OCCUPATIONAL PROGNOSIS

BY

R. DEANS WEIR AND W. BRASS

*From the Department of Social Medicine and the Department of Statistics,
University of Aberdeen*

Recovery from illness can be assessed in two main ways, first by medical criteria such as relief from symptoms or recovery of function and secondly by social criteria such as return to work or other specified activities. This paper is concerned with recovery from hospital-treated illness as measured by the employment position of 399 patients 12 months after discharge; it will show that occupational prognosis can be reliably based on certain characteristics which were either known or readily ascertainable before discharge from hospital.

METHOD

The follow-up survey of 500 hospital patients, of which this prediction study formed part, has been reported elsewhere (Weir, McKenzie, and Richardson, 1962). The patients were drawn from representative medical and surgical wards of Aberdeen Royal Infirmary and were interviewed in hospital and at home visits one, 3 and 12 months after discharge. The 399 patients still eligible for employment at 12 months could be divided into three groups on the basis of their employment position one year after leaving hospital:

- (A) 100 men with an employment problem related to the illness which took them into hospital;
- (B) 73 men with an employment problem which appeared either to antedate the hospital illness or to be in no way attributable to it;
- (C) 226 men who had returned to employment with little or no difficulty.

By scrutinizing the recorded medical and social situation of these men during admission, fifteen characteristics were identified which appeared to be related to their subsequent employment progress. From an analysis of the patients' measurements for these characteristics it was found that a forecast of

the employment position 12 months later, which was near optimal on the information recorded, could be obtained by the use of only five characteristics, four divided into two measurement grades and one into three. In the assessment of the efficiency of forecasts allowance was made for the chance error due to the variability of patients from sample to sample. The most convenient procedure for making use of these results in practice is by a scoring system; a simple one has been devised and is shown below. The scores in the characteristics are added for each patient to give a total between 0 and 8:

<i>Characteristic</i>	<i>Score</i>
(a) Manual worker	1
(b) Unemployed on admission	3
(c) Age over 50	1
(d) Income while sick less than earnings	1
(e) Main diagnosis cardiovascular or neurological	2
Main diagnosis gastrointestinal or urogenital	0
Other diagnosis	1

Three examples will illustrate the technique:

GROUP C (No employment difficulties).

Total score 1.

Case 1, aged 36 (score 0), an excavator driver (score 1), was admitted to hospital with a perforated peptic ulcer (score 0). The firm with which he was working (score 0) made up his wages while he was in hospital (score 0) and he returned to work after 3 months convalescence to be employed initially in maintaining the firm's fleet of staff cars.

GROUP A (Related employment difficulties).

Total score 5.

Case 2, a nightwatchman (score 1) aged 55 (score 1), had been in hospital with hypertension, an arteriovenous aneurysm, and long-standing chronic bronchitis (score 2). When seen at one month he was back at his previous work (score 0) against his

doctor's advice because he could not exist on sickness benefit alone (score 1). Before the end of the year he had been admitted to hospital for 5 weeks with pneumonia and when last visited had lost his watchman's job.

**GROUP B (Unrelated employment difficulties).
Total score 3.**

Case 3, aged 26 (score 0), working as a fishing tackle fitter (score 0 and 1), was admitted to hospital for diabetic stabilization (score 1). He was not paid while off sick (score 1) and some months after his return to work, trade became slack and he was paid off. Later he found himself employment as a builder's labourer and again had trouble with his stabilization.

RESULTS

The proportion of patients with employment problems at each score level

$$\left[100 \times \frac{\text{Groups A+B}}{\text{Groups A+B+C}} \right]$$

was as follows:

Score	Per cent. with Employment Problems
0	0
1	14
2	21
3	34
4	70
5	92
6, 7, and 8	100

The distribution of scores divided between 0-3 and 4-8 is shown in the Table.

TABLE

DISTRIBUTION OF TOTAL SCORES FOR FIVE CHARACTERISTICS, SHOWING THE RELATION BETWEEN PREDICTIVE SCORE AND EMPLOYMENT PROBLEMS OF 399 MALE PATIENTS AGED 15-64, 12 MONTHS AFTER DISCHARGE

Total Score	Employment Difficulties		
	Group A: Related problems	Group B: Unrelated problems	Group C: No problems
0	—	—	16
1	1	5	38
2	3	17	76
3	13	28	78
4	30	5	15
5	27	7	3
6	15	10	—
7	7	1	—
8	4	—	—
Total	100	73	226

This distribution gave the following results:

- (1) The prediction of work problems related to admission:

85 per cent. of patients were correctly allocated between Groups A and B+C; 10.3 per cent. were "false positives" in the sense that they were wrongly assumed to have employment difficulties and 4.3 per cent. were "false negatives" in the sense that they were wrongly allocated the other way.

- (2) The prediction of work problems in general:

79 per cent. of patients were correctly allocated between Groups A+B and C; 4.5 per cent. were "false positives" and 16.8 per cent. were "false negatives".

DISCUSSION

These findings show that it is possible with high accuracy to identify, on admission to hospital, those men who are likely to encounter employment problems within one year of discharge. Some of the characteristics are already recorded routinely on case notes; the others could easily be incorporated.

The prediction score system developed here, based on five items of information, would appear to offer a possible method for the early detection of after-care problems so that patients especially vulnerable to occupational difficulties could be recognized and either helped at once or observed at follow-up clinics to ensure that problems were tackled as soon as they arose. Too often such patients drift into the ranks of the unemployable and if rehabilitation facilities are to be used efficiently further trials of this present technique must be undertaken. Used in this way a prediction score can be considered similar to many other diagnostic aids providing comparative information to strengthen the clinician's opinion.

The adoption of predictive techniques as both diagnostic and administrative aids affords the opportunity of tackling many exceedingly complex problems. It has already been shown by Crooks, Wayne, and Robb (1960) that scored clinical indices, which were simple to calculate, could provide as accurate a diagnostic aid as various biochemical and other clinical investigations. In much the same way a comparative index of information regarding choice of operation or most suitable form of specific therapy could be prepared. By modifying these approaches an analysis of symptom complexes (for example, the "dyspepsias") could be carried out to provide indices for discriminating between specific conditions or for forecasting the likelihood of developing particular conditions.

A more direct application of the method used in the present study could be the use of prediction in

determining admission priority for patients on the hospital waiting list or in calculating expected bed occupancy.

In all these examples prediction methods provide the clinician with objective experience, in a practical form, that might not otherwise be available; it is then the responsibility of the doctor to interpret the significance of this information for individual patients or in particular circumstances.

SUMMARY

The experience required for prediction was obtained by following up a sample of 399 male patients, aged 15–64, after discharge from hospital and recording their employment problems. By the allocation of combinations of characteristics between the groups to be distinguished, a procedure was

devised for identifying prior to discharge those patients likely to have employment difficulties. Examples of the further applications of such techniques in medicine are discussed.

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