The basic conditions for hospitals in Germany have changed considerably over the past few years. In the cost discussion in the psychiatric inpatient setting, length of inpatient stay is of great concern: duration of treatment and cost per case are closely correlated, and costs can be influenced via this indicator because, unlike in somatic medicine, the daily care rates are fixed (1). Within the specialty psychiatry and psychotherapy, the health insurance companies are demanding shorter inpatient stays, especially for patients with addiction disorders (2). A cost effectiveness calculation that makes more sense in terms of health economics over longer time periods and across all treatment sectors does currently not exist (3). In addition, duration of inpatient stay is controversial as a criterion of therapeutic efficiency. When comparing hospitals with regard to length of inpatient stay, several methodological pitfalls have to be borne in mind, especially in the specialty psychiatry and psychotherapy, and different variables have to be considered (5-7).

Nationally and internationally, the durations of inpatient stays are decreasing substantially in hospitals for psychiatry and psychotherapy (7, 8). The mean duration of treatment in special hospitals and wards for psychiatry/psychotherapy fell over the years from 40.7 days (1994) to 24.7 days (2004) (9).

A reduction of 40% in the length of inpatient stay will have consequences. Internationally, studies into the effects of increasingly shorter inpatient stays in psychiatry and psychotherapy have found an increase in readmission rates (10-14). The cumulative length of inpatient stay was decreasing only partly (13, 14); in patients with addiction disorders (12) and schizophrenia (11) it remained constant. A study conducted in Germany showed that when the length of inpatient stays decreased and readmission rates increased, the cumulative duration of inpatient stay fell significantly in dementia patients, a smaller reduction was seen in patients with schizophrenia and drug addiction disorders, and a rise was seen in patients with alcohol disorders (2). Against this background, we evaluated data from the psychiatric basic documentation system (DGPPN-BADO) to find out whether the rate of...
readmission increases in psychiatric inpatients when the inpatient stay is reduced, and how length of inpatient stay and degree of improvement are correlated.

**Method**

**Sample**

All 18,074 patients (with a total of 24,888 treatment episodes) who had been treated in the hospital and policlinic for psychiatry, psychosomatic medicine, and psychotherapy of the university at the regional hospital Regensburg from 1995 to 2003 were included in the study. Each patient’s first inpatient stay in a year was used as the index inpatient stay. The hospital has 475 beds and is responsible for an area with a population of about 800,000. Of the case patients, 53.4% were men, the average age was 45.4 years. The following diagnoses were made (according to ICD-10):

- Organic psychological disorders (F0) 13.7%
- Psychological and behavioural disorders caused by psychotropic substances (F1) 27.9%
- Schizophrenic, schizotypal, and delusional disorders (F2) 23.0%
- Affective disorders (F3) 15.6%
- Neurotic, stress-related, and somatoform disorders (F4) 10.7%
- Behavioural disturbances with physical disorders and factors (F5) 0.4%
- Personality and behavioural disorders (F6) 4.9%
- Diminished intelligence (F7) 1.1%
- Developmental disorders (F8) 0.0%, and
- Behavioural and emotional disorders with onset in childhood and adolescence (F9) 1.6%.

**Instrument**

The evaluation was done on the basis of the psychiatric basic documentation system (DGPPN-BADO) recommended by the Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde (DGPPN, the German society for psychiatry, psychotherapy, and neurology/neuropsychiatry). With the DGPPN-BADO, more than 70 sociodemographic variables are recorded for each patient, which include age, sex, marital status, living...
conditions/accommodation, school qualification, vocational/professional training, job situation; also included are illness-related variables, such as age at first onset of illness, duration of illness, the state that led to the patient being admitted, duration of current episode, attempted suicide in the patient’s history, suicidality and aggressive behaviour preceding admission and during admission, fixations, treatment with psychoactive drugs, psychotherapy, legal basis for admission, care (15, 16). The target variables of the study were:

- Duration of each inpatient stay
- Cumulative inpatient stay over a year, including index inpatient stay
- Rate of readmission within a year after discharge
- Psychosocial functioning, operationalized with the Global Assessment of Functioning (GAF) scale, and
- Degree of improvement, measured with the Clinical Global Impression (CGI) scale.

Statistical analyses
In addition to the descriptive statistic for each target variable, we used regression analysis (log-linear model) to determine factors that influenced the dependent variable “rate of readmission”, while including sociodemographic and illness-related data from the DGPPN-BADO as independent variables. Inclusion was decided on the basis of univariate tests, the analyses were performed using the statistical environment R.

Results
In the study period from 1995 to 2003, the mean inpatient stay fell from 41.0 days to 31.3 days, the median duration fell from 25 days to 22 days (figure 1). The cumulative length of inpatient stay within a year fell slightly between 1995 and 1998 and stagnated from 1999 to 2003. When differentiated by diagnoses, the cumulative length of inpatient stay increased from 1999 for organic psychological disorders (F0) and affective disorders (F3), it stagnated for addiction disorders (F1), and it fell for schizophrenia and delusional disorders (F2).

The rate of readmission within a year of discharge stagnated in 1995 to 1999 and increased from 2000, from a mean of 0.55 in 1995 to 0.65 in 2002 (figure 2). When differentiated by diagnoses, an increase of the readmission rate is seen for addiction disorders (F1) and affective disorders (F3) and a stagnation for organic psychological disorders (F0) and schi-
zophrenic/delusional disorders. An increased rate of readmission was found for an index inpatient stay of less than 14 days. In addition to a short inpatient stay, regression analysis showed several other, significant predictors of readmission (table): readmission of patients with personality and behavioural disorders (F6), addiction disorders (F1), and schizophrenic/delusional disorders (F2) is relatively common, whereas it is less common for organic psychological disorders (F0), neurotic, stress-related, and somatoform disorders (F4) and affective disorders (F3). Additional important predictors are attempted suicide/self harm during the inpatient stay and a lack of continuing outpatient care by general practitioners or neurologists/psychiatrists. In the study period, patients were admitted in a worse state and were discharged with a lower psychosocial ability to function, measured with the GAF; however, the gain in GAF points during inpatient stay increased over the years. Per unit of time, an increasing improvement was achieved, measured with the CGI, of 3.5 points (mean). With a longer inpatient stay, the improvement increased.

Discussion
The data derived from routinely collected basic documentation of a special hospital for psychiatry and psychotherapy show that increasingly short inpatient stays are associated with an increased readmission rate and that the cumulative length of inpatient stay is therefore not decreasing. This means no cost saving for the health insurance companies, the "revolving door" effect increases for the patients, however, who are being discharged in a worse state. Psychiatric inpatient treatment has improved over the study period, from 1995 to 2003, probably thanks to new and effective therapeutic options, but the limits of therapy effects are being reached increasingly because of the shorter inpatient stay. Lower psychosocial functioning at discharge results in more frequent readmission (17).

<p>| TABLE |
| Predictors of readmission to hospital from 1995 to 2002 in a psychiatric-psychotherapeutic hospital (n= 18 674 patients) |</p>
<table>
<thead>
<tr>
<th>Predictor</th>
<th>Regression coefficient</th>
<th>Standard error</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time passing (per year)</td>
<td>0.001</td>
<td>0.005</td>
<td>0.031</td>
</tr>
<tr>
<td>Inpatient stay (per day)</td>
<td>-0.195</td>
<td>0.004</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Interaction: Inpatient stay in passing time</td>
<td>-0.006</td>
<td>0.002</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Legal reason &quot;voluntary&quot;</td>
<td>0.179</td>
<td>0.019</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Legal reason &quot;emergency admission&quot;</td>
<td>0.298</td>
<td>0.039</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Legal reason &quot;law on accommodation&quot;</td>
<td>-0.288</td>
<td>0.031</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organic psychological disorders (F0)</td>
<td>-1.246</td>
<td>0.041</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Addiction disorders (F1)</td>
<td>0.227</td>
<td>0.021</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Schizophrenia/delusional disorders (F2)</td>
<td>0.116</td>
<td>0.022</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Affective disorders (F3)</td>
<td>-0.347</td>
<td>0.028</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neurotic, stress-related, and somatoform disorders (F4)</td>
<td>-0.583</td>
<td>0.032</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Personality and behavioural disorders (F6)</td>
<td>0.864</td>
<td>0.023</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Attempted suicide/self harm in hospital</td>
<td>0.654</td>
<td>0.028</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Danger to others in hospital</td>
<td>0.022</td>
<td>0.025</td>
<td>0.391</td>
</tr>
<tr>
<td>No continuing outpatient treatment</td>
<td>-0.067</td>
<td>0.016</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Outpatient treatment from general practitioner</td>
<td>-0.270</td>
<td>0.013</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Outpatient treatment from neurologist/psychiatrist</td>
<td>-0.186</td>
<td>0.014</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Standard hospital discharge</td>
<td>-0.022</td>
<td>0.013</td>
<td>0.087</td>
</tr>
<tr>
<td>Private accommodation after hospital discharge</td>
<td>0.107</td>
<td>0.015</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

+, Effect that increases readmissions; -, Effect that decreases readmissions
An increase in readmissions has also been the main result of studies into the effects of the shortening of hospital stays that was enforced over the years (2, 10-14). Like our evaluation, several other studies also show that the “gain” of a shorter inpatient stay per stay does not always result in a shorter cumulative inpatient stay (2, 11, 12), especially not in patients with schizophrenic or addiction disorders. Especially in alcoholic patients, the effects of longer treatment are clearly positive (18-21). Accordingly, the introduction of diagnosis-related groups (DRGs) for alcohol-related disorders in somatic hospital wards is counterproductive because they favour a short and non-specific detoxification (22). Generally the introduction of DRGs in their current format into the specialty psychiatry and psychotherapy does not make sense. The DRGs would have to be adapted in the sense of a mixed financing system, because otherwise a further reduction in the inpatient stay and increases in the readmission rates are likely, and will be accompanied by an overall deterioration of services (23, 24). In addition to the effects of shorter inpatient stays on readmission rates, however, further predictors have to be taken into consideration in the discussion. It will have to be investigated how improvements in hospital treatment and psychiatric services generally can influence this, for example, by expanding outpatient treatment facilities.

Conclusions

For the psychiatry and psychotherapy specialty, the shorter inpatient stay per stay has now reached a bottom limit. Further reductions will affect readmission rates and treatment results. Further pressure from the health insurance companies on the duration of inpatient stays is unhelpful in economic terms too, because the cumulative inpatient stay, and thus the costs incurred in psychiatry/psychotherapy over the past years would remain unchanged. Perhaps the data presented here will contribute to a more appropriate discussion with the health insurance companies about increasingly shorter inpatient stays.

Conflict of Interest Statement

The authors declare that no conflict of interest exists according to the Guidelines of the International Committee of Medical Journal Editors.

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