

# The Interplay of Outpatient Services and Psychiatric Hospitalization Among Medicaid-Enrolled Children With Autism Spectrum Disorders

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**Objective:** To examine whether increased provision of community-based services is associated with decreased psychiatric hospitalizations among children with autism spectrum disorders (ASDs).

**Design:** Retrospective cohort study using discrete-time logistic regression to examine the association of service use in the preceding 60 days with the risk of hospitalization.

**Setting:** The Medicaid-reimbursed health care system in the continental United States.

**Participants:** Medicaid-enrolled children with an ASD diagnosis in 2004 (N=28 428).

**Main Exposures:** Use of respite care and therapeutic services, based on procedure codes.

**Main Outcome Measures:** Hospitalizations associated with a diagnosis of ASD (*International Classification*

*of Diseases, 10th Revision*, codes 299.0, 299.8, and 299.9).

**Results:** Each \$1000 increase in spending on respite care during the preceding 60 days resulted in an 8% decrease in the odds of hospitalization in adjusted analysis. Use of therapeutic services was not associated with reduced risk of hospitalization.

**Conclusions:** Respite care is not universally available through Medicaid. It may represent a critical type of service for supporting families in addressing challenging child behaviors. States should increase the availability of respite care for Medicaid-enrolled children with ASDs. The lack of association between therapeutic services and hospitalization raises concerns regarding the effectiveness of these services.

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**W**E SOUGHT TO EXAMINE whether increased provision of community-based respite and therapeutic services is associated with decreased psychiatric hospitalizations among children, adolescents, and young adults (age,  $\leq 21$  years) with autism spectrum disorders (ASDs). Autism spectrum disorders represent a complex set of behaviorally defined conditions, the hallmarks of which are impairments in social interaction and communication, often accompanied by perseverative behaviors and interests.<sup>1,2</sup> Children with ASDs often present with other psychiatric symptoms, such as anxiety and hyperactivity, and in many cases engage in self-injurious or aggressive behavior.<sup>3-5</sup> Recommended interventions for children with ASDs include intensive and prolonged community-based behavioral and socialization therapies.<sup>6</sup> Because of the challenging behaviors that children with ASDs fre-

quently exhibit, they and their families also can benefit from services such as respite and home health care.<sup>7,8</sup>

Despite evidence supporting the efficacy of these types of interventions for children with ASD, related services are in short supply. Local practitioners often lack experience and training in working with children with ASDs or in using the specific proven effective behavioral strategies.<sup>9-11</sup> Even when qualified practitioners are available, payers for health care may exclude ASD as a covered diagnosis, may not cover these therapies or support services, or may reimburse at such a low rate as to discourage providers from entering the market.<sup>12,13</sup>

Perhaps as a result of the poor availability of relevant community-based services, children with ASDs are much more likely than children with other psychiatric and developmental disorders to be hospitalized for psychiatric reasons.<sup>14-16</sup> A sur-

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vey of parents of children with ASDs aged 5 to 21 years found that 11% had a lifetime history of psychiatric hospitalization.<sup>17</sup> Another study that relied on Medicaid claims found that 7% of children with ASDs were psychiatrically hospitalized in a single year.<sup>18</sup>

Outpatient services for children with ASDs may substitute for services such as psychiatric hospitalization. Although not examined for ASD, studies have found this substitution for individuals with other psychiatric disorders. Prospective studies have reported that intensive community services reduce psychiatric hospitalizations for adults with psychiatric disorders in general<sup>19-22</sup> and specifically for schizophrenia,<sup>23-25</sup> adolescent depression,<sup>26</sup> and bipolar disorder.<sup>27</sup> On the other hand, a study of intensive outpatient services compared with usual community care resulted in no reduction in hospitalizations, despite increased use of outpatient care.<sup>28</sup> Two trials of case management among frequent users of inpatient services also showed no decrease in hospitalizations.<sup>29,30</sup>

Fewer studies have examined this issue retrospectively using administrative data; however, these studies generally have shown a similar relationship. For example, one medical record review found that individuals with serious mental illness who had better outpatient care had lower hospitalization expenditures.<sup>31</sup> Conversely, another study showed that disruption in Medicaid eligibility was associated with increased hospitalizations among patients with schizophrenia, perhaps because of the loss of access to outpatient services.<sup>32</sup>

There have been many recent efforts to reduce barriers to outpatient health care for children with ASD, including use of autism-specific Medicaid home- and community-based waivers (currently in use in 6 states) and private insurance mandate (legislated in 24 states at the time of this writing). Examining whether increasing outpatient services results in reduced use of costly and restrictive service has important implications for how service systems for children with ASDs are designed and funded. In the present study, we examine the extent of this substitution in a large, diverse, national sample of Medicaid-enrolled children with ASDs, taking into account child and health care system characteristics. The University of Pennsylvania institutional review board approved this study.

## METHODS

### DATA SOURCES

The Medicaid Analytic eXtract database from 2004 provided information on ASD diagnosis, service use, demographic characteristics, and state of residence. State-level characteristics were obtained from the Area Resource File.<sup>33</sup> Data in the file are obtained from the Bureau of the Census, the American Hospital Association, the American Medical Association, and the Centers for Disease Control and Prevention, among other agencies.

### SAMPLE

The study sample included the 28 481 Medicaid-enrolled children, adolescents, and young adults aged 5 through 21 years on January 1, 2004, who had at least 2 outpatient claims on

different days from May 1 through October 31, 2003, associated with a primary diagnosis of autistic disorder (*International Classification of Diseases, 10th Edition*, code 299.00) or Asperger disorder/pervasive developmental disorder not otherwise specified (code 299.8 or 299.9).<sup>34</sup> Patients with an ASD diagnosis who had claims associated with inpatient care but no outpatient care (n=31) were excluded from the analysis. We also excluded all patients in Arizona because they had no expenditures associated with their claims (n=1022). To be included in the sample, patients had to be continuously enrolled in Medicaid during the entire study period.

## GENERAL STUDY DESIGN

We first used a person-level analysis to examine demographic, clinical, and regional factors associated with the risk of any hospitalization during the study year. We then examined the longitudinal risk of hospitalization for each day of calendar year 2004 as a function of total outpatient service use in the 2 months before each study day. For this analysis, we used claims data from November 1, 2003, through December 31, 2004, to calculate service use during the preceding 2 months for each day starting on January 1, 2004.

## VARIABLES

### Psychiatric Hospitalization

The dependent variable was psychiatric hospitalization. For the person-level analysis, psychiatric hospitalization was coded as present or absent according to whether a patient had any claim for hospitalization from the inpatient Medicaid Analytic Extract file that was associated with a diagnosis of ASD. For the day-level analysis, the presence or absence of an ASD-associated hospital admission was determined for each day during the study year.

### Use of Outpatient Services

The primary independent variable of interest was use of outpatient services. Of particular interest were (1) services with a high probability of directly relating to autism therapies and (2) services that may offer caregiving relief to families. Claims were coded as belonging to one of these 2 categories on the basis of procedure codes, place of service, and provider type. The first category of interest included one-to-one and group services for speech, occupational, physical, behavioral, talk, and family therapies. The second category included respite care and home health aides/personal care assistants. A complete list of procedure codes constituting these categories is available at <http://www.paautism.org/tools.html>.

Many of the procedure codes were state specific. Units of service assigned to each code varied greatly across and within states, and many procedure codes did not have a specific length of time associated with their definitions. Therefore, we used the Medicaid-paid amount as a proxy for the volume of service delivered. For each outpatient service category, the cumulative payment for the past 60 days was calculated for each day of the study year for each patient.

### Child Characteristics

Previous studies have found that various demographic characteristics are associated with the probability of hospitalization among children with ASDs.<sup>17</sup> Therefore, we included the following demographic characteristics in our analysis, which

were abstracted from the Medicaid eligibility file: age, race/ethnicity, sex, and state of residence. Age was coded using date of birth. Age was categorized to correspond with different educational levels (elementary school, middle or high school, and beyond high school). Race/ethnicity was coded according to Medicaid categories as white, black or African American, Asian, Latino, or other. Medicaid eligibility reason was coded from the Medicaid eligibility files and included poverty, disability, foster care, and other programs.

### State Characteristics

States vary in their policies and practices regarding the care of children with ASDs and in the level of health care resources they have available to provide therapy and support to children with ASDs.<sup>18,35-37</sup> Therefore, we included state characteristics in the analysis that may affect the observed association between outpatient service use and the outcomes of interest. First, we aggregated outpatient expenditures to the state level because outpatient spending in specific categories may be indicative of state policies and practices. For example, states may have specific programs to provide respite care or intensive community-based services to children with ASDs that may in turn be associated with policies discouraging hospitalization, regardless of the level of care any individual child receives. Any observed association at the individual child level between outpatient and inpatient service use may be a proxy for state practices that incentivize intensive outpatient services and create disincentives for relying on inpatient care.

We also included state-level variables that may affect use of outpatient and inpatient service use, including the number of per capita pediatricians, pediatric specialists, and hospital beds. These variables were abstracted from the Area Resource File. Each state-level variable was broken into tertiles for ease of interpretation, with the exception of pediatric specialists, which was dichotomized.

### STATISTICAL ANALYSIS

We first calculated the rate of hospitalization overall and stratified by patient and state factors. We calculated unadjusted odds ratios (ORs) to examine the magnitude and statistical significance of differences in rates across strata using logistic regression models, including hospitalization as the dependent variable and each factor in turn as an independent variable.

We then used a logistic regression analysis to assess the association between cumulative 60-day service expenditures and hospital admission at the day level. An adjusted model included all service use variables and controlled for the previously described sociodemographic and regional factors. For these analyses, patients were followed up from January 1, 2004, to the first hospitalization for ASD or until the end of 2004 if they did not have a hospital admission. For all regression analyses, we used commercially available software (Proc Surveylogistic in SAS; SAS Institute, Inc, Cary, North Carolina) to provide robust standard errors that account for the nesting of patients within state.

### RESULTS

The **Table** presents the rate of hospitalization per 1000 patients and ORs estimating the association between patient and state characteristics and hospitalization; 675 patients (2.4% of the sample) experienced at least 1 hospitalization during the study year associated with a diagnosis of ASD. In unadjusted analysis, each \$1000 in

respite care was associated with a 9% decrease in the odds of hospitalization. Female patients were less likely than male patients to be hospitalized (OR, 0.73). Patients aged 13 to 17 years (OR, 1.84) and patients in foster care (OR, 2.56) were more likely to be hospitalized than other groups. The only state characteristic associated with hospitalization was the number of psychiatric hospital beds per capita, with patients in states with the middle tertile of number of hospital beds being 2.42 times more likely to be hospitalized than patients in states with the lowest tertile.

The Table also presents the adjusted odds of hospitalization associated with respite and therapeutic services use in the preceding 60 days. Each \$1000 increase in respite expenditures in the preceding 60 days was associated with an 8% decrease in the odds of hospitalization. The magnitude of the association of other variables with hospitalization and their statistical significance remained relatively constant in the adjusted analysis.

### COMMENT

In the present study, we found that, among Medicaid-enrolled patients diagnosed as having ASD who were aged 5 to 21 years, 2.4% experienced at least 1 psychiatric hospitalization in 2004. After adjusting for many patient- and state-level characteristics, increased use of respite and home/community aide services was associated with a decrease in the risk of psychiatric hospitalizations for children, adolescents, and young adults with ASD.

Raising a child with ASD is fraught with challenges and can place considerable stress on families.<sup>38</sup> In many cases, hospitalization may result as much from the stress the child's behavior places on the family as from the behavior per se. Respite care and home- and community-based aides may considerably reduce stress on families, leading to reduced hospitalization rates.

Among the entire sample, use of therapeutic services was not associated with the risk of hospitalization. Our expectation was that therapeutic services have a similar effect as respite care in that they would address problem behaviors that increase the risk of hospitalization. The lack of association may be due to the confounding between service use and severity. If this were the case, however, we might expect to observe a similar result for respite care. Alternatively, these therapeutic services may not be effective. A growing literature finds that community practitioners often do not have the training or resources to implement evidence-based autism interventions and that outcomes for children with ASD in the community often are suboptimal.<sup>11,39-42</sup> In this case, quantity may not equal quality, and a focus on more targeted, evidence-based interventions may result in more positive outcomes and less use of restrictive services, such as hospitalization.<sup>43</sup>

Findings such as these in claims data may merit special attention. At the individual patient level, increasing mental health care has rarely been shown to reduce inpatient care,<sup>44</sup> in large part because children are not randomized to levels of service use, and the frequent (high-level) users of services use all types of services in response

**Table. Adjusted and Unadjusted Associations Between Psychiatric Hospitalization and Sample Characteristics<sup>a</sup>**

|   | Rate<br>per 1000 | Hospitalization, OR (95% CI)  |                               |
|---|------------------|-------------------------------|-------------------------------|
|   |                  | Unadjusted                    | Adjusted                      |
| Average 60-d service use per \$1000                   |                  |                               |                               |
| Respite services                                      |                  | 0.91 (0.85-0.98)              | 0.92 (0.86-0.99) <sup>b</sup> |
| Therapeutic services                                  |                  | 1.00 (0.90-1.10)              | 1.01 (0.94-1.09)              |
| Other outpatient services                             |                  | 1.03 (0.90-1.17)              | 1.03 (0.93-1.15)              |
| Patient characteristics                               |                  |                               |                               |
| Sex   |                  |                               |                               |
| Male (n=22 722)                                       | 25               | 1 [Reference]                 | 1 [Reference]                 |
| Female (n=5706)                                       | 18               | 0.73 (0.58-0.91) <sup>b</sup> | 0.72 (0.58-0.90) <sup>b</sup> |
| Age, y  |                  |                               |                               |
| 5-12 (n=19 550)                                       | 19               | 1 [Reference]                 | 1 [Reference]                 |
| 13-17 (n=7404)  | 35               | 1.84 (1.44-2.36) <sup>b</sup> | 1.80 (1.40-2.32) <sup>b</sup> |
| 18-20 (n=1596)  | 32               | 1.68 (1.12-2.53)              | 1.60 (1.05-2.46)              |
| Race/ethnicity  |                  |                               |                               |
| White (n=15 699)                                      | 26               | 1 [Reference]                 | 1 [Reference]                 |
| African American (n=5472)                             | 22               | 0.84 (0.49-1.43)              | 0.92 (0.69-1.24)              |
| Latino (n=1969)                                       | 17               | 0.63 (0.37-1.07)              | 0.88 (0.58-1.33)              |
| Other (n=5288)  | 26               | 0.76 (0.53-1.09)              | 0.76 (0.54-1.07)              |
| Eligibility   |                  |                               |                               |
| Poverty (n=3561)                                      | 15               | 1 [Reference]                 | 1 [Reference]                 |
| Disability (n=22 142)                                 | 24               | 1.62 (1.20-2.18)              | 1.69 (1.29-2.21)              |
| Foster care (n=1852)                                  | 37               | 2.56 (1.88-3.50) <sup>b</sup> | 2.50 (1.77-3.53) <sup>b</sup> |
| Other (n=873)   | 29               | 1.95 (1.24-3.08)              | 1.97 (1.23-3.18)              |
| State characteristics                                 |                  |                               |                               |
| Average therapeutic service use                       |                  |                               |                               |
| Low (\$239-\$1543)                                    | 28               | 1 [Reference]                 | 1 [Reference]                 |
| Medium (\$1544-\$3514)                                | 26               | 0.94 (0.54-1.65)              | 0.84 (0.49-1.43)              |
| High (\$3515-\$13 735)                                | 19               | 0.68 (0.41-1.12)              | 0.71 (0.44-1.16)              |
| Average respite service use                           |                  |                               |                               |
| Low (\$0-\$207)                                       | 29               | 1 [Reference]                 | 1 [Reference]                 |
| Medium (\$208-\$2104)                                 | 23               | 0.81 (0.44-1.52)              | 1.19 (0.71-2.00)              |
| High (\$2105-\$15 515)                                | 22               | 0.76 (0.45-1.29)              | 1.00 (0.58-1.73)              |
| Medicaid-treated ASD prevalence per 10 000 population |                  |                               |                               |
| Low (0.99-4.98)                                       | 17               | 1 [Reference]                 | 1 [Reference]                 |
| Medium (4.99-9.95)                                    | 27               | 1.67 (1.05-2.65)              | 1.40 (0.77-2.54)              |
| High (9.96-42.23)                                     | 22               | 1.25 (0.66-2.38)              | 1.36 (0.90-2.06)              |
| Pediatricians per 10 000 population                   |                  |                               |                               |
| Low (2.12-4.63)                                       | 31               | 1 [Reference]                 | 1 [Reference]                 |
| Medium (4.64-6.02)                                    | 23               | 0.73 (0.40-1.33)              | 0.75 (0.43-1.32)              |
| High (6.03-20.94)                                     | 21               | 0.64 (0.35-1.18)              | 0.74 (0.41-1.32)              |
| Pediatric specialists per 10 000 population           |                  |                               |                               |
| Low (0.25-1.44)                                       | 24               | 1 [Reference]                 | 1 [Reference]                 |
| High (1.45-6.49)                                      | 24               | 1.02 (0.62-1.66)              | 0.70 (0.41-1.21)              |
| Psychiatric hospital beds per 1000 population         |                  |                               |                               |
| Low (5.81-10.30)                                      | 13               | 1 [Reference]                 | 1 [Reference]                 |
| Medium (10.40-13.12)                                  | 30               | 2.42 (1.46-4.01) <sup>b</sup> | 2.90 (1.71-4.90) <sup>b</sup> |
| High (13.13-30.08)                                    | 28               | 2.29 (1.28-4.07)              | 2.46 (1.31-4.59)              |

Abbreviations: ASD, autism spectrum disorder; OR, odds ratio.

<sup>a</sup>Includes 28 550 patients. The total number of patients varies because of missing data.<sup>b</sup>Difference is statistically significant compared with the null at  $P < .05$ .

to their considerable need.<sup>16,45</sup> Because claims data provide no measure of severity, disentangling these relationships is particularly difficult and often results in a null finding or positive association between community-based service use and hospitalization. Therefore, an inverse relationship between respite services and hospitalization in claims data may be considered particularly robust.

We should mention at least 2 study limitations. The first relates to the accuracy of the ASD diagnosis in Medicaid claims. Although this issue has not been studied specifically in Medicaid data, at least 2 studies

have found that a diagnosis of ASD in administrative claims has very high positive predictive value against medical record diagnoses<sup>46</sup> and criterion standard assessment.<sup>47</sup> Similarly, our process of categorizing procedure codes has not been validated and may have affected observed associations between service use and hospitalization.

Despite these limitations, the results have important implications for state policy and practice. Although hospitalization is sometimes warranted,<sup>48</sup> it often is an undesired outcome that may represent a failure to appropriately care for children rather than the needs of the child

per se. The results also suggest the need to examine the characteristics and effectiveness of therapeutic services provided to children with autism in the community. Although the lack of measures of children's clinical presentation significantly limits the ability to interpret the lack of association between these services and hospitalization, the different association with respite services is puzzling.

The reduced risk of hospitalization associated with respite care is more encouraging. However, despite its apparent role in reducing hospitalization and its critical importance for families of children with disabilities,<sup>49,50</sup> respite is not universally available and not always reimbursed.<sup>50,51</sup> States have options within Medicaid to ensure the availability of respite and other community-based services, yet many have not exercised them.<sup>52-54</sup> The present study offers evidence in support of the need to expand these community-based service options.

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### Correction

**Incorrect Data in Table 3 and in Text.** In the article titled “Effect of Neuromuscular Warm-up on Injuries in Female Soccer and Basketball Athletes in Urban Public High Schools: Cluster Randomized Controlled Trial” by LaBella et al, published in the November issue of the *Archives* (2011;165[11]:1033-1040), on page 1037, in Table 3, the values in the first 6 columns (“Control” and “Intervention” classifications for “Injuries, No.”; “AEs, No.”; “Injury Rate” subclassifications) are incorrect. Reading from left to right, top to bottom, the value sets for “Gradual onset” should have been 14, 12 467 (for all entries in this column), 1.12 and 11, 20 345 (for all entries in this column), and 0.54. For “Acute onset,” the value sets for “Injuries, No.” and “Injury Rate” should have been 32 and 2.57 and 18 and 0.88; for “Ankle sprains,” 11 and 0.88 and 7 and 0.34; for “Knee sprains,” 11 and 0.88 and 6 and 0.29; and “ACL sprains,” 6 and 0.48 and 2 and 0.10. On the same page, left-hand column, “Effect of the Intervention of Injury Rates for the Entire Sample” subsection of the “Results” section, paragraph 2, the first sentence should have read as follows: “Compared with control athletes, intervention athletes had a 65% reduction in gradual-onset injuries, a 56% reduction in acute, noncontact injuries, and a 66% reduction in noncontact ankle sprains.”