AN OUTCOME INDEX FOR MENTAL HOSPITAL PATIENTS

E. I. BURDOCK AND ANNE S. HARDESTY

New York State Department of Mental Hygiene and Columbia University

At any particular point in time, the patients in a mental hospital vary with respect to length of stay, number of admissions, number of releases, and time since first admission. A single index number combining these factors could provide a criterion for assessing the predictive validity of psychiatric prognoses, psychological tests, and treatment regimens.

Previous attempts to describe the fates of institutionalized patients by Crandell, Zubin, Mettler, and Logan (1954) and by Crandell, Zubin, Mettler, and Kugelmass (1956) culminated in an "immobility index," which was the ratio of number of months of hospitalization to number of admissions during the two years following first admission. This immobility index was found to correlate negatively with subsequent outcome.

The Outcome Index,

\[ OI = \frac{t_o}{l} \times \frac{r^2}{a^2} \]

represents a refinement of the earlier immobility index in the direction of greater sensitivity and convenience. The four elements are:

- \( l \) = length of time in days between first admission and a selected anniversary date.
- \( t_o \) = total number of nights slept outside the hospital on official leave or discharge status.
- \( a \) = number of admissions.
- \( r \) = number of releases.

The relative weights given to admissions and releases were determined empirically from a sample of patients ranked in order of length and frequency of hospital experience. Previous studies as well as clinical observation suggest that each successive readmission increases the expectation of subsequent admissions, but each successive release is less indicative of genuine remission.

The Outcome Index is like a probability in that it ranges from zero for a patient with no significant releases to a hypothetical maximum of one for a patient who spent no days in the hospital.

The Outcome Index has been applied to three samples of patients first admitted to a New York State mental hospital in 1953, 1955, and 1956, respectively. They were followed up at four successive intervals: 6 months, 1 year, 2 years, and 3 years. The long-term follow-up was greatly facilitated by the fact that the patients had been located on the earlier occasions. The data were tabulated and Outcome Indices were computed for each patient at every period.

The 1953 sample consisted of 35 first-admission patients who were all young schizophrenics (mean age 29) and who had been selected by the professional staff for accessibility and amenability to psychological testing. The 1955 group of 60 first-admission patients was a sample of young schizophrenics (mean age 30) chosen by a survey of the case records. The 1956 group of 85 first-admission patients successively admitted to the same institution were heterogeneous from the standpoint of diagnostic category, age, sex, etc., being alike only with respect to time of entry into the hospital and first-admission status. These 85 patients were the survivors of a somewhat larger cohort reduced by deaths. (There appeared to have been a disproportionately large number of geriatric admissions in this cohort.) No Outcome Indices were computed for those who failed to survive to the end of the final follow-up period.

Previous studies (Kramer, Goldstein, Israel, & Johnson, 1955) have suggested that by the end of the second year of hospitalization, the careers of mental patients have become stabilized. Therefore, 2 years has been taken as a basal follow-up period for dividing patients into homogeneous groups with respect to the Outcome Index. Figures 1 through 3 represent the trends of individual Outcome Indices from 6 months to 3 years for each sample successively. In each sample, the patients have been divided into four groups according to the magnitude of the 2-year index. Chronic residents with zero indices at 720 days are not shown on the figures. There were 4 of these in the 1953 sample, 4 in the 1955 sample, and 17 in the 1956 sample. Only 3 of these 25 with zero index showed any change by the third year. One of the 1953 patients rose from zero to .004 and 2 of the 1956 patients rose from zero to .013 and to .222, respectively.

In each of the three figures, the right-hand graph, Early Release, represents patients with a 2-year Outcome Index of .50 or higher. To obtain a basal index this high, these patients must have had only a single admission and must have been released within one year. Some of these, with a 2-year index of .75 or higher, were released within 6 months of admission. In each of the three samples more than half the patients fit this
Fig. 1. Individual lines of trend of successive Outcome Indices from time of first admission to state mental hospital in 1953.

Fig. 2. Individual lines of trend of successive Outcome Indices from time of first admission to a state mental hospital in 1955.

definition for early release:

In 1953—18 out of 35
In 1955—36 out of 60
In 1956—44 out of 85
Total—98 out of 180

Only 4 of the 98 relapsed during the third year, 2 from the 1955 sample and 2 from the 1956 sample.

The middle graphs in Figures 1 through 3 are for patients with Delayed Release. The 2-year Outcome Index ranging from .125 to .50 again reflects a single admission, but with between 12 and 21 months of hospitalization. There were or three such patients in each sample.

The three left-hand graphs, Late Release or Relapse, are for patients with 2-year Outcome Index between zero and .125. A few patients with
Outcome Index less than .125 had a single admission but were released only after 21 months of hospitalization. There were two such patients in the 1955 sample and one in the 1956 sample. But the majority of those with an Outcome Index between zero and .125 were released during their first year and readmitted before the end of the 2-year basal period.

Figures 1–3 also suggest that the frequencies for each of the four categories of outcome are unequal. The disparity is more clearly revealed in Table 1, which presents the data in summarized form and includes the appropriate statistical tests of significance. The tests support the conclusion that in each sample the frequencies of the four different outcome categories are significantly different from each other. Moreover, an overall test of the pooled data, as shown in Table 1, indicates that the differences among the categories tend to be consistently in the same direction from sample to sample. Finally, a test of independence encourages the presumption that all three samples are drawn from the same population of outcomes.

The stability of the basal Outcome Index is most graphically demonstrated by dividing each sample into two subgroups, those with a 2-year index equal to or greater than .5 vs. those with a 2-year index less than .5. If separate frequency distributions of the 3-year Outcome Indices for each subgroup are then plotted on the same axes, the extent of overlap is seen to be negligible. Figures 4 through 6 show the data arranged in this way.

The evidence so far presented suggests that, in general, when it is applied to individual patients the basal Outcome Index computed for the 2-year period following first admission yields a maximum amount of information in a minimum follow-up time. However, it will often be of interest to examine the records of a cohort at the end of their first year so as to get some notion as to the

<table>
<thead>
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<th>TABLE 1</th>
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<tr>
<td>CHI SQUARE ANALYSIS OF FREQUENCIES IN FOUR CATEGORIES OF A TWO-YEAR OUTCOME INDEX APPLIED TO THREE SAMPLES OF FIRST-ADMISSION PATIENTS AT A STATE MENTAL HOSPITAL</td>
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<table>
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<tr>
<th>Sample</th>
<th>OI = 0</th>
<th>0 &lt; OI &lt; .125</th>
<th>.125 ≤ OI &lt; .50</th>
<th>.50 ≤ OI &lt; 1.00</th>
<th>Total</th>
<th>χ²</th>
<th>df</th>
<th>p</th>
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<tr>
<td>1953</td>
<td>4</td>
<td>10</td>
<td>3</td>
<td>18</td>
<td>35</td>
<td>16.312</td>
<td>3</td>
<td>&lt;.001</td>
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<tr>
<td>1955</td>
<td>4</td>
<td>17</td>
<td>3</td>
<td>36</td>
<td>60</td>
<td>47.332</td>
<td>3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>1956</td>
<td>17</td>
<td>21</td>
<td>3</td>
<td>44</td>
<td>85</td>
<td>40.879</td>
<td>3</td>
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<td>(Σχ²)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>104.523</td>
<td>9</td>
<td>&lt;.001</td>
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<tr>
<td>Pooled</td>
<td>25</td>
<td>48</td>
<td>9</td>
<td>98</td>
<td>180</td>
<td>100.310</td>
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<td>(Test of Independence)</td>
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<td></td>
<td>4.213</td>
<td>6</td>
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Fig. 3. Individual lines of trend of successive Outcome Indices from time of first admission to a state mental hospital in 1956.
types of patients and their disposition. For this purpose the Outcome Index has been applied to a sample of 83 first-admission patients who entered New York Psychiatric Institute in 1958–1959. The New York Psychiatric Institute is a small intensive treatment facility which selects patients suitable for teaching and research and which does not relegate any patient to custodial care. It has a high staff-to-patient ratio. As it is still less than 2 years since admission, a basal Outcome Index could not be computed for these patients. But it is of interest to compare them with unselected state hospital patients for early outcome. The proportion of institute patients with zero index for the first 6 months is almost twice as large as the corresponding proportion for the state hospital; by the end of the year, the proportion of institute patients with zero index has increased so that the ratio is 5:2. The reason why fewer patients are released from the Psychiatric Institute during their first year appears to be that almost all patients become involved in intensive and prolonged psychotherapy (Burdock, Glass, Hardesty, & Beck, 1961).

The difference between the state hospital and the Psychiatric Institute is pointed up by tabulating the corresponding frequencies for each outcome category for the end of the first year after admission. When the Outcome Index is based on

Table 2 shows the relative frequencies of the 1-year outcome categories for each of the three samples from the state hospital and for the sample from the Psychiatric Institute. The accompanying statistical tests again support the hypotheses.
that the four outcome categories are on the whole significantly different and that the variations are the same direction from sample to sample, but the 1953 sample, the smallest, fails to provide a statistically significant difference. However, a noteworthy contrast emerges between the institute sample and the combined state hospital samples when the tests of independence are examined. While all three state hospital samples appear to come from the same population of outcomes, the Psychiatric Institute sample registers as in all probability independent. The institute's policy of holding patients for intensive psychotherapy is reflected in a slower release rate during the first year after admission.

From the data presented here it can be concluded that the Outcome Index, based on the first 2 years after admission, provides a reasonably stable criterion for assessing effectiveness of treatment and for distinguishing institutional policies. Three successive samples of first-admission patients taken from a regular state mental hospital show basically similar patterns of outcome despite different diagnoses, different age groups, and the varying effects of the current trend in drug therapy.

The Outcome Index can be used to characterize institutions as well as to describe individual patients. This latter application is illustrated by the comparison of the three state hospital samples with the sample from the Psychiatric Institute.

**SUMMARY**

An *Outcome Index* for mental hospital patients is described. The index relates time out of hospital to follow-up period since first admission and weights their ratio differentially by number of readmissions and releases. This index becomes relatively stable on 2-year follow-up. It can be used as a criterion for prognostic efficiency, for efficacy of treatment, and for characterizing institutional policy.

**REFERENCES**


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