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Child Behavioral Health Service Use and Caregiver Strain: Comparison of Managed Care and Fee-For-Service Medicaid Systems

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This study compares behavioral health service utilization patterns and their determinants among Medicaid-enrolled children, ages 5–17 ($N = 676$) who were being served under managed care in Tennessee or a traditional fee-for-service system in Mississippi. Children in the fee-for-service program were significantly more likely than their counterparts in the managed care Medicaid program to receive behavioral health services (i.e., any service, support services, traditional outpatient services, day treatment, inpatient/residential care) and to receive more services overall. This finding held after controlling for the influence of other factors. Although child, family, and community variables were related to service use patterns, the relationships differed across systems. Caregiver strain was associated with several service use variables, but its influence was more pronounced in Tennessee. These findings support continued focus on the multi-level factors that shape behavioral health service use among children.

KEY WORDS: child service utilization; child behavioral health; managed care; caregiver strain; family predictors.

System reform efforts, such as managed care, aim to increase efficiency and reduce costs by limiting benefits, instituting utilization review, and reducing the use of inpatient hospitalization (Mowbray, Grazier, & Holter, 2002; Stroul, Pires, Armstrong, & Meyers, 1998). Managed care in children's mental health has been associated with shifts in system-level distribution of behavioral health services, especially when applied to Medicaid programs. Although Medicaid managed care has been implemented in a variety of ways (e.g., capitation, carve-outs), research has identified some consistent findings across approaches. Among children and adolescents, Medicaid managed care has generally been associated with increases in access to care overall and in the use of case management, and reductions in inpatient service use; however, the impact on the use of specialty outpatient services is less clear (Burns, Teagle, Schwartz, Angold, & Holtzman, 1999; Hutchinson & Foster, 2002; Saunders & Heflinger, 2003, 2004; Stroul et al., 1998). Studies have also found that under Medicaid managed care (i.e., health maintenance organizations and carve out programs) children with emotional and behavioral problems generally had greater difficulty accessing needed services (Mandell, Boothroyd, & Stiles, 2003; Stroul et al., 1998).

The impact of system changes on service utilization are illustrated in the comparison of behavioral health services to children in Tennessee's managed care Medicaid program and to Mississippi's fee-for-service Medicaid system. Using the encounter and claims data for the entire population of enrollees

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over 7 fiscal years, Saunders and Heflinger (2004) found that changes in access to services and mix of services were observed after the introduction of managed care. Access rates increased in Tennessee over the observation period, but at a slower rate than in Mississippi. The increase in overall access to behavioral health services in Tennessee, however, coincided with decreases in access to residential and specialty outpatient services. In contrast, access to both rose steadily in Mississippi. Dramatic increases in the use of case management and medication monitoring were seen in Tennessee following the introduction of managed care (Saunders & Heflinger, 2003, 2004). Although the study documented increased overall access for children in Tennessee, lower rates of access were found among minority children and girls. However, the administrative dataset used in this study did not include information on important service use predictors such as child need and family resources.

In general, the mental health service use literature documents several child and family characteristics that influence service utilization. Child clinical need for services (e.g., psychological disorder, functional impairment) has consistently been associated with the probability of behavioral health service use and service use patterns (e.g., Angold et al., 1998; Brannan, Heflinger, & Foster, 2003; Burns et al., 1995; Cook et al., 2004; Foster, 1998, 2000; Foster, Saunders, & Summerfelt, 1996; Garland, Aarons, Brown, Wood, & Hough, 2003; Offord et al., 1987; Zahner, Pawelkiewicx, DeFrancesco, & Adnopoz, 1992). Research suggests that boys and older children are more likely to use behavioral health services and to use more services once in treatment (Burns et al., 1995; Padgett, Patrick, Burns, Schlesinger, & Cohen, 1993; Realmutto, Bernstein, Maglothin, & Pandey, 1992; Saunders & Heflinger, 2004; Wu et al., 1999). The role of race and ethnicity has also been studied, with some finding that children from minority backgrounds access services less frequently (Mandell, Boothroyd, & Stiles, 2003; Saunders & Heflinger, 2004), and use fewer outpatient and inpatient services (Cook et al., 2004; Padgett, Patrick, Burns, & Schlesinger, 1994; Saunders & Heflinger, 2004).

The field is increasingly considering the influence of family variables on children's use of behavioral health services. Higher parental education has been associated with greater likelihood of children's behavioral health service use (John, Offord, Boyle, & Racine, 1995; Padgett et al., 1993). Socioeconomic status has been found to relate positively with completion of outpatient treatment (Armbruster & Fallon, 1994) and time in treatment (Bui & Takeuchi, 1992), although not in all studies (Gilbert, Fine, & Haley, 1994; Gould, Schaffer, & Kaplan, 1985; Kaminer, Tarter, Bukstein, & Kabene, 1992).

Caregiver strain (i.e., strain associated with caring for a child with emotional, behavioral or substance abuse disorders) has emerged as an important predictor of child behavioral health service use. Children whose caregivers report higher caregiver strain are more likely to receive behavioral health services (Angold et al., 1998; Bussing et al., 2003; Farmer, Burns, Angold, & Costello, 1997; Garland et al., 2003) and to experience more intensive levels of care, fewer breaks in treatment, and higher costs of care (Brannan, Heflinger, & Foster, 2003; Cook et al., 2004; Garland et al., 2003; Lambert, Brannan, Heflinger, Breda, & Bickman, 1998). Studies have also found that the relationship between service utilization and child and family factors vary in different service systems, an effect sometimes obscured when samples from different systems were analyzed together (Foster, 1998, 2000; Bickman, Foster, & Lambert, 1996).

The current study contributes to the knowledge base by exploring the influence of child, family and community variables on child behavioral health service utilization in two Medicaid service systems. This study includes interview data that allow examination of child clinical and family variables in addition to the demographic variables found in Medicaid administrative datasets. Three primary research aims drive these analyses. First, we compared overall service use patterns across the interview samples to examine whether the two systems allocated behavioral health resources differentially. Second, we explored which community, child and family variables predicted child behavioral health service utilization patterns within each system, and whether the variables related differently to service use across systems. Third, we examined the role of systems in shaping service use, after controlling for child, family and community variables.

METHOD

Because we view family help-seeking from a transactional ecological perspective, a theoretical framework based in family stress and coping theory guided this research (see Brannan, Heflinger, & Foster, 2003; and McCubbin & Patterson, 1983). The theory asserts that families help-seeking decisions on behalf of their children are shaped by a variety factors at several levels including the child (e.g., clinical need as a family stressor), family (e.g., resources, perceptions), community (e.g., rurality), and service system (e.g., managed care versus fee-for-service). Caregiver strain is a direct response to the stress of child problems and a demonstrated contributor to child service utilization and is, therefore, of key interest in this study.

The data were collected as part of a study to examine the impact of managed care on vulnerable populations, funded by the Substance Abuse and Mental Health Services Administration (Heflinger, Simpkins, Northrup, Saunders, & Renfrew, 2000a,b). The Impact of Medicaid Managed Care (IMMC) study was designed to compare service use and outcomes across Tennessee (i.e., where the Medicaid system was operating under managed care) and Mississippi (i.e., a traditional fee-for-service Medicaid system). Medicaid eligibility requirements for children in both states were identical (Kaiser Family Foundation, 2002). Analyses indicated that, prior to the implementation of managed care in Tennessee, access rates for behavioral health care and inpatient lengths of stay were comparable across systems (Saunders & Heflinger, 2004).

During the observation period for this study (i.e., 1997 through 2001), children's mental health services delivered under Tennessee's TennCare program were "carved-out" on a capitated basis to specialty behavioral health organizations (BHOs). Costs were to be contained with a combination of mechanisms including sub-capitation, pre-authorization requirements, and lower negotiated reimbursement rates. Community mental health centers were paid a capitated case rate for services to children with severe emotional disturbance including case management, medication management, and individual and group therapy. For higher levels of care not included in the case rate (e.g., day treatment, inpatient hospitalization), prior authorization was required and lower payments for services were negotiated. Other behavioral health providers, including public and private hospitals, residential treatment centers, clinics, and other providers were also paid through these mechanisms. In order to receive payment from the BHO, all providers were required to submit encounter data. During that time period, Mississippi's Medicaid program continued to operate as a traditional fee-for-service system. Although financing arrangements differed after the shift to managed care in Tennessee, the types of services covered under Medicaid in both states were virtually identical and both included mental health services provided in schools.

According to data from the 2000 Census, Mississippi and Tennessee were similar in terms of childhood poverty levels (i.e., 19% in Mississippi vs. 18% in Tennessee), Medicaid enrollment of children (i.e., 35% vs. 38%, respectively), prevalence of disabilities among children between 5 and 15 years of age (i.e., 6% in both states), and rates of serious emotional disturbance among Medicaid-enrolled children (i.e., 22% vs. 26%) (Saunders & Heflinger, 2004). There were differences in the availability of health care across the states. In 2002, Tennessee had 256 physicians per 100,000 residents while Mississippi had 179 (Kaiser Family Foundation, 2004). Tennessee, however, had fewer hospital beds per 1,000 residents than Mississippi in 1999 (i.e., 3.8 vs. 4.8, respectively).

Sample

Children in this study ($N = 1,012$) were Medicaid enrollees, ages 5 through 17, in Tennessee and Mississippi. In both states, the sample was selected using a stratified random sampling method with purposeful oversampling of children who had used behavioral health services previous to recruitment (i.e., as indicated by Medicaid claims), (see Heflinger & Saunders, in press, for more details). Because this was not a clinic sample enrolled at entry into treatment, we were able to examine factors that influenced the probability of accessing services as well as other service use variables.

A core set of instruments was administered to all children in the sample. Central to this study was caregiver strain, assessed with the Caregiver Strain Questionnaire (CGSQ; see description under *Instruments and Data Collection*). The CGSQ asks specifically about problems associated with caring for children with emotional and behavioral problems (i.e., as distinguished from instruments that assess general parenting stress irrespective of child disability) and is, therefore, not relevant in the absence of child problems. Hence, the CGSQ was only administered if (a) the child had used behavioral health services in the past, or (b) the caregiver indicated that the child was experiencing emotional or behavioral problems. Only families who met the criteria for administration of the CGSQ were selected for this study; this included 733 children (i.e., 374 from Mississippi and

359 in Tennessee). Of those, 344 children in Mississippi and 332 in Tennessee (92% of each sample) had complete baseline data on all instruments used in this study and were included in these analyses. The excluded children were not statistically different from those included in terms of age [$t(742, N = 744) = -1.22$, $p = .22$], gender [$X^2(1, N = 744) = .02$, $p = .89$], or race [$X^2(2, 738) = 2.09$, $p = .35$].

Sample characteristics for the Tennessee and Mississippi samples are summarized in Table 1. Sixty-eight percent of the children in the sample were boys. The children ranged from 5 to 17 years of age ($M = 11.50$, $SD = 2.83$), with the majority (55%) being in the 11–15-year-old range. A larger proportion of the children in Mississippi were African American (67% compared to 21% in Tennessee), similar to the Medicaid-enrolled child populations in the two states (Saunders & Heflinger, 2004). The caregivers were predominantly female (96%), and were primarily biological parents (75%) or adoptive or step-parents (16%). Children in the Tennessee sample were more likely than their Mississippi counterparts to be in the care of a non-parent biological relative, while children in the Mississippi sample were more likely than the Tennessee sample to be cared for by adoptive or step-parents. The caregivers ranged in age from 20 to 79 ($M = 39.31$, $SD = 10.18$), with most (44%) being in the 30 – 39 age range. Most of the caregivers had completed high school (70%).

Instruments and Data Collection

Data on child and family variables were collected from caregivers in accordance with ethical guidelines approved and monitored by the Vanderbilt University Institutional Review Board. Data gathered at the initial interview were used in these analyses to predict subsequent service use patterns. Sample comparisons on predictor variables can be found in Table 1. Dependent variables were derived from Medicaid administrative claims data for a 13-month time period ranging from 1 month before the baseline interview to 12 months afterwards.

Predictor Variables

Two broadband scales from the Child Behavior Checklist (CBCL) (Achenbach, 1991) were used to describe child emotional and behavioral symptoms. The CBCL has been widely used in clinical and services research and has demonstrated good reliability and validity (Achenbach, 1991). The externalizing total problem *T*-score assesses disruptive conduct-related behavior in children; the internalizing total problem *T*-score assesses mood-oriented symptoms. *T*-scores are standardized for age and gender with scores of 64 or above considered to be in the borderline or clinical range. *T*-scores are presented in Table 1 to facilitate interpretation, but raw scores were used in regression analyses. Both samples had mean CBCL externalizing and internalizing *T*-scores at or above the clinical range (65 and 67, respectively, for the combined sample). The majority of children in the sample met borderline or clinical criteria.

We used the Columbia Impairment Scale (CIS; Bird et al., 1993) to assess children's social functioning (i.e., how well the child functions in home, school and community settings). The CIS has 13 items rated on a scale ranging from 0 (i.e., *no problem*), to 4 (i.e., *a very big problem*) with the potential total score ranging from 0 to 52. A score greater than or equal to 15 indicates impairment in functioning (Bird et al., 1993). The CIS provides an adequately reliable and valid measure of impairment and correlates highly with the clinician-determined scores of the Children's Global Assessment Scale (Bird et al., 1993). Children in both samples had mean impairment scores above the cutoff, with 80% meeting clinical criteria (see Table 1).

The Caregiver Strain Questionnaire (CGSQ; Brannan, Heflinger, & Bickman, 1997) was developed to assess the impact on the caregiver and family of the additional demands related specifically to caring for children with emotional and behavioral disorders. The CGSQ measured three dimensions of caregiver strain with 21 items rated on a scale ranging from 1 (i.e., *not at all a problem*) to 5 (i.e., *very much a problem*). The objective strain score is a measure of observable negative events and occurrences related to caring for a child with emotional and behavioral disorders including interruption of personal time and work, and disruption of family routines, relationships and social activities. Subjective internalized strain assesses caregiver's inwardly directed negative feelings related to caring for a child with emotional and behavioral disorders such as worry, guilt, sadness and fatigue. Subjective externalized strain assesses outwardly directed negative feelings such as anger, resentment, and embarrassment about the child's problems. The CGSQ has demonstrated good reliability and validity in several samples (Brannan, Heflinger, & Bickman, 1997; Brannan &

Table 1. Sample Characteristics

Characteristics	Tennessee ($N = 332$)	Mississippi ($N = 344$)	Combined ($N = 676$)
Child mean age (*SD*)	11.52 (2.93)	11.49 (2.74)	11.50 (2.83)
5–10—*N* (%)	94 (28.31)	89 (25.87)	183 (27.07)
11–15—*N* (%)	174 (52.41)	200 (58.14)	374 (55.33)
16–17—*N* (%)	64 (19.28)	55 (15.99)	119 (17.60)
Child gender—*N* (%)			
Boys	227 (68.37)	236 (68.60)	463 (68.49)
Girls	105 (31.63)	108 (31.40)	213 (31.51)
Child race—*N* (%)*			
African American	69 (20.78)	231 (67.15)	300 (44.38)
White	251 (75.60)	108 (31.40)	359 (53.11)
Other	12 (3.61)	5 (1.45)	17 (2.51)
Child clinical variables			
CBCL externalizing T-score mean (*SD*)	67.36 (11.28)	67.32 (11.81)	67.34 (11.89)
Borderline or clinical range—*N* (%)	257 (77.41)	263 (76.45)	520 (76.92)
CBCL internalizing T-score mean (*SD*)	64.33 (12.17)	65.10 (11.63)	64.72 (11.54)
Borderline or clinical range—*N* (%)	216 (65.06)	239 (69.48)	455 (67.31)
CIS social functioning score mean (*SD*)	25.20 (10.84)	24.23 (10.31)	24.71 (10.57)
Borderline or clinical range—*N* (%)	268 (80.72)	276 (80.23)	544 (80.47)
Caregiver gender—*N* (%)			
Female	315 (94.88)	334 (97.09)	649 (96.01)
Male	17 (5.12)	10 (2.91)	27 (3.99)
Caregiver mean age (*SD*)	38.55 (9.33)	40.05 (10.89)	39.31 (10.18)
<30—*N* (%)	62 (18.67)	56 (16.28)	118 (17.46)
30–39—*N* (%)	147 (44.28)	153 (44.48)	300 (44.38)
40–49—*N* (%)	78 (23.49)	72 (20.93)	150 (22.19)
≥50—*N* (%)	45 (13.55)	63 (18.31)	108 (15.98)
Caregiver relationship with child—*N* (%)**			
Biological parent	250 (75.30)	255 (74.13)	505 (74.70)
Other biological relative	25 (7.53)	8 (2.33)	33 (4.88)
Step or adoptive parent	37 (11.14)	69 (20.06)	106 (15.68)
Foster parent or legal guardian	15 (4.52)	11 (3.20)	26 (3.85)
Other relationship	5 (1.51)	1 (.29)	6 (.89)
Caregiver strain			
Objective mean score (*SD*)**	2.35 (1.04)	2.08 (.97)	2.21 (1.02)
Subj. externalizing mean score (*SD*)	2.00 (.83)	1.92 (.94)	1.96 (.89)
Subj. internalizing mean score (*SD*)	3.21 (1.11)	3.07 (1.12)	3.14 (1.12)
Caregiver education—*N* (%)			
Completed high school	243 (73.19)	229 (66.57)	472 (69.82)
Did not complete high school	89 (26.81)	115 (33.43)	204 (30.18)
Monthly household income—*N* (%)**			
<$900	115 (34.64)	121 (35.17)	236 (34.91)
$900–$2,099	161 (48.49)	177 (51.45)	338 (50.00)
$2,100–$2,999	36 (10.84)	43 (12.5)	79 (11.69)
>$3,000	20 (6.02)	3 (.87)	23 (34.00)
Urban residence—*M* (*SD*)*	66.20 (29.97)	42.99 (25.09)	52.91 (29.37)

Note. Bonferroni-adjusted to account for the number of tests conducted.
*$p \leq .0001$.
**$p < .002$.

Heflinger, 2001; Kang, Brannan, & Heflinger, 2005). Caregivers in this sample reported greater subjective internalized strain than the other forms ($M = 3.14$ for the combined sample); subjective externalized strain was rated lowest ($M = 1.96$ for the combined sample). Tennessee caregivers reported significantly more objective strain than Mississippi caregivers (see Table 1). This may be related to the larger proportion of African American caregivers in the Mississippi sample. Previous research suggests that African American caregivers tend to report less strain on the total and objective strain scales (McCabe, Yeh, Lau, Garland, & Hough, 2003; Kang, Brannan, & Heflinger, 2005).

Caregiver education was included as a resource that has been shown to impact children's behavioral health service use in previous research. In this study, we examined the impact of not having a high school education compared to having one. Slightly more caregivers in the Tennessee sample had completed high school but the difference is not statistically significant (see Table 1). As economic variables have also been found to influence service use, monthly household income was also included. This is a categorical variable with 13 levels ranging from <\$100 to >\$3,000 per month, and includes income from the following sources: earned income; foster family payments; income support programs (e.g., WIC, food stamps, TANF); federal support for disabled persons (i.e., SSI, SSDI); worker's compensation; unemployment compensation; pensions, retirement, investment, or savings income; Social Security; and unreported or other income. Table 1 summarizes the income variable into four categories for ease of presentation. There were more families in the Tennessee sample with monthly incomes above \$3,000 than in the Mississippi sample.

The level of urbanization of the county in which the family lived was also included as a community-level predictor variable. Formal behavioral health services are typically scarce in rural areas (Knepser, Pagnucco, & Wheeler, 1985), and rural behavioral health utilization rates tend to be lower than urban rates for both outpatient and inpatient care (Lambert & Agger, 1995). This "percent urban" measure was obtained from the 2000 Census and refers to the proportion of the population within the family's county of residence that lived in urban areas. An urban area is defined by the Census Bureau as one having a population density of 1,000 or more people per square mile or a surrounding area with densities of more than 500 people per square mile (US Bureau of Census, 2000). Both Tennessee and Mississippi have large rural populations. Compared to the Tennessee sample, however, families in this Mississippi sample tended to live in counties that were less urban (see Table 1).

Three child demographic variables were included as control variables including age, gender, and race. Hispanic ethnicity is not included as a separate variable because less than 1% of the children in the samples were of Hispanic background.

Outcome Variables

Service use, covering a 13-month period, included the following outcome variables: (1) use of any formal specialty behavioral health service (i.e., excluding support services), (2) amount of services received, (3) use of day treatment/partial hospitalization, and (4) use of inpatient hospitalization or residential services. For the amount of services variable, each type of service received per day was counted. If a child received day treatment services and individual therapy on the same day, that would count as two service encounters.

To create these variables, Medicaid claims/encounters were categorized into service types based on procedure codes and diagnoses; only claims with mental health or substance abuse diagnoses were included (for details see Saunders & Heflinger, 2003). The Medicaid data management systems in the two states were designed by the same developers and had identical structures, maximizing data comparability across systems. Although providers in the managed care system were paid a case rate for certain services, they were still required to report those encounters. The information was used to justify payment for the rate per case by demonstrating that the minimum number of services had been provided in the previous month. Hence, providers' incentives to report services delivered were similar across the two systems (TDFA, 1999).

Analysis

The primary goals of this study were to compare service utilization across systems and examine the impact of child, family, and community variables on service use. We first used descriptive statistics to examine differences in service use across samples. Next, we conducted regression analyses to examine which child, family, community and system variables were associated with four service use variables (Long, 1997; Tabachnick & Fidell, 1989). Four service use outcome variables were examined including: (1) use of any formal behavioral health service versus no service use; (2) amount of services received; (3) use versus non-use of inpatient/residential services; and (4) use versus non-use of day treatment services. In both states, 98% of the children who received any service had received traditional outpatient services, and virtually all children who received the other types of services also received traditional outpatient services. Therefore, we conducted no analyses to predict use of traditional outpatient services because it would have been redundant with the use of any service analysis.

Sample sizes varied across analyses. All children in the sample were included in analyses predicting the use of any service. However, to predict use of service types (i.e., day treatment, inpatient/residential) and amount of services received, only children who received any formal behavioral health service (i.e., not including support services) were included.

The following were entered as continuous variables: the three caregiver strain subscale scores, monthly household income, internalizing and externalizing behavior scores, social functioning, urbanicity and child's age. Dichotomous variables included caregiver education (i.e., not completing high school compared to completing high school, the referent level), gender (i.e., girls vs. boys), and race (i.e., White children compared to children of minority backgrounds).

We performed analyses for each state sample separately and for the combined samples. Presenting the findings for each state separately allows examination of the contributors to service use in each system. Using an interpretive approach, we can identify similarities and differences among contributors across systems. In the combined analyses, state (i.e., Tennessee vs. Mississippi) was included as a system-level variable to assess the relative impact of the system controlling for other variables in the analyses.

Logistic regression was used for dichotomous service use outcome variables (i.e., use of any service, use of day treatment, use of inpatient/residential services). To explore what variables were associated with amount of services used by children, standard multiple regression was used. Regression analyses were guided by both theoretical and empirical considerations. We built five models for each outcome variable based on our theoretical perspective. Because the role of caregiver strain was of key interest, the first model included only the three dimensions of caregiver strain. The second model added family resources including monthly household income and caregiver education. The third model added child clinical variables. The fourth model added the degree to which the child's county was urban. The fifth model added child demographic characteristics including gender, age, and race. In the combined sample analyses, the system variable that compared Tennessee to Mississippi was included at every step. After theory-based model building, we applied empirical criteria to select the best model. To find the most parsimonious model to explain service utilization, we selected the best-fitting model for each service use variable. For the logistic regression analyses, we used the likelihood ratio test to determine whether adding the next block of variables resulted in a significant improvement in X^2 given the change in degrees of freedom (Long, 1997). For the standard multiple regression analyses, we used the incremental F ratio test to assess whether adding the next block of variables significantly improved R^2 (Tabachnick & Fidell, 1989). The models' overall explanation of variance was considered significant at the $p < .0125$ (adjusted for multiple tests). We also discuss individual predictor variables that reach the $p < .05$ threshold.

RESULTS

Table 2 compares overall service utilization across samples. Children served in the Mississippi fee-for-service system were significantly more likely to receive any formal behavioral health service (76%) than children in the Tennessee managed care system (56%), and to receive more services on average (i.e., 59 services in Mississippi compared to 17 services in Tennessee). In addition, children served in the Mississippi system were significantly more likely to have received each of the service options and experienced more encounters of each service.

Results of the regression analyses are summarized in Tables 3 and 4, showing only the best-fitting model for each outcome variable. For logistic regression analyses we report odds ratios (OR) and confidence intervals estimated with the Wald statistic. For statistically significant variables, odds ratios less than 1 indicate a negative relationship between the predictor and outcome variables, other variables held constant; odd ratios greater than 1 indicate a positive relationship. For standard regression analyses (i.e., amount of services received) a statistically significant negative coefficient indicates a negative relationship with the outcome variable, while a statistically significant positive coefficient indicates a positive relationship.

Use of Any Service

The fifth model (i.e., including all the predictor variables) was the best-fitting model for use of any

Table 2. Comparison of Service Use between the Fee-For-Service and the Managed Care Medicaid Samples

	Managed Care Tennessee ($N = 332$)		Fee-For-Service Mississippi ($N = 344$)	
Mental health service use				
Use of any formal service-N (%)	186 (56.02)*		263 (76.45)	
Average number of encounters[a]-M (SD)	17 (26.20)*		59 (81.35)	
Gap in care = >30 days[b]-N (%)	143 (92.86)		213 (87.65)	
Types of services used	N (%)	Mean (SD)**	N (%)	Mean (SD)**
Support services	61* (32.80)	15*** (11.94)	171 (65.02)	22 (17.66)
Traditional outpatient	182* (54.82)	11* (10.71)	257 (76.45)	18 (22.00)
Day treatment	13* (6.99)	13* (21.34)	70 (26.62)	102 (73.27)
Residential/inpatient	28**** (15.05)	38**** (44.39)	48 (18.25)	76 (110.20)

[a] Includes youth who received any formal behavioral health service.

[b] Mean number of encounters of that service among children who used that service option.

*$p \le .0001$. **$p \le .001$, ***$p \le .01$, ****$p \le .05$.

service in Tennessee ($X^2 = 33.97$, $p < .001$). Living in a more urban community ($OR = 1.01$, $p < .05$) and being White ($OR = 2.97$, $p < .001$) increased the likelihood of receiving any formal behavioral health service. For each additional 1% of a county's population that lived in an urban area, the odds of receiving a service increased by 1% for Tennessee children, other variables held constant. In the Tennessee sample, White children were almost three times more likely to receive a service than minority children. Note that these findings do not suggest that child clinical variables did not exercise a direct influence on use of services. Indeed, when other variables were removed from the analysis (not shown), child externalizing behavior and social functioning were significant predictors. However, child clinical variables offered no independent prediction of use of any service over that provided by other variables in the model.

In the Mississippi system, the fourth model ($X^2 = 42.33, p < .001$) including caregiver, child clinical, family and community predictors demonstrated the best fit. (Adding child demographics did not improve explanation of variance in the receipt of any service variable; those parameter estimates are therefore not shown). A one-unit increase in subjective externalized strain (e.g., feelings of anger, resentment, and embarrassment about the child's problems) was associated with a 33% reduction in the likelihood of receiving a service ($OR = .67$, $p < .05$). In contrast to Tennessee, a 1% increase in urban residence reduced the odds of receiving a service by 1% for Mississippi children (OR = .99, $p < .05$). A one-unit increase in externalizing behavior problems was related to a 3% increase in the likelihood of receiving a behavioral health service ($OR = 1.03$, $p < .05$). A one-unit increase in impairment in social functioning increased the likelihood of receiving a service by 4% ($OR = 1.04$, $p < .05$).

For the combined Mississippi and Tennessee analyses, model 3 fit best ($X^2 = 80.82, p < .001$). After controlling for other variables, being served in the Mississippi system increased the likelihood of receiving a service significantly ($OR = 2.86$, $p < .0001$). Having more externalizing symptoms increased the likelihood of using a behavioral health service ($OR = 1.03, p < .01$).

Amount of Services Received

Model 1 ($F = 5.26$, $p < .01$), with only caregiver strain variables, was the best-fitting model in the Tennessee system with objective caregiver strain being the sole unique predictor of amount of services used ($B = 7.46$, $p < .01$). (See Table 3). A one-unit increase in objective strain was associated with receiving 7.5 more service encounters. This means that the more objective strain a caregiver reported (e.g., disrupted family and social relationships, problems with neighbors and the community, interrupted work and personal time) the more services their child was likely to use. Inclusion of other child, family, or community variables did not improve model fit. Although social functioning demonstrated a direct relationship on amount of services received (not shown), it offered no unique predictive power over that provided by objective strain and the other variables. In the combined sample analyses, model 3 demonstrated the best fit ($F = 7.72$, $p < .0001$). Having more externalizing

Table 3. Child, Family, Community and System Predictors of Any Service Use and Amount of Services Used by State

	Any service[a]						Amount of service[b]					
	Tennessee ($N = 332$)		Mississippi ($N = 344$)		Combined ($N = 676$)		Tennessee ($N = 186$)		Mississippi ($N = 263$)		Combined ($N = 449$)	
State	Model 5		Model 4		Model 3		Model 2		Model 3		Model 3	
-2 Log likelihood	455.42		375.51		862.86							
Best fitting model	$X^2 = 33.97$**		$X^2 = 42.33$*		$X^2 = 80.82$*		$F = 5.26$***		$F = 2.25$****		$F = 7.72$*	
Model fit	($R^2 = .13$)		($R^2 = .17$)		($R^2 = .16$)		($R^2 = .11$)		($R^2 = .07$)		($R^2 = .14$)	
Parameter	OR[c]	CI[d]	OR[c]	CI[d]	OR[c]	CI[d]	B[e]	(SE)	B[e]	(SE)	B[e]	(SE)
State (combined sample only)												
Mississippi	—	—	—	—	2.86*	2.01–4.05	—	—	—	—	44.58*	6.24
Caregiver strain												
Objective	1.12	.77–.63	1.23	.77–1.96	1.12	.85–1.48	7.46***	2.56	−5.34	7.31	−1.58	4.52
Subj.-externalized	1.16	.83–1.63	.67****	.46–.99	.90	.71–1.15	−.57	2.54	.68	6.65	−.60	4.11
Subj.-internalized	.93	.68–1.27	1.07	.74–1.53	1.00	.80–1.26	−.12	2.60	3.00	6.47	1.70	4.05
Family resources												
Income	1.00	.93–1.08	.99	.90–1.08	.99	.94–1.05	1.04	.58	.84	1.68	1.07	1.00
Caregiver educ[g]	.72	.42–1.21	.86	.48–1.54	.82	.53–1.19	3.82	4.45	−23.65****	10.72	−14.52****	6.81
Child clinical												
Int. behavior	1.00	.97–1.03	1.02	.98–1.05	1.00	.98–1.03	—	—	—	.58	−.63	.35
Ext. behavior	1.02	.99–1.05	1.03****	.99–1.06	1.03***	1.01–1.05	—	—	1.55***	.53	.96***	.33
Social function	1.01	.97–1.04	1.04****	1.00–1.08	1.02	1.00–1.05	—	—	−.05	.70	.20	.43
Urban[f] (%)	1.01****	1.00–1.02	.99****	.98–1.00	—	—	—	—	—	—	—	—
Child demographics												
Child's age	.98	.91–1.07	—	—	—	—	—	—	—	—	—	—
Girl	.71	.43–1.17	—	—	—	—	—	—	—	—	—	—
White	2.97**	1.55–5.69	—	—	—	—	—	—	—	—	—	—

[a] Receipt of any formal behavioral health services not including support services. Includes all youth.

[b] Includes only youth who received any formal behavioral health service not including support services.

[c] OR = Odds ratios.

[d] CI = Confidence interval estimates that are 95% Wald confidence limits.

[e] Unstandardized parameter estimates.

[f] Percentage of the population in the child's county of residence that lived in a Census-defined urban area.

[g] Parent had not completed high school.

*$p \leq .0001$. **$p \leq .001$. ***$p \leq .0125$. ****$p \leq .05$.

Table 4. Child, Family, Community and System Predictors of Use of Inpatient/Residential and Day Treatment Services by State

	Inpatient/residential[a]						Day treatment[a]					
State	Tennessee ($N = 186$)		Mississippi ($N = 263$)		Combined ($N = 449$)		Tennessee ($N = 186$)		Mississippi ($N = 263$)		Combined ($N = 449$)	
Best fitting model	Model 1		Model 5		Model 5		Model 4		Model 5		Model 5	
−2 Log likelihood	157.59		249.94		408.34		94.25		304.77		429.85	
Model fit	$X^2 = 26.9^*$ ($R^2 = .24$)		$X^2 = 45.59^*$ ($R^2 = .26$)		$X^2 = 62.28^*$ ($R^2 = .22$)		$F = 21.33^*$ ($R^2 = .11$)		$F = 34.43^*$ ($R^2 = .18$)		$F = 63.40^*$ ($R^2 = .21$)	
Parameter	OR[b]	CI[c]	OR[b]	CI[c]	OR[b]	CI[c]	OR[b]	CI[c]	OR[b]	CI[c]	OR[b]	CI[c]
State (combined sample only)												
Mississippi	—	—	—	—	2.22****	1.12–4.38	—	—	—	—	3.47***	1.60–7.52
Caregiver strain												
Objective	3.33*	1.79–6.20	1.48	.92–2.41	1.91**	1.30–2.81	2.05	.70–6.01	1.20	.77–1.87	1.27	.86–1.87
Subj.-externalized	.99	.55–1.80	.80	.50–1.29	.93	.65–1.32	2.03	.88–4.68	1.37	.92–2.04	1.41****	.99–2.00
Subj.-internalized	.83	.41–1.67	1.14	.70–1.87	.98	.66–1.45	.58	.21–1.60	.63****	.43–.94	.65****	.46–.92
Family resources												
Income	—	—	.923	.82–1.04	.99	.91–1.09	.80****	.64–.99	1.02	.92–1.12	.98	.90–1.07
Caregiver educ[e]	—	—	.938	.43–2.04	.98	.52–1.85	.35	.04–3.16	.50****	.26–.98	.51****	.28–.93
Child clinical												
Int. behavior	—	—	.95****	.91–.99	.97	.94–1.01	.94	.87–1.02	1.01	.97–1.04	.99	.96–1.03
Ext. behavior	—	—	1.00	.96–1.04	1.00	.97–1.03	1.00	.93–1.08	1.02	.99–1.06	1.03	1.00–1.06
Social function	—	—	1.07**	1.01–1.13	1.05****	1.01–1.09	1.01	.96–1.17	.96	.92–1.00	.97	.94–1.01
Urban[e] %	—	—	1.01	1.00–1.02	1.00	.99–1.01	1.03****	1.00–1.06	1.00	.99–1.01	1.00	.99–1.01
Child demographic												
Child's age	—	—	1.26***	1.08–1.47	1.17***	1.05–1.31	—	—	.96	.85–1.08	.98	.88–1.09
Girl	—	—	.36****	.15–.90	.64	.34–1.23	—	—	.74	.38–1.44	1.03	.58–1.84
White	—	—	.913	.43–1.94	1.39	.74–2.60	—	—	.23**	.11–.50	.33**	.18–.62

[a] Includes children who received any formal behavioral health service not including support services.

[b] OR = Odds ratios.

[c] CI = Confidence interval estimates that are 95% Wald confidence limits.

[d] Percentage of the population in the child's county of residence that lived in a Census-defined urban area.

[e] Parent had not completed high school.

$^*p \leq .0001$. $^{**}p \leq .001$. $^{***}p \leq .0125$. $^{****}p \leq .05$.

symptoms was related to using more services ($B = .96$, $p < .01$), other variables held constant. Having a parent who had not completed high school was associated with receiving approximately 15 fewer service encounters ($B = -14.52, p < .05$). Being served in Mississippi was associated with receiving 45 more service encounters ($B = 44.58$, $p < .0001$), all other variables held constant. No model was significant for the Mississippi sample at the adjusted $p < .0125$ but the findings are presented on Table 3 for the best fitting model.

Inpatient/Residential Services

Model 1 was the best fitting model in the Tennessee system ($X^2 = 26.91$, $p < .0001$) with greater objective caregiver strain increasing the risk of residential placement considerably (OR = 3.33 $p < .0001$). (See Table 4). Model 5 fit the Mississippi ($X^2 = 45.59, p < .0001$) and combined sample ($X^2 = 62.28$, $p < .0001$) data best. In the Mississippi and combined samples, greater functional impairment ($OR = 1.07$, $p < .001$ and $OR = 1.05$, $p < .05$, respectively), and being older ($OR = 1.26, p < .01$ and $OR = 1.17$, $p < .01$) increased the risk of residential treatment. In Mississippi, having more internalizing symptoms ($OR = .95, p < .05$) and being a girl ($OR = .36$, $p < .05$) reduced the likelihood of residential placement. Being served in Mississippi increased the probability of receiving residential services ($OR = 2.22, p < .05$).

Day Treatment

These results can be found on Table 4. In the Tennessee system, model 4 was the only significant model ($X^2 = 21.33$, $p < .0125$). Greater income was associated with a decrease in the probability of receiving day treatment ($OR = .80, p < .05$), and children who lived in more urban areas were more likely to receive day treatment ($OR = 1.03, p < .05$). Model 5 demonstrated the best fit in the Mississippi ($X^2 = 34.43$, $p < .001$) and combined ($X^2 = 63.40$, $p < .0001$) samples. In both samples, greater subjective internalized strain, having a caregiver who had not completed high school, and being White were associated with a lower likelihood of receiving day treatment. In the combined sample analysis, being served in the Mississippi system increased the probability of day treatment use ($OR = 3.47$, $p < .01$), as did greater subjective externalized strain ($OR = 1.41, p < .05$).

LIMITATIONS

This study focused on Medicaid-enrolled children in two southern states and the findings may not generalize to other Medicaid children or non-Medicaid populations. Medicaid systems serve poor children and families who are at risk for a variety of negative outcomes and, therefore, are often the focus of research and policy initiatives. Medicaid has become the largest health insurance program in the country (Weil, 2003) and is the most widespread public system in the US for children and adolescents (Schneider, Fennel, & Long, 1998). More research is needed, however, to examine the determinants of children's behavioral health service utilization in other populations.

Selection of children for this study depended on caregiver report of the child's problems or child's previous service use claims. As caregivers are less reliable informants of internalizing problems (i.e., depression symptoms), children with internalizing problems (and without externalizing problems) may be under-represented in this sample. Hence, the variables associated with service use in this study may be more relevant for children with externalizing problems than for those with only internalizing problems. However, the distribution of internalizing and externalizing problems in this sample is comparable to that of other children's mental health services research samples (e.g., Bickman et al., 1995; Holden et al., 2003).

This study relies on caregiver reports of both child symptoms and caregiver strain raising the risk of collinearity. While child problems are the primary contributors to caregiver strain, previous research has found that there are other important caregiver, family, and service contributors, as well (Angold et al., 1998; Brannan & Heflinger, 2001; Brannan & Heflinger, 2004; Kang, Brannan, & Heflinger, 2005; Yatchmenoff, Koren, Friesen, Gordon, & Kinney, 1998). In this study it is important to note that the inability of child symptoms to predict some service use variables does not suggest that there is no relationship, but that child symptoms did not provide any independent predictive power above that offered by other variables in the model.

Differences across the two states in the availability of providers could also have affected these findings. The states were very similar in terms of child Medicaid enrollment, poverty, and prevalence of emotional and behavioral problems. However, Tennessee had more physicians, and fewer hospital beds, per resident. No data are available, however, on differences across the states in terms of the mental health specialty providers who serve Medicaid patients. If the availability of Medicaid mental health providers across states reflects that of physicians and hospitals in general, we might expect Tennessee enrollees to use more outpatient services but to be less likely to use residential services. Although Medicaid-enrolled children in Tennessee did use fewer residential services, they were also less likely to receive any service and had fewer service encounters overall.

The use of Medicaid claims/encounter data in this study fails to include any services children received that were not paid by Medicaid. It is possible that the use of non-Medicaid services would be associated with different variables than were found to be important here. In addition, the number of children who received day treatment services in the Tennessee sample and inpatient and residential services in both samples may compromise the stability of those findings. There may also be other state characteristics that influence service use such as distance to providers. Although those data were not available for this study, we included a measure of how urban the child's community was as a proxy variable.

DISCUSSION AND IMPLICATIONS

It is notable that the probability of receiving any services or a given service option was greatly influenced by which system served the child. The important role that systems play in shaping service use has also been found in previous studies with a variety of populations (e.g., Bickman, Foster, & Lambert, 1996; Foster, 1998, 2000; Patrick, Padgett, Burns, Schlesinger, & Cohen, 1993; Summerfelt, Foster, & Saunders, 1996). Previous research using data for the whole population of Medicaid-enrolled children in Tennessee and Mississippi also found that children in the fee-for-service system had a greater probability of using any behavioral health service and using more of each type of service (Saunders & Heflinger, 2004). The current study extends those findings by demonstrating that the results hold after controlling for child need for services and other important variables.

Differences across systems in the relationships among service use and child and family variables have also been found elsewhere (e.g., Bickman, Foster, & Lambert, 1996; Foster, 1998, 2000). This suggests that systems not only have direct effects on how services are used, but also influence how families make help-seeking and treatment decisions for their children. This also helps explain inconsistencies across studies on what factors best predict service utilization. Service systems create different types of incentives and disincentives that impact administrators,' providers' and families' choices. They also present different barriers to care. While some of these may be intentional (e.g., utilization review to reduce use of residential services), others are likely unintentional. Understanding how families' help-seeking decisions are affected by system characteristics can help identify unintentional consequences, reduce unmet need, and improve appropriate use of services.

Across all samples, caregiver strain was associated with several service use variables after controlling for other key factors, largely replicating findings from previous studies. However, the relationship was stronger in Tennessee where caregiver strain variables alone were uniquely associated with two of the four service use variables examined. Most notably, greater objective caregiver strain (e.g., trouble with neighbors, lost work time, disrupted family relationships) increased the risk for inpatient/residential treatment in the Tennessee and the combined samples. Children whose caregivers reported greater objective strain also received more services in Tennessee. Greater subjective externalized strain (e.g., anger, embarrassment, resentment about the child's problems), reduced the likelihood of receiving any service in the Mississippi system, and increased the likelihood of receiving day treatment in the combined sample. Children whose caregivers reported more subjective internalized strain (e.g., sadness, worry, fatigue) were less likely to receive day treatment in the Mississippi and combined samples.

These findings suggest that the way caregivers of children with emotional or behavioral disorders experience the caregiving role (e.g., as more or less onerous or straining) can profoundly affect whether children enter care and their subsequent service use. Addressing caregiver needs, therefore, may maximize the meeting of individual treatment and service system goals. For example, providing support services to families to reduce objective caregiver strain may serve to reduce use of residential settings and associated costs. As we struggle to reduce unmet behavioral health needs among children, helping caregivers deal with feelings of anger, embarrassment and resentment about their child's challenges (i.e., subjective externalized strain) may result in more children entering care when needed.

Previous research indicated that, compared to their Mississippi counterparts, families in Tennessee's managed care Medicaid program experienced more payer-related barriers while trying to get mental health services for their children (Brannan & Heflinger, 2004) and were less satisfied with their insurance plans (Heflinger, Simpkins, Scholle, & Kelleher, 2003). Findings that caregiver strain was more strongly associated than other variables with receipt of residential services and amount of services received in the Tennessee system may suggest that, when services seem difficult to access, caregivers may need to work harder to overcome barriers. Perhaps caregiver strain mitigates the relationship between barriers to care and service use; that is, in the face of barriers, caregivers who are feeling more strained are more likely to persevere to get services for their children. Additional research is needed to examine this possibility.

Beyond the role of the service system, externalizing symptoms and social functioning were the child clinical variables most consistently associated with increased likelihood of service use. In the Mississippi and combined samples, having more internalizing symptoms was negatively associated with amount of services received. This echoes the conventional wisdom in the field and empirical findings from Wu et al. (1999) that children with disruptive behavior problems are more likely to receive care than children with mood disorders.

Understanding the role of race is important to the study of behavioral health service utilization. Among families with comparable insurance coverage, children from minority backgrounds have been found to be less likely to receive behavioral health services than their White counterparts (Padgett et al., 1994). In addition, African American caregivers tend to report less strain on the objective and total scales (Kang, Brannan, & Heflinger, 2005; McCabe et al., 2003), and objective caregiver strain is related to increases in service use (e.g., Brannan, Heflinger, & Foster, 2003; Bussing et al., 2003). One would expect, therefore, that because the Mississippi sample had a considerably larger proportion of African American children, service utilization rates would be lower in that sample. Instead, service use was substantially higher in the Mississippi sample compared to the Tennessee sample. Additionally, the relationship between race and service use differed across states. In Tennessee, White children were much more likely to enter treatment, all other factors held constant. However, once children were involved in the service system, race was not related to the types of services used. In Mississippi, however, race did not influence entry into the system, but having entered, minority children were more likely to receive day treatment. Several factors likely influence the interplay of race, service system features, and community characteristics. For example, structural barriers (e.g., location of treatment facilities) differ across service systems and communities and their impact may differ across racial groups. Research in this area is critical to any effort to reduce racial disparities in service use and health outcomes.

Living in a more urban setting reduced the likelihood of receiving any service in Mississippi, but increased the likelihood in Tennessee. It is possible that, because the Mississippi sample tended to live in more rural settings, outreach efforts were made to serve children outside of urban settings. The majority of Medicaid-funded day treatment services in Mississippi, for example, were delivered through the school systems, in part, to increase access for rural children (MDMH, 1997).

The variables explained a larger proportion of the variance in use of any service and the use of residential services, compared to the other service use variables, as indicated by the adjusted R^2 and X^2 statistics. Previous examinations of service use among military dependents explained greater proportions of the variance in service use (e.g., Bickman, Foster, & Lambert, 1996; Brannan, Heflinger, & Foster, 2003). The military-dependent population was socio-economically more advantaged than the Medicaid samples examined here, lived in closer proximity (i.e., in or around military posts), and were likely more homogeneous. The Medicaid samples were drawn across whole states with presumed differences in regional and community structure (e.g., availability of providers) and culture (e.g., attitudes toward professionals). Perhaps this heterogeneity makes service utilization more difficult to predict.

It is clear that behavioral health service utilization among children served in these Medicaid systems was influenced by factors beyond the child, family, community, and system variables examined here. Further research is needed to examine why some children with considerable behavioral health problems do not use any formal services. The field needs to examine the community- and system-level structural barriers to treatment. Continued attention to the role of family variables, especially caregiver strain, is also warranted. Following from our theoretical perspective, we also propose that family perceptions likely influence whether children access behavioral health service systems and subsequent service utilization. These perceptions include beliefs about behavioral health, attributions regarding the cause of disorders, appraisals of the severity of child problems, expectations of cure, receptivity to professional intervention, and concerns about stigma. Future research should pursue the influence of these factors.

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