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Ten-year Trends in Treatment Services for Children with Attention Deficit Hyperactivity Disorder (ADHD) Enrolled in Medicaid

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Closing the gap between evidence-based clinical practices and their inclusion in routine practice continues to be a major goal of health policy reforms. The rift is especially large for children with psychiatric disorders. This paper presents data on ten-year trends in:(1) the prevalence of attention deficit hyperactivity disorder (ADHD);(2) rates of comorbidities among children with ADHD; and (3) treatment of ADHD by modality (i.e., medication, psychotherapy, combined) among Medicaid recipients, ages 3–17 years. These data are part of a recent Institutional Review Board-approved Rutgers University analysis of ten years of Medicaid claims data included in a new National Academies of Sciences, Engineering, and Medicine report, *Mental Disorders and Disabilities Among Low-Income Children*.¹ While there are limitations to claims data, analyses revealed that during the decade from 2001–2010, the proportion of low-income children diagnosed with ADHD rose by 83%. Rates of comorbidity in those diagnosed with ADHD were high (43.3% in 2010), an increase of 13% over the study period. Importantly, more children received treatments that appeared to conform to clinical practice standards over the decade, including a 74% increase in combined treatment (both medication and psychotherapy). Rates of treatment reported here are substantially higher than in other recent reports.

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Health policies such as those recommended in the Institute of Medicine report² should be guided by existing research evidence and clinical practice guidelines. ADHD is both a common disorder^{3,4} and a condition for which evidence-based treatments and clinical practice guidelines exist. Many children with ADHD receive no treatment,⁵ and untreated ADHD is associated with adverse consequences that may endure into adulthood.⁶ The quality of care in usual practice does not match practice standards.^{7,8,9} Since the 1999 publication of the landmark Multimodal Treatment Study,¹⁰ studies of trends in medication treatment have proliferated,^{11,12,13,14,15,16} although studies of rates of behavior treatment remain limited. A range of evidence-based treatments, including psychotherapy, medication, and their combination, have emerged as the treatments of choice because they reduce impairment, improve developmental trajectories, and improve long-term outcomes.^{6, 17,18,19,20} Extensive studies of behavioral therapy have demonstrated its efficacy.^{21,22} However, prior studies using Medicaid claims data did not report non-medication therapies for ADHD – despite the call in most clinical practice guidelines for a combination of medication and behavioral interventions.^{23,24}

This paper presents 10-year trend analyses from Medicaid claims data to describe changes over time in medication, psychotherapy, and combined treatment services. It does not claim to make statements about the quality of those treatment services.

Methods

Data

We used Medicaid service encounter and pharmacy claims data (2001–2010) from a sample of 20 states using the Medicaid Analytic eXtract database (MAX); this sample was selected for inclusion because prior research found that it provided relatively complete diagnosis and treatment details for managed care, as well as fee-for-service enrollees.^{25,26} The MAX data include diagnoses, medication prescriptions, and claims for any type of psychotherapy (i.e., individual, group, or family) for children ages 3–17 years, who had 11 months of Medicaid eligibility within the year.

Analysis

The category “any mental health diagnosis” includes all enrollees meeting the diagnostic criterion for one or more of the following: ADHD, Conduct disorder, Emotional disturbances, Oppositional defiant disorder, Depression, Bipolar disorders, Anxiety disorders, Autism spectrum disorders, Intellectual disorders, or Learning disorders (see Technical Appendix). The prevalence estimate for ADHD was determined by dividing the number of children with ADHD diagnoses by the number of all Medicaid enrollees meeting age/eligibility criteria for each year. The denominator was the total number of all eligible Medicaid enrollees for each year. The numerator was the number of children with the diagnosis (two visit were required for a diagnosis of ADHD). For comorbidity estimates, beneficiaries with ADHD diagnoses were sub-classified into those with and without other mental health conditions.²⁷ The presence of comorbid conditions was established using the claim count criterion among those children meeting our definition for an ADHD diagnosis. ADHD medication use was classified based on presence of one or more prescription drug

claims with National Drug Codes for a medication on the list of medications (see Technical Appendix). Receipt of psychotherapy was classified based on the presence of one or more outpatient claims with a Current Procedural Terminology (CPT) code for psychotherapy, using the list of codes (see Technical Appendix). Diagnostic and treatment status was determined separately for each calendar year to facilitate trend analysis over the study decade; thus, the analyses did not examine persistence or change in individual children.

All results, including Medicaid eligibility, diagnoses, medication receipt and the use of psychotherapy, are presented by calendar year. While this approach precludes analysis of change within children, it supports the cross-sectional analysis of year-over-year trends in diagnosis and treatment services.

Limitations

Absolute rates of treatment may be underestimated because only children who were continuously enrolled in Medicaid were included and receipt of services in other child-serving agencies (education, foster care, juvenile justice) may not have been captured. Continuous treatment rates for ADHD, however, may be overestimated by the requirement for 11-month eligibility and the requirement for at least two claims to be considered in the sample. Conclusions about the appropriateness or quality of treatment cannot be made because procedure codes in claims data do not specify evidence-based psychotherapies nor provide evidence of the *quality* of medication use. These data represent 20 states, and may not generalize to all Medicaid children, although states were chosen for inclusion based on published work indicating comprehensive diagnostic and treatment data.^{25,26} These claims data reflect services that were billed and paid; while they represent almost all of the medications, they likely represent a smaller proportion of the psychotherapy services, because some services (foster care, residential, school) are not routinely billed through Medicaid. These reflect Medicaid-paid services, not the range of actual services provided. Diagnostic issues for ADHD are complex; claims data provide diagnoses based merely on clinician report.

Results

The proportion of all Medicaid enrollees with a diagnosis of any of the mental disorders increased by 40.5% on a relative basis (from 7.9 to 11.1 percent) as the total number of study-eligible children increased from 5,232,083 to 8,208,507. The number of children diagnosed with ADHD (the most common mental disorder diagnosis) rose from 157,867 to 448,796, while the percentage of children with a diagnosis of ADHD rose by 83%, from 3.0 to 5.5 percent. Overall the rates of comorbidity were high. Among all Medicaid enrollees, the proportion of children with ADHD and any comorbid mental or developmental disorder rose 13 percent between 2001 and 2010, from 38.2 percent to 43.3 percent (Table 2).

Regarding trends in treatment, all Medicaid enrollees with ADHD had increased rates of treatment with medications, psychotherapy, or their combination. Medication alone remained the most common treatment regimen. However, there was a shift from medication only to combined treatment over time. Among all Medicaid enrollees with ADHD, the

percentage of children diagnosed without any reimbursed treatment decreased from 13.1% to 8.0%, a decrease of 39%. Treatment with medication only decreased by 18% (from 65.2% to 53.2%) while combined treatment increased by 74%, from 18.5% to 32.1%. Treatment with psychotherapy only rose by 52%, from 3.2% to 6.7% (Table 3).

Discussion

These data show that the percentage of children enrolled in Medicaid with a diagnosis of ADHD rose by 83%, between 2001 and 2010. Analyses also revealed a concomitant rise in comorbidity (i.e., children having claims for both ADHD and other mental disorders), suggesting more complicated cases. Importantly, rates of diagnoses without any reimbursed treatment decreased by 39%, and more children received treatments that at least potentially conformed to practice standards,^{28,29} including the use of combination treatments of medication and psychotherapy. Combined treatment increased by 74%, psychotherapy alone increased by 52%, and rates of medication alone decreased by 18%. These trends in claims for ADHD suggest increasing adherence to guidelines by providers serving children with ADHD in the Medicaid population. This is in contrast to prior studies showing only a small percentage of children receiving guideline-based care.^{7,8,20} The increase likely reflects multiple factors, which may include improved medical school, residency, and continuing medical education training that targets use of practice guidelines and quality measures.³⁰

Conclusion

During 2001–2010, more Medicaid children were diagnosed with attention deficit hyperactivity disorder (ADHD), and they have higher rates of comorbidity over time. More of these children received treatments that conformed more closely to clinical practice standards over the decade, and rates of treatment reported here are substantially higher than in other recent reports.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1
Prevalence and percent change in comorbidity and combined treatment in attention deficit hyperactivity disorder among Medicaid enrollees between 2001–2010

	% Medicaid Enrollees Receiving Medicaid-funded Care for Attention Deficit Hyperactivity Disorder										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% Change
Prevalence											
N	157,867	181,400	217,970	248,157	280,223	286,997	306,834	349,037	405,795	448,796	+184.3%
Any	3.0%	3.2%	3.5%	3.9%	4.2%	4.3%	4.7%	5.1%	5.4%	5.5%	+83.3%
% with any secondary MH diagnosis ^c	38.2%	37.8%	38.4%	37.8%	38.7%	41.2%	41.6%	42.2%	42.7%	43.3%	+13.6%
Receiving Combined Treatment ^d											
Medication + Psychotherapy	18.5%	18.1%	24.2%	32.8%	30.8%	30.6%	31.4%	31.7%	31.8%	32.1%	+73.5%

Source: This figure is adapted from Tables 18–8a 18–2a, 18–3a, 18–6a from *Mental disorders and disabilities among low-income children*. The National Academies of Sciences, Engineering, and Medicine. Washington, DC: The National Academies Press; 2015.

Prevalence and percent change of any mental health diagnoses and attention deficit hyperactivity disorder among Medicaid enrollees between 2001–2010

Table 2

% Medicaid Enrollees Receiving Medicaid-funded Care for Any Mental Health (MH) Diagnosis ^d											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% Change
Prevalence											
N	5,232,083	5,749,809	6,144,784	6,356,411	6,658,353	6,630,423	6,593,490	6,899,748	7,545,081	8,208,507	+56.9%
Any	7.9%	8.0%	8.4%	8.8%	9.2%	9.4%	10.0%	10.6%	11.0%	11.1%	+40.5%
% Medicaid Enrollees Receiving Medicaid-funded Care for Attention Deficit Hyperactivity Disorder ^b											
Prevalence											
N	157,867	181,400	217,970	248,157	280,223	286,997	306,834	349,037	405,795	448,796	+184.3%
Any	3.0%	3.2%	3.5%	3.9%	4.2%	4.3%	4.7%	5.1%	5.4%	5.5%	+83.3%
I secondary MH diagnosis											
Yes	1.9%	2.0%	2.2%	2.4%	2.6%	2.5%	2.7%	2.9%	3.1%	3.1%	+63.2%
No	1.2%	1.2%	1.4%	1.5%	1.6%	1.8%	1.9%	2.1%	2.3%	2.4%	+100.0%
% with any secondary MH diagnosis ^c	38.2%	37.8%	38.4%	37.8%	38.7%	41.2%	41.6%	42.2%	42.7%	43.3%	+13.6%

Notes:

^a prevalence of any mental health diagnosis defined as at least two outpatient claims on different dates or one inpatient claim for ADHD, conduct disorder, emotional disturbances, oppositional defiant disorder, depression, bipolar disorders, anxiety disorders, autism spectrum disorders, intellectual disorders, and learning disorders;

^b prevalence of ADHD defined as at least two outpatient claims for ADHD on different dates or one inpatient claim for ADHD;

^c a child with multiple secondary mental health diagnoses are counted only once.

Source: Adapted from Tables 18–2a, 18–3a, 18–6a from *Mental disorders and disabilities among low-income children*. The National Academies of Sciences, Engineering, and Medicine. Washington, DC: The National Academies Press; 2015.

Table 3

Medicaid-funded treatment for attention deficit hyperactivity disorder between 2001–2010

	2001 (n=157,867)	2002 (n=181,400)	2003 (n=217,970)	2004 (n=248,157)	2005 (n=280,223)	2006 (n=286,997)	2007 (n=306,834)	2008 (n=349,037)	2009 (n=405,795)	2010 (n=448,796)	% Change
Any Treatment ^a											
None	13.1%	12.2%	10.3%	8.5%	9.9%	10.0%	9.8%	9.3%	8.8%	8.0%	-38.9%
Medication only	65.2%	66.8%	60.9%	52.6%	53.2%	52.5%	51.7%	51.8%	52.4%	53.2%	-18.4%
Psychotherapy only	3.2%	2.9%	4.6%	6.1%	6.2%	7.0%	7.2%	7.2%	7.0%	6.7%	+109.4%
Medication + Psychotherapy	18.5%	18.1%	24.2%	32.8%	30.8%	30.6%	31.4%	31.7%	31.8%	32.1%	+73.5%

Notes:

^a At least one adjudicated pharmacy claim for ADHD medication or at least one service encounter claim for psychotherapy during the index year.

Source: Adapted from Table 18–8a from *Mental disorders and disabilities among low-income children*. The National Academies of Sciences, Engineering, and Medicine. Washington, DC: The National Academies Press; 2015.