

## Changing Patterns of Inpatient Care for Children and Adolescents at the Menninger Clinic, 1988–1994

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The authors describe trends in inpatient psychiatric length of stay (LOS) and admissions for the population of children and adolescents ( $N = 784$ ) at the Menninger Clinic from 1988 to 1994. During this period, median LOS declined dramatically from 7 months to 3 weeks, whereas admissions increased 4-fold. The diagnostic case mix changed substantially, with a crossover in modal principal diagnosis from personality disorder to affective disorder. Use of medications became almost universal. Diagnosis and medication use became less important determinants of LOS over time. The practical implications of these patterns include higher patient turnover, fewer inpatient clinical contact hours, and heightened importance of continuity with outpatient care. Research should center on the impact of declining LOS on clinical and functional outcomes for children and adolescents.

Aggressive expansion of managed care is believed to have had important influences on children's mental health services and use, but little relevant data are available on patterns of inpatient care. We used existing medical record data gathered from 1988 to 1994 at the Menninger Clinic, a private, nonprofit psychiatric facility, to describe how one hospital with a tradition of long-term care has been affected by changes in the health care landscape. Our aim was to answer two questions: How has the inpatient population changed over time, and have the factors associated with inpatient length of stay (LOS) changed? In this article we detail the socio-demographic and illness characteristics and the LOS of children and adolescents who received inpatient care over the study period. We identify years in which LOS declined and then look at factors

associated with LOS and its decline, such as diagnosis, child problems, service and medication history, and demographic information.

Research has suggested that LOS is associated with both diagnosis and inpatient medications: Youths with more severe illnesses, such as psychotic disorders, and youths who receive psychotropic medications have longer LOS in contrast with youths having affective or behavioral disorders and with those who do not receive medications (Borchardt & Garfinkel, 1991). Studies have also suggested that other factors, such as prior hospitalization, other mental health care, and the younger age of youth in treatment, are positively associated with LOS, whereas demographic factors such as gender, race–ethnicity, or socioeconomic status (SES) have shown weak or inconsistent results. (For a comprehensive review, see Pottick, Hansell, Miller, & Davis, 1999.) Most studies have been based on cross-sectional data, so they could not assess changing patterns associated with LOS. We relied on longitudinal data for analysis. Longitudinal studies on inpatient youth (e.g., Burns, 1991; Kiesler & Simpkins, 1991; Pottick, McAlpine, & Andelman, 2000) have described the changing distribution of the characteristics of inpatient populations but have not investigated how factors related to LOS may be changing. Using longitudinal data and multivariate methods, we contribute in this study to a growing literature on patterns of inpatient care in a changing health care environment.

In one national trend study of general hospitals, Pottick et al. (2000) found a substantial increase from 1988 to 1995 in the number and proportion of children and adolescents hospitalized with a primary diagnosis of depressive disorder, which was consistent with observed trends in the 1980s (Kiesler & Simpkins, 1991). Pottick et al. also found a decrement in LOS across all diagnostic categories, so that there was little variation by the end of the study period. In our data, therefore, we expected that the

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diagnostic case mix would include more depressed youths in the later years of study. Additionally, we expected to find a decline in the association between diagnosis and LOS over the study period.

The use of psychotropic medication for children and adolescents has risen over the past 2 decades. Some medications may effectively ameliorate symptomatology, supporting the use of less restrictive settings as alternatives to inpatient hospitalization (Joshi, Coyle, & Walkup, 1994). Managed care organizations are likely to support treatments that reduce costs and shorten LOS. In our data, we expected to observe a significant rise in the use of medication. Moreover, we expected to find that decreased variation in medication use over the period of study would reduce the impact of medication on LOS to nonsignificance. We expected few changes in the associations between other factors and LOS over the period of study.

## Method

Trained research assistants abstracted data from existing medical records of patients admitted between 1988 and 1994 to the Menninger Clinic's Children's Hospital. Principal discharge diagnosis, child abuse and suicide history, previous psychiatric treatment, family SES, use of medications, and demographic information were recorded. Staff was unaware of the purposes of our research.

Interrater reliability was established on a randomly selected sample of 30 cases. Percentage agreements ranged from 83% to 100% ( $M = 96\%$ ). Kappas ranged from 0.65 to 1.0. Variables with moderate kappas (e.g., prior outpatient treatment, prior medication) were mostly attributable to very skewed distribution on those variables, so that one or two misratings decreased the kappa.

The Menninger Clinic was changing during the period covered; in 1988, the hospital consisted of 69 beds in six long-term units and of one admission and diagnostic unit. Over the next 3 years, there were some minor modifications in the structure of the units and in 1993, two long-term units were closed. In 1994, the program was physically moved and reorganized into 48 beds in four 12-bed units—two units offering hospital-based residential treatment and two units providing acute hospital services.

We analyzed the population composed of 784 patients under the age of 18 (children <13 years [20%] and adolescents 13–17 years [80%]) admitted to the child and adolescent inpatient and residential units between January 1, 1988, and December 31, 1994. The last study case was discharged on June 13, 1995, so there were no censored cases.

Mean LOS was 123.97 days ( $SD = 179.51$ , range = 1–910). Two outliers (1,131 and 1,705 days) were eliminated.

Demographic variables of gender and race were coded dichotomously, as girls (1) versus boys (0) and as White (1) versus non-White (0). Non-Whites included African Americans, Asians, and Native Americans, as well as all patients of multiethnic and Hispanic origins. Age was a continuous variable. Whether the youth was in an out-of-home residence just prior to the admission also was coded dichotomously (1 = *out-of-home*, 0 = *in-home*). SES was calculated according to the Hollingshead's two-factor model (Hollingshead & Redlich, 1957), using parental occupation and education. When there were two custodial parents, we calculated SES for each and used the higher of the two.

Other variables included number of prior inpatient admissions and dichotomous variables that measured whether the patient had received prior mental health care other than inpatient treatment (1 = *prior care*, 0 = *no prior care*); had prior other out-of-home care (1 = *prior care*, 0 = *no prior care*); had received psychotropic medication (1 = *yes*, 0 = *no*), and had a history of suicide attempts (1 = *yes*, 0 = *no*). History of physical or sexual abuse was also coded (1 = *known or suspected abuse*, 0 = *no abuse*).

On the basis of clinically determined *Diagnostic and Statistical Manual of Mental Disorders* (i.e., 3rd ed., rev.; *DSM-III-R*, American Psychiatric Association [APA], rev., 1987; *DSM-IV*, APA, 1994) principal diagnosis at discharge, diagnosis was coded in these categories: affective disorders (e.g., major depressive disorders, bipolar disorders), personality disorders (e.g., borderline personality disorders, personality disorders not otherwise specified), disruptive behavior disorders (e.g., conduct disorders, oppositional defiant disorders), psychotic disorders (e.g., schizophrenia, schizoaffective disorders), and other disorders (e.g., eating, adjustment, anxiety, and pervasive developmental disorders). Categories were broad to accommodate changes in *DSM* versions over the study period and to improve reliability of comparisons across years. For regressions, dummy variables were created with affective disorders as the reference category. Current medication was coded by whether psychotropic medication was administered during the inpatient stay (1 = *yes*, 0 = *no*).

We conducted chi-square tests of significance and one-way analyses of variance to investigate yearly changes in the number of admissions and LOS. For regressions, year of admission was centered (the mean is subtracted from each score), and all dichotomous and dummy variables were coded 0 or 1 to facilitate post hoc interpretation of interaction effects (Aiken & West, 1991; Holmbeck, 2000).

## Results

### *Changes in Admissions and LOS: 1988–1994*

The number of child and adolescent admissions more than tripled over the period of the study, increasing from 54 in 1988 to 173 in 1994 (Table 1). At the same time, LOS declined by nearly 90%. Mean LOS declined steadily and consistently from over 9 months (282.1 days) in 1988 to about 5 weeks (35.4 days) in 1994; median LOS decreased from about 7 months (214.5 days) to 3 weeks (21.0 days). Increasing admissions did not offset decreasing LOS, which resulted in a substantial decline in the number of bed days (Number of Admissions  $\times$  LOS), from well over 15,000 to just over 6,000. This decline, pronounced between 1993 and 1994, reflected reorganization around a smaller number of available beds.

### *Changes in Characteristics of Inpatients: 1988–1994*

There were substantial changes in principal diagnoses, history of service use, and use of medication during hospitalization (Table 1). The percentage of patients with physical abuse histories reported in the medical records increased, whereas the proportion with suicidal histories decreased. No changes in gender, age, race-ethnicity, or SES were observed.

In the study period, there was a crossover of principal diagnostic case mix. The proportion of youths with affective disorder diagnoses increased steadily, from 13% (1988) to almost half (46%) of the population (1994). Simultaneously, personality disorder diagnoses, which represented well over half the population in 1988 (56%) steadily declined to 13% in 1994. Numbers of youths with diagnosed psychotic disorders varied somewhat, although they consistently represent a very small proportion of the child and adolescent inpatients. The percentage of youths with behavior and other diagnoses did not change appreciably.

Dramatic changes in the service use history of inpatients are reflected in two significant trends. There was a substantial decline in youths admitted directly from out-of-home (institutional) care, from almost half (48%) of the population to only 9%. The average

Table 1  
 Characteristics of Inpatient Population by Year of Admission

Characteristic	1988	1989	1990	1991	1992	1993	1994
<b>Admissions and LOS</b>							
LOS ( <i>M</i> days) <sup>a****</sup>	282.1	253.3	250.1	160.4	85.4	66.3	35.4
LOS ( <i>Mdn</i> days) <sup>b****</sup>	214.5	205.5	165.0	42.0	30.0	25.0	21.0
Number of admissions <sup>c****</sup>	54	74	77	97	127	180	173
Number of bed days <sup>d****</sup>	15,233	18,746	19,254	15,560	10,841	11,941	6,116
<b>Background factors</b>							
Gender (% female)	31.5	47.3	48.1	55.7	53.5	50.6	42.8
Age ( <i>M</i> years)	14.4	14.1	13.5	14.1	14.1	14.1	14.0
White (%)	98.1	93.2	92.2	90.7	89.8	94.4	88.4
SES ( <i>M</i> )	2.5	2.7	2.7	2.5	2.7	2.8	2.8
<b>Diagnosis</b>							
Personality disorder (% yes) <sup>e****</sup>	55.6	56.8	41.6	35.1	34.6	23.9	13.3
Behavioral disorder (% yes)	16.7	16.2	22.1	23.7	13.4	16.7	23.7
Psychotic disorder (% yes) <sup>f*</sup>	7.4	5.4	11.7	1.0	5.5	6.7	2.9
Affective disorder (% yes) <sup>g****</sup>	13.0	14.9	16.9	30.9	36.2	42.2	45.7
Other disorder (% yes)	7.4	6.8	7.8	9.3	10.2	10.6	14.5
<b>Child history</b>							
Physical abuse (% yes) <sup>h**</sup>	18.5	13.5	18.2	26.8	22.8	27.2	36.4
Sexual abuse (% yes)	18.5	21.6	26.0	29.9	26.8	28.3	32.3
Suicide attempt (% yes) <sup>i**</sup>	31.5	31.1	24.3	38.6	21.3	26.1	16.0
<b>Service history</b>							
Institutionalized before admission (% yes) <sup>j****</sup>	48.1	51.4	51.9	44.3	26.8	22.2	9.2
Prior inpatient admissions ( <i>M</i> ) <sup>k****</sup>	2.4	2.1	2.0	2.0	1.8	1.7	1.6
Prior outpatient treatment (% yes) <sup>l*</sup>	94.4	100.0	98.7	95.9	92.1	91.1	91.3
<b>Medications</b>							
Prior medications (% yes)	64.8	63.0	75.0	65.3	62.0	63.1	63.7
Current medications (% yes) <sup>m****</sup>	46.3	45.9	68.8	60.8	66.9	82.2	90.2

Note. LOS = length of stay; SES = socioeconomic status.

<sup>a</sup>  $F(6, 775) = 40.66, p < .001$ . <sup>b</sup>  $\chi^2(6, N = 782) = 214.65, p < .001$ . <sup>c</sup>  $\chi^2(6, N = 784) = 132.73, p < .001$ . <sup>d</sup>  $\chi^2(6, N = 782) = 9,344, p < .001$ . <sup>e</sup>  $\chi^2(6, N = 784) = 72.24, p < .001$ . <sup>f</sup>  $784^2(6, N = 784) = 12.78, p < .05$ . <sup>g</sup>  $\chi^2(6, N = 784) = 49.65, p < .001$ . <sup>h</sup>  $\chi^2(6, N = 776) = 20.20, p < .01$ . <sup>i</sup>  $\chi^2(6, N = 752) = 19.13, p < .01$ . <sup>j</sup>  $\chi^2(6, N = 784) = 92.40, p < .001$ . <sup>k</sup>  $F(6, 775) = 8.66, p < .001$ . <sup>l</sup>  $\chi^2(6, N = 784) = 13.36, p < .05$ . <sup>m</sup>  $\chi^2(6, N = 784) = 87.50, p < .001$ .

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

number of previous inpatient psychiatric hospitalizations declined by nearly one hospitalization (1988,  $M = 2.4$ ; 1994,  $M = 1.6$ ). Although the proportion declined, nearly all youths over all years had prior outpatient treatment before hospitalization.

Psychotropic medication use before hospitalization was stable, at about two thirds. By contrast, inpatient medication use rose substantially, from 46% in 1988 to 90% in 1994.

#### Regression of LOS on Year of Admission and Patient Characteristics

LOS was regressed on the centered year of admission and patient background characteristics, diagnosis, illness and service history, and medication use. Results (not shown here) indicated that year of admission had a strong negative association with LOS ( $\beta = -29.68, t(781) = -8.90, p < .001, r = -.48$ ).

One interaction effect was added to this model that involved year of admission and medication status, and four interaction effects were added that involved year and each of the four dummy variables for diagnosis. When these interaction effects were added to the model (Table 2), the main effect of centered year of admission became nonsignificant. Thus, the relationship between year of admission and LOS is largely determined by changes in patient mix and changes in the relationships of medication and diagnosis to LOS. Three interaction effects were significant:

Year  $\times$  Medication Status, Year  $\times$  Personality Disorder (vs. affective disorder), and Year  $\times$  Psychotic Disorder (vs. affective disorder).

We probed these three interaction effects using strategies suggested by Aiken and West (1991) and by Holmbeck (2000). For the Year  $\times$  Medication interaction effect, we examined a reduced model that included year, medication status, and the Year  $\times$  Medication interaction term, which was still significant,  $t(781) = -4.26, p \leq .001$ . Then we ran separate, simple regressions for each medication group. These regressions revealed that LOS decreased significantly in both the medication group,  $t(781) = -16.19, p \leq .001$ , and the nonmedication group,  $t(781) = -5.63, p \leq .001$ . The significant interaction effect is illustrated in Figure 1, in which the decrease in LOS over time is much steeper in the medication group as compared with the nonmedication group.

For the Year  $\times$  Diagnosis interaction effect, we examined a reduced model that included year, the four diagnosis dummy variables, and four Year  $\times$  Diagnosis interaction terms. The interaction terms for Year  $\times$  Personality Disorder (vs. affective disorder) and for Year  $\times$  Psychotic Disorder (vs. affective disorder) remained significant,  $t(781) = -5.62, p \leq .001$ ;  $t(781) = -3.50, p \leq .001$ ; respectively. Then we ran separate, simple regressions for each diagnosis group. These regressions revealed that LOS decreased significantly over time in all of the diagnosis

Table 2  
*Simultaneous Regression of Child and Adolescent Length of Stay on Year of Admission and Patient Factors (N = 782)*

Predictor	$\beta$
Year of admission	10.49
Background factors	
Female	-11.89
Age in years	-1.37
White	-10.29
SES scale	-8.88
Discharge diagnosis	
Personality disorder (yes)	78.71***
Behavioral disorder (yes)	15.84
Psychotic disorder (yes)	61.43*
Other disorder (yes)	51.93**
Child history	
Physical abuse (yes)	-21.04
Sexual abuse (yes)	-2.91
Suicide attempt (yes)	-8.00
Service history	
Institutionalized before admission (yes)	83.05***
Prior inpatient admissions (#)	51.03***
Prior outpatient care (yes)	12.23
Medications	
Prior medications (yes)	5.62
Current medications (yes)	35.74**
Interaction effects	
Year $\times$ Medications	-29.17***
Year $\times$ Personality Disorder	-40.21***
Year $\times$ Behavior Disorder	-11.46
Year $\times$ Psychotic Disorder	-28.70*
Year $\times$ Other Disorder	-18.59
Adjusted $R^2$	.49***

Note. All dummy variables are coded 1 for the indicated category and 0 otherwise. For discharge diagnosis, affective disorder was the reference category. Year of admission was centered for this analysis. SES = socioeconomic status.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

groups: psychotic disorder,  $t(781) = -5.11, p \leq .001$ ; personality disorder,  $t(781) = -11.63, p \leq .001$ ; other disorder,  $t(781) = -4.65, p \leq .001$ ; behavior disorder,  $t(781) = -3.60, p < .001$ ;

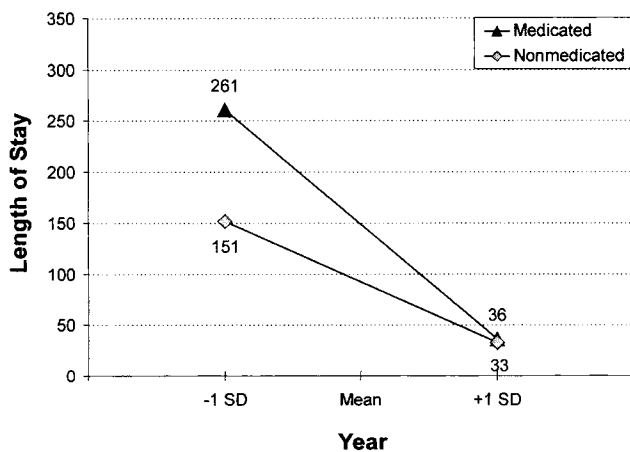


Figure 1. Mean length of stay by year of admission (1988–1994) and medication status.

affective disorder,  $t(781) = -2.44, p < .015$ . The significant interaction effect is shown in Figure 2, in which the decrease in LOS over time is steeper among the psychotic and personality disorder groups as compared with the affective disorder group.

Discussion

We found that hospital psychiatric admissions for children and adolescents increased while LOS declined. Although the dramatic decline in LOS was partially offset by increased number of admissions, the actual number of bed days declined by more than half, which resulted in the need to reorganize services around a smaller number of hospital beds.

The long-term organizational implications of rising admissions and declining LOS remain unknown. Practically, higher patient turnover, fewer inpatient clinical contact hours, and a heightened importance of continuity with outpatient care are likely consequences. These changes have required the Menninger Clinic to recruit patients locally, rather than nationally, and to invest in innovative outpatient services and programs. Other long-term care facilities have faced similar challenges and have adopted similar solutions. Shepard–Pratt, another private, nonprofit facility in Baltimore, reported that inpatient psychiatric LOS for adults and youths has declined substantially in the past decade, while admissions have risen dramatically. To provide continuity of care, Shepard–Pratt has contracted with outside agencies for outpatient services (Sharfstein, Boronow, & Dickerson, 2000). These strategies may signal emerging trends for hospitals under increasing financial pressures.

As we hypothesized, there were significant changes in the principal diagnoses of the youths, with striking increases in the proportion of youths diagnosed with affective disorders and significant declines in diagnoses of personality disorders. In addition, there were fewer youths admitted with prior outpatient mental health experiences and fewer who were hospitalized directly from out-of-home residential placements. Taken together, these changes may reflect a shift from a chronic population to a more acute group, with a higher proportion of first admissions. Medical record data also show a rise in reported physical abuse; this may be due to increased awareness and documentation, but it also may reflect

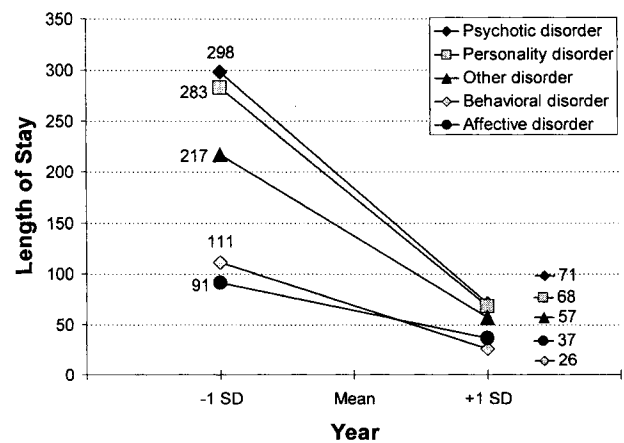


Figure 2. Mean length of stay by year of admission (1988–1994) and diagnosis.

youths entering inpatient treatment from more dangerous environments.

It is not clear from these data whether the underlying problems of adolescents have changed or whether clinicians are tending to assign diagnoses that are treatable within the time constraints imposed by managed care. Shorter LOS may bolster treatment modalities that focus more on safety and crisis management and less on diagnostic clarification and treatment.

The declining association of diagnosis with LOS is noteworthy. It suggests that patients are being kept in the hospital to ensure short-term safety and stability rather than to consolidate fundamental changes in enduring patterns of behavior. Outpatient programs and other community-based care may be asked to shoulder increasing responsibility for treating the more persistent and enduring issues that characterize chronic disorders.

As we expected, use of psychotropic medication in the Menninger Clinic increased substantially, from just over half of all patients to almost nine tenths of them. Increased use of psychiatric medication for youths may be gaining acceptance, but it remains controversial (Fisher, Bergin, & Singer, 1995). Problems in administering, monitoring, and evaluating effectiveness of medications are exacerbated when inpatient stays preclude sufficient time for controlled observation. In our study, medication influenced LOS less over time largely because its use became almost universal.

Although these data have illustrated one organization's experiences with a changing mental health care service system, they have a number of important limitations. First, the study was based on a single, nonprofit psychiatric facility, so we must be cautious about generalizing results to all nonprofit facilities or to public or proprietary hospitals or to residential treatment facilities. Second, analyses represent trends until only 1994, and significant changes may have occurred since then. Third, the data do not include indices of illness severity, which could be an important determinant of the observed results. Clinical diagnoses were abstracted from existing medical records and, thus, are of unknown reliability. Finally, 93% of youths were privately insured; therefore, this study cannot examine the effects of private versus public funding.

Despite these limitations, these results support the conclusion that the characteristics of the inpatient population changed as LOS declined and that the factors associated with LOS changed in this facility. The real clinical impact of declines in LOS for children and adolescents with psychiatric illnesses remains unknown. In Massachusetts, Nicholson and collaborators discovered that youth psychiatric readmission rates increased after the implementation of managed care (Nicholson, Young, Simon, Bateman, & Fisher, 1996). Similarly, Wickizer, Lessler, and Boyd-Wickizer (1999) have shown that reductions in LOS lead to higher readmission rates among formerly hospitalized children and adolescents. Creating effective linkages between inpatient and outpatient care to provide treatment continuity will challenge clinicians and intervention researchers alike. Ultimately, the impact of changes in LOS must be understood from a clinical perspective. The inter-

mediate and long-term outcomes of the new style of acute inpatient stays are uncertain. Research should center on the impact of declining LOS on clinical and functional outcomes for children and adolescents.

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