegal context.

Method

During the year of 1978, 598 accused persons were assessed within the BAU at METFORS and were employed as subjects in this study. The majority of the sample is male and between the ages of 16 and 30. For a full

description of the BAU population, we refer the reader to Chapter 3 in our recent book *Clinical Assessment before Trial: Legal Issues and Mental Disorder*.⁸

An interdisciplinary team of clinicians⁹ (psychiatrist, psychologist, social worker, nurse, correctional officer) interviewed up to four patients daily on the BAU. As a matter of routine, all clinicians were required to indicate whether the patient should be considered as dangerous to others on a four-point scale of "no," "low," "medium," and "high."

At the end of a two-year period subsequent to assessment, four types of follow-up data were collected on subjects in the sample: (a) any further criminal charges; (b) misconducts during incarceration; (c) incidents precipitating contact with psychiatric facilities; (d) behavior during psychiatric hospitalization. The criminal data were collected at the Ontario Ministry of Correctional Services from a central computerized storage system. Because no such centralized system exists in this Province for psychiatric hospitals, it was necessary to limit the survey to the five psychiatric hospitals closest to Toronto.¹⁰ These five hospitals most likely have provided the great bulk of psychiatric services offered subjects during the two-year follow-up period.

Once collected, these follow-up data were used to construct profiles for each subject in the sample. The profiles included the entire set of behaviors discovered for that particular subject. Three external raters (all MA-level students in Criminology at the University of Toronto) independently assigned a value from 1 to 11 per follow-up profile designed to reflect the overall dangerousness to others exhibited by each subject during follow-up ('1'' being extremely low and ''11'' being extremely high). The rater mean for each profile, rounded to the nearest integer, was used as the outcome measure in subsequent analyses.¹¹ With regard to inter-rater agreement, a Pearson correlation coefficient was calculated on the ratings for Raters A and B (r=+0.74, p=0.001), A and C (r=+0.67, p=0.001), and B and C (r=+0.58, p=0.001).

To give the reader some idea of the composition of the follow-up profiles and the ratings assigned them, we offer two examples of profiles, one of which received a rater mean of "1" and the other "9." Subject A's only follow-up incident was a further criminal charge of "fraud." All three raters assigned a value of "1" to this profile. At the other end of the scale, Subject B was admitted to a psychiatric facility because "while in jail he tore his clothes, damaged his cell, and was extremely upset." Further criminal charges were noted at follow-up consisting of "common assault, assault with intent to inflict bodily harm, causing a disturbance, common assault, possession of dangerous weapons, arson." One rater assigned this profile a value of "8" and the other two a value of "9." Note that although individual raters occasionally chose "11" as a rating, no rater mean ever worked out to be higher than "9."

Results

For subjects comprising approximately 25 percent of the entire sample, no follow-up profile was constructed nor composite outcome value assigned. In these cases no further criminal offenses or, in the event of incarceration during follow-up, no misconducts were found to have occurred. In addition, there was no contact between these subjects and the five psychiatric facilities included in the study, or if some form of contact did take place it was of a rather short and cursory nature (for example, a drop-in) with only negligible and irrelevant information available in the clinical records. Tempting as it may be to classify this portion of the sample as "not dangerous" at follow-up, we decided to err perhaps in the direction of caution and exclude these cases from the analysis. This decision is strongly based on the uncertainty as to whether these subjects remained incident free during the two-year follow-up period (and, therefore, "not dangerous") or simply free from our scrutiny and the limited number of data sources available to us.

Our follow-up investigations were restricted to the Province of Ontario and, in the case of hospital data, to only five of the approximately twenty psychiatric facilities in the Province (not including the psychiatric wards in general hospitals). A further 7 percent of the sample was removed from the analyses since records at the Ministry of Correctional Services were missing for each of these cases and no follow-up information was available from any of the psychiatric data sources. For these reasons, therefore, the results of the present study are based on the analysis of approximately two-thirds of the original sample of 598.¹² Of course, the reader will note that the great majority of the sample *did* come to our notice during the two-year period, an observation of considerable interest in its own right.

Chi-Square Analysis

Although the outcome scores were rated on a continuous scale, we decided for this first set of analyses to divide the scale into "low" dangerousness at follow-up (scores of 1 to 4) and "high" dangerousness at followup (scores of 5 to 9)¹³ in order to place the data in a format comparable to that of previous studies in this area where "no" or "yes" descriptions of outcome were employed.

Sex, Age, Employment, Previous Hospitalization, Psychiatric Diagnosis Table 1 shows results obtained using certain demographic and psychiatric variables as predictors. Looking at male and female comparisons, a slightly smaller proportion of the female subsample expressed high degrees of dangerousness at outcome than did the male subjects, a result that did not, however, yield a significant effect, $\chi^2 = 1.09$, p=0.30.

Similarly in the case of age, those subjects aged 30 years or less showed high dangerousness in a greater proportion than did the subjects over 30 years old, although a chi-square analysis of the data was not significant, $\chi^2=1.37$, p=0.24. Whether the subject was employed did not seem to

Table 1. Demographic and Psychiatric Variables by Outcome			
	Dangerousness		
	Low	High	
Sex			
Male	198	169	
Female	25	14	
$\chi^2 = 1.09, df = 1, p = 0.30$			
Age			
30 or less	141	124	
Greater than 30	83	57	
$\chi^2 = 1.37$, df = 1, p=0.24			
Employed			
No	71	60	
Yes	128	107	
$\chi^2 < 1$			
Psychiatric Diagnosis			
Person. disorder	76	66	
Psychosis	67	45	
Other	73	62	
$\chi^2 = 1.18, df = 2, p = 0.55$			
Previous Hospitalizations			
No	91	60	
Yes	96	83	
$\chi^2 = 1.21, df = 1, p = 0.27$			

determine the degree of dangerousness exhibited at outcome, $\chi^2 < 1$. Since the population under study was being assessed for fitness to stand trial and other psychiatrically related factors, previous hospitalization and psychiatric diagnosis were examined with respect to dangerousness at follow-up. It would appear that a slightly higher percentage of subjects in the sample having had previous hospital experience (as opposed to not) fall into the high dangerousness category. A chi-square test proved not to be significant, $\chi^2=1.21$, p=0.27. Likewise with psychiatric diagnosis, no category singled itself out as having a disproportionate number of cases in either the low dangerousness or the high dangerousness group, $\chi^2=1.18$, p=0.55. **Assessment Charge, Previous Incarceration, Offense Pattern** Outcome compared with various criminal information factors is presented in

Tat	le 2. Criminal History Variables by Out	tcome
	Dange	erousness
	Low	High
Assessment charge		
Non-violent	136	107
Violent	86	74
$\chi^2 < 1$		
Offense pattern		
Non-violent	114	76
Violent	88	92
$\chi^2 = 4.17, df = 1, p = 0.04$		
Previous incarceration		
No	99	65
Yes	93	103
$\chi^2 = 5.48, df = 1, p = 0.02$		

Table 2. If we look at the violence inherent in the criminal charge that precipitated the original assessment at METFORS, we see it apparently fails as a significant predictor of future dangerousness, $\chi^2 < 1$. That is, the proportion of subjects presenting with violent-type offenses at assessment who subsequently commit acts of relatively high dangerousness during follow-up is ostensibly the same as those who appeared at METFORS for assessment with nonviolent-type offenses. On the other hand, if we look at the nature of the offense pattern that preceded subjects' assessment at METFORS (presumably, more indicative of their true criminal history than the single charge or single set of charges that precipitated assessment), 60 percent of the nonviolent offense pattern subjects fall in the low dangerousness outcome category, while about 51 percent of the violent offense pattern subjects fall in the high dangerousness outcome category. This result is statistically significant ($\chi^2 = 4.17$, p=0.04) and seems to suggest that subjects without any violence in their criminal history will more likely remain free from expressing high levels of dangerousness than will their violent-history counterparts. There is also some evidence to suggest that a higher proportion of those subjects having been previously incarcerated also show a greater probability of high dangerousness at follow-up, $\chi^2 = 5.48$, p=0.02. Previous incarceration seems to be a more important indicator of future dangerousness than previous hospitalization where (as we saw) a chi-square test proved not significant.

Psychiatric Prediction A final chi-square type analysis considered psychiatric prediction of dangerousness and actual dangerousness at outcome. As in the case of outcome, the four-point predicting scale was collapsed into "low" (no and low ratings) and "high" (medium and high ratings). The results of the analysis are presented in Table 3. It is worth noting that the "correct" predictions, both in the case of low and high predictions, are in the majority (114 out of 180 for low dangerousness and 103 out of 184 for high dangerousness). Although the way in which prediction ratings and outcome scores have been recorded for this analysis is not directly comparable to the format of data collected in previous investigations, the results presented here seem to show slightly higher levels of accurate psychiatric predictions. The common finding of the past has been one accurate prediction for every three predictions of future dangerousness. The figures resulting from the analysis of our data are more along the lines of three accurate predictions for every five predictions of future dangerousness.

	Table 3. Psy	chiatric Prediction by Outcome		
		Dangero	usness	
		Low	High	
Prediction	Low	114	66	
	High χ^{2} =	81 = 12.88, df = 1, p = 0.003	103	

ness. As might be expected, chi-square analysis of the results is highly significant, $\chi^2 = 12.88$, p=0.0003.

In summary, then, chi-square analysis of certain background characteristics (sex, age, employment) and psychiatric variables (previous hospitalization, psychiatric diagnosis) with respect to either low or high dangerousness discovered on follow-up were not significant, indicating these factors are very likely not trustworthy predictors of future dangerousness. Although the chi-square analysis of assessment charge by outcome proved not significant, a history of violent offenses and previous incarceration appeared to be related to high dangerousness at follow-up. Finally, psychiatric predictions of low and high dangerousness were found to be significantly related to outcome according to a chi-square analysis of the results. In addition, the data from the present study are slightly more optimistic than previous attempts at examining this relationship since the "hit" rate was found to be higher. Of course, it may be argued that in this study the low and high categories, based as they were on degrees of dangerousness from our prediction and outcome scales, constitute a "looser" classification of the data as opposed to the usual "ves" vs. "no" descriptions and, therefore, the task of predicting is rendered far less stringent; we have made it easier for the results to obtain levels of significance.

Correlations

Since both prediction and outcome variables are in continuous form, Pearson correlation coefficients were calculated between prediction and outcome to ascertain the nature of the relationship between these two variables. Correlations were computed individually according to the mental health discipline of the predicting clinicians. In Table 4 the correlation between prediction and outcome is presented for psychiatrists, psychologists, correctional officers, psychiatric nurses, and social workers. The five disciplines have been ordered according to the size of the correlation coefficient. Psychiatrists showed the highest correlation of +0.20 with psychologists having the second highest of +0.17, followed by the correctional officers with +0.12. Although these correlations are rather low they were all statistically significant. There would not appear to be any significant correlation between prediction and outcome in the case of both the nurses and the social workers where r values are effectively zero. It should be noted that although each team member at the time of assessment filled

Table 4. Pearson Correlations Between	Prediction and Outcome by Individual Discipline
Psychiatrists	r = +0.20, n = 364, p = 0.001
Psychologists	r = +0.17, n = 288, p = 0.002
Correctional officers	r = +0.12, n = 266, p = 0.03
Nurses	r = +0.08, $n = 309$, $p = 0.07$
Social workers	r = +0.03, $n = 273$, $p = 0.30$
Team average	r = +0.09, n = 113, p = 0.18
Random clinician	r = +0.02, n = 407, p = 0.33

out individual forms on each patient, the independence of prediction ratings was not controlled for in this study. That is, team members were free to use the opinions of their colleagues during discussion of the case to formulate their final ratings.¹⁴ Given the variation in coefficients from one discipline to another, however, it seems that team members must have remained fairly independent when making their ratings even though this was not required.

For purposes of comparison, the team average prediction was calculated in the case of every subject for whom the entire complement of disciplines was present at the assessment. The correlation between the team average prediction and outcome was calculated and appears in Table 4. This correlation is negligible, however, indicating that if one were simply to average all the ratings made by team members for each subject, this would bear no significant relationship to dangerousness at follow-up. Likewise for the purposes of comparison, we decided to examine the accuracy of an invented clinician who simply formulated predictions randomly. The resulting zeroorder correlation, again presented in Table 4, is very near zero. We take this to be an encouraging sign that randomly generated predictions of dangerousness are not in any way related to outcome and presumably some kind of clinical expertise is responsible for the positive and significant relationship found between prediction and outcome for many of the clinicians participating in the study.

Since the psychiatrists as a group appeared to show the strongest relationship between prediction and outcome, these data were analyzed separately for each of the four psychiatrists. The results of this individual analysis (presented in Table 5) indicate a marked variation in r values depending on the individual psychiatrists. While psychiatrists 1 and 3 have sufficiently large correlations so the coefficients are indeed significant (r=+0.18, p=0.01 and r=+0.28, p=0.004, respectively), psychiatrist 2 and 4 did not achieve correlations between their predictions of dangerousness and actual outcome, which are significantly high (r=+0.14, p=0.11 and r=+0.03, p=0.42).

Table 5. Pearson Correlations Between Prediction and Outcome by Individual Psychiatrist		
Psychiatrist 1	r = +0.18, $n = 160$, $p = 0.01$	
Psychiatrist 2	r = +0.14, $n = 75$, $p = 0.11$	
Psychiatrist 3	r = +0.28, n = 86, p = 0.004	
Psychiatrist 4	r = +0.03, $n = 43$, $p = 0.42$	

There appear to be marked differences in the prediction by outcome correlations across the various disciplines represented in the clinical assessment team at METFORS. Although the correlation coefficients are, on the whole, fairly low, as would be expected, three of the five disciplines studied show significant correlations between prediction and outcome. On closer examination of the data by individual clinicians, however, one could conclude that the variation in correlations across disciplines noted previously may be more a matter of interclinician differences than interdiscipli-

nary ones. We found, for instance, that prediction by outcome correlation coefficients for individual psychiatrists ranged in size from +0.03 to +0.28, and only two of the four psychiatrists showed significant prediction by outcome correlations.

Discussion and Conclusions

We have presented the results of a follow-up study dealing with the clinical prediction of dangerous behavior as it applies to a population of accused individuals remanded for psychiatric assessment. An attempt was made to point out aspects of the study representing a somewhat improved methodology compared to previous investigations in the area of dangerousness prediction, usually of the maximum security setting post-release type. The results of the study are based on the use of a four-point probability scale for prediction with a relatively unselected population of subjects, and the design of the study is longitudinal, rather than merely retrospective. These refinements aside, the data resulting from the current study are very similar to those reported elsewhere in the literature. A tabulation of the accurate versus inaccurate predictions results in a sizable proportion of both "misses" and "false positives." The correlation between prediction and outcome, although positive and significant, is rather low. Nonetheless, we were able to show that the accuracy of predictions varies with the mental health profession of which a particular clinician is a member, psychiatry per se being only one of several, and that, at least among psychiatrists, the degree of accuracy is very strongly associated with the individual clinician. Indeed, these results in themselves may have proved to be the most interesting outcome from the study in that they point to the necessity of specifying exactly who is doing the predicting before proceeding with an examination of clinical opinion and the prediction of dangerousness.

Levels of accuracy obtained in any study of dangerousness and its prediction are a function of far more than the nature of the predicting clinician, however. We are referring here to Monahan's concept of "unsynchronized definitions"¹⁵ wherein exists the very real possibility of a discrepancy between what the investigating researcher takes to be as evidence of future dangerous behavior and what the predicting clinician assumes it to be while formulating his or her opinions on the matter. This discrepancy can affect the degree of accuracy, of course, since the criteria used to validate the predictions differ from those on which the predictions were originally based.

We have not, in the present study, incorporated a method by which to test the "synchronicity" of researcher and predicting clinician definitions of what constitutes dangerousness at follow-up and to what degrees. An attempt was made, nonetheless, to prevent researcher bias from influencing the results of the study by having external raters assign outcome values to follow-up data, but this does not solve the problem of a possible discrepancy between those who predicted dangerousness and those who decided to what extent it occurred during follow-up. An obvious pre-investigation remedy would be to put into operation with as much specificity as possible the criterion variables so both researcher and clinician were fully aware of exactly what was being predicted.

In the present study, the time is long gone when such a remedy could have been applied since prediction data have been collected. We have it in mind to submit the follow-up data collected on the sample (or a selectedsubsample) to a rating procedure that would allow the clinicians who originally formulated the predictions to assign outcome values. Taking into consideration that more than two years have lapsed since the predictions were made and that one's perception of a concept may change over time, we would hope that outcome scores obtained in this manner will be based on criteria fairly similar to those used at the point of prediction. The intention would be to examine whether the level of accuracy determined by an analysis of the prediction-outcome relationship is affected by the use of predicting clinicians as raters of outcome, as opposed to external criminology students.

In conclusion, our purpose was not to prove or disprove the accuracy of clinical predictions of dangerousness. Rather, the results are offered for consideration by both the legal and mental health community of professionals to deal with as they see fit in light of issues raised by Shah, Monahan, and others. The strength of the present study, we believe, lies in the comparison of levels of accuracy across the mental health disciplines and across individuals; the results of the study should not be taken to represent a definitive test of the absolute accuracy of mental health professionals burdened with the task of predicting future dangerousness. Finally, we believe that attempts to answer the question, "what factors affect the accuracy of clinical predictions of dangerousness?" as opposed to "can clinicians predict dangerousness?" would result in a far more productive and useful line of inquiry.

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- 7. Monahan J: The Clinical Prediction
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- 9. The composition of the team changed on a regular basis so that, for example, while a psychiatrist attended every assessment it was not the same psychiatrist in each case.
- 10. These were the Clarke Institute of Psychiatry, Queen Street Mental Health Centre, Whitby Psychiatric Hospital, St. Thomas Psychiatric Hospital, and Penetanguishene Mental Health Centre.
- 11. A prediction by outcome analysis was performed at one stage using the single most dangerous incident found at follow-up for each subject, which we believe to be a less sensitive measure than the one described in the present study. For a description of this analysis see Appendix H in Clinical Assessment Before Trial, reference 8 above.
- 12. In fact, we pooled those subjects with "0" outcomes (i.e., n=151) and those subjects with 1 to 4 outcomes to create a "not dangerous" group. This group was then compared to the "dangerous" group (i.e., outcome scores of 5 to 9) with respect to low and high predictions of dangerousness. We found that 187 of the 253 or 74 percent of those subjects predicted *not* to be dangerous, indeed, fell into the "not dangerous" group at follow-up, while 103 of 262 or 39 percent predicted to be dangerous were found to be so at follow-up ($\chi^2 = 10.21$, df=1, p=0.001). The 61 percent false positive proportion is very much in line with the two-thirds figure so often reported in the literature.
- 13. The scale was divided this way since final outcome values ranged from 1 to 9 with a median of 4.13.
- 14. In a subsequent study described in part at the 1982 AAPL Meeting in New York and to be reported later, this was controlled by having a researcher collect forms immediately following the group interview. There was no discussion among clinical staff members until forms had been completed.
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