

PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Psychotropic Medication Patterns Among Youth in Foster Care

Julie M. Zito, Daniel J. Safer, Devadatta Sai, James F. Gardner, Diane Thomas,
Phyllis Coombes, Melissa Dubowski and Maria Mendez-Lewis

Pediatrics 2008;121:e157-e163

DOI: 10.1542/peds.2007-0212

The online version of this article, along with updated information and services, is
located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/121/1/e157>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2008 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



Psychotropic Medication Patterns Among Youth in Foster Care

Julie M. Zito, PhD^{a,b}, Daniel J. Safer, MD^c, Devadatta Sai, MS^a, James F. Gardner, ScM^a, Diane Thomas, BA^d, Phyllis Coombes, MA^d,
Melissa Dubowski, BS^d, Maria Mendez-Lewis, MPA^d

Departments of ^aPharmaceutical Health Services Research and ^bPsychiatry, University of Maryland, Baltimore, Maryland; ^cDepartment of Psychiatry and Pediatrics, Johns Hopkins Medical Institutions, Baltimore, Maryland; ^dOffice of the Texas Comptroller of Public Accounts, Austin, Texas

Financial Disclosure: Drs Zito and Safer have received consulting fees from the Office of the Texas Comptroller of Public Accounts. The other authors have indicated they have no financial relationships relevant to this article to disclose.

ABSTRACT

CONTEXT. Studies have revealed that youth in foster care covered by Medicaid insurance receive psychotropic medication at a rate >3 times that of Medicaid-insured youth who qualify by low family income. Systematic data on patterns of medication treatment, particularly concomitant drugs, for youth in foster care are limited.

OBJECTIVE. The purpose of this work was to describe and quantify patterns of psychotropic monotherapy and concomitant therapy prescribed to a randomly selected, 1-month sample of youth in foster care who had been receiving psychotropic medication.

METHODS. Medicaid data were accessed for a July 2004 random sample of 472 medicated youth in foster care aged 0 through 19 years from a southwestern US state. Psychotropic medication treatment data were identified by concomitant pattern, frequency, medication class, subclass, and drug entity and were analyzed in relation to age group; gender; race or ethnicity; *International Classification of Diseases, Ninth Revision*, psychiatric diagnosis; and physician specialty.

RESULTS. Of the foster children who had been dispensed psychotropic medication, 41.3% received ≥ 3 different classes of these drugs during July 2004, and 15.9% received ≥ 4 different classes. The most frequently used medications were antidepressants (56.8%), attention-deficit/hyperactivity disorder drugs (55.9%), and anti-psychotic agents (53.2%). The use of specific psychotropic medication classes varied little by diagnostic grouping. Psychiatrists prescribed 93% of the psychotropic medication dispensed to youth in foster care. The use of ≥ 2 drugs within the same psychotropic medication class was noted in 22.2% of those who were given prescribed drugs concomitantly.

CONCLUSIONS. Concomitant psychotropic medication treatment is frequent for youth in foster care and lacks substantive evidence as to its effectiveness and safety.

www.pediatrics.org/cgi/doi/10.1542/peds.2007-0212

doi:10.1542/peds.2007-0212

Several members of the staff of the Texas State Comptroller participated in the identification, extraction, and management of data for the study and reviewed and approved the article. Ms Thomas had full access to all the data in the study and takes responsibility for the integrity of the data; Dr Zito takes full responsibility for the accuracy of the data analysis; and Mr Gardner performed statistical analysis.

Key Words

concomitant medications, psychotropic medication, foster care, Medicaid, pharmacotherapy

Abbreviations

ADHD—attention-deficit/hyperactivity disorder

SSRI—selective serotonin-reuptake inhibitor

ATC-MS—anticonvulsant mood stabilizer

Accepted for publication May 29, 2007

Address correspondence to Julie M. Zito, PhD, University of Maryland, 220 Arch St, 12th Floor, Room 216, Baltimore, MD 21201. E-mail: jzito@rx.umaryland.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275). Copyright © 2008 by the American Academy of Pediatrics

IN JUNE 2006, the Health and Human Services Committee of the Texas Department of State Health Services published a report titled "Use of Psychoactive Medication in Texas Foster Children, State Fiscal Year 2005."¹ In that Medicaid-sponsored investigation of administrative claims data, the annual (2005) prevalence of any psychotropic medication for Medicaid-enrolled youth in foster care (aged 0–17 years) in Texas was 34.7%. Disaggregated by age group, the annual psychotropic medication prevalence was 12.4% (ages 0–5 years), 55.3% (ages 6–12 years), and 66.5% (ages 13–17 years).

Aside from this recent as-yet-unpublished monograph, the prevalence of psychotropic medication for US youth in foster care placements has rarely been the subject of quantitative research. Zima et al² and McMillen et al³ analyzed interview data from foster care case files, dosReis et al⁴ and Ferguson et al⁵ used Medicaid administrative claims data from 1 county, and Zito et al⁶ and dosReis et al⁷ used statewide Medicaid claims data to assess psychotropic patterns

TABLE 1 Age, Race, and Gender of the Random Sample (N = 472)

Age Group, y	White (N = 181)				Black (N = 119)				Hispanic (N = 167)				Other (N = 5) ^a				Total (N = 472)					
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
0-4	4	3.7	0	0.0	2	3.1	4	7.4	7	8.2	6	7.3	0	0.0	0	0.0	13	5.0	10	4.7	23	4.9
5-9	21	19.6	19	25.7	16	24.6	9	18.5	20	23.5	18	22.0	0	0.0	0	0.0	57	21.9	47	22.2	104	22.0
10-14	39	36.4	24	33.0	33	50.8	26	48.1	34	40.0	24	29.3	3	100.0	1	50.0	109	41.9	75	35.4	184	39.0
15-19	43	40.2	31	41.0	14	21.5	14	25.9	24	28.2	34	41.5	0	0.0	1	50.0	81	31.2	80	37.7	161	34.1
Total	107	100.0	74	100.0	65	100.0	54	100.0	85	100.0	82	100.0	3	100.0	2	100.0	260	100.0	212	100.0	472	100.0

^a Other race/ethnicity includes Asian (n = 1), American Indian (n = 1), and unknown (n = 3).

of medication treatment among youth in foster care. Relevant findings showed that the foster care psychotropic prevalence for youth peaks at ages 10 to 14 years, is 3.5 to 11.0 times greater than the rate for Medicaid-insured youth who qualify because of low family income, and is higher in white youth than in minority youth.^{4,6}

Large-scale studies of concomitant psychotropic medication treatment of youth are very limited, and most reports of this practice are based on record reviews.⁸ A survey of medication prescribing from numerous private-practicing psychiatrists who volunteered to report on the youth treatment patterns of outpatients under their care revealed that, in 1997-1999, one half were receiving concomitant psychotropic treatment.⁹ This practice seems to be increasing.^{8,10}

Thus, there is a need for a large-scale, systematic analysis of the practice of concomitant medication treatment of youth. Previous Medicaid data analyses have assessed concomitant psychotropic drug use for youth with ≥2 drugs with overlapping prescribing time periods. Martin et al¹¹ used a prescribing time period overlap of 7 days, which underestimates temporal coprescribing. Other Medicaid studies assessed a 1-year period^{7,12} and a 3-month period of multiple medication usage,^{7,13} which overestimate coprescribing. Because Medicaid prescriptions are typically written for a 30-day supply, the 1-month period use herein is viewed as optimal to evaluate concomitant treatment.

Medicaid data on individual youth in foster care from the state of Texas were available on computerized records in 2005. From the fiscal year 2004 data, a random sample of 472 youth aged 0 to 19 years was obtained. This information was analyzed with respect to concomitant use. The month of July 2004 was selected to assess the coprescribing. The usage patterns were analyzed for monotherapy and concomitant use according to medication class, subclass and drug entity (all product forms of a drug), diagnosis, age group, gender, race or ethnicity, and prescriber specialty.

METHODS

Among 32 135 Texas foster care 0- to 19-year-old Medicaid enrollees in the study year (September 2003 to August 2004), 12 189 had a dispensed psychotropic medication, resulting in an annual prevalence of 37.9%. Assessing concomitant use required manual assessment of patient-level computerized claims data occurring in 1 month. Conse-

quently, to create a reasonably sized sample, 500 subjects were randomly selected from among those with any psychotropic medication during the month of July 2004, which was representative of monthly use across the study year. Of these, 472 had usable data representing 7.3% of the 6459 medicated youth. This sample did not include mentally retarded and medically fragile youth who are distinct from the general foster care population. The anonymized administrative claims data from this treatment population were assessed by clinician-reported *International Classification of Diseases, Ninth Revision*, psychiatric diagnoses; age group (0-4, 5-9, 10-14, and 15-19 years); gender; race or ethnicity (white, black, Hispanic, and other race or ethnicity); and prescriber specialty (psychiatry versus primary care). The age groupings were selected following the US census groupings for children and have been used in previous pediatric studies.⁶ *International Classification of Diseases, Ninth Revision*, codes were grouped into 15 psychiatric diagnostic categories. Eight psychotropic medication groupings included drugs for attention-deficit/hyperactivity disorder (ADHD [stimulants or atomoxetine]), antidepressants (selective serotonin-reuptake inhibitor [SSRI], tricyclic, etc), antipsychotic agents (conventional [eg, haloperidol]; atypical [eg, risperidone]), lithium, α-agonists, anticonvulsant mood stabilizers (ATC-MSs [divalproex, oxcarbazepine, topiramate, and carbamazepine]), antianxiety drugs (hydroxyzine, benzodiazepines, etc), and miscellaneous (desmopressin, antiparkinsonian, etc). Psychotropic medications (dependent variable) were reported by class (eg, antidepressant), subclass (eg, SSRI, tricyclic, and other antidepressants) and specific drug entity (eg, fluoxetine). Concomitant use was further characterized in terms of within-class and among-class combinations. Independent variables included concomitant/monotherapy users (reported by frequency of concomitant classes, subclasses, and types of combinations). Prescriber specialty was assessed in relation to drug class. Age group, gender, and race or ethnicity were treated as covariates. The University of Maryland Institutional Review Board designated the study exempt.

RESULTS

Characteristics of the Treatment Sample

Of the 472 Medicaid-enrolled youth in foster care receiving psychotropic medication in July 2004, there was a predominance of boys (54.7%), relatively few whites (38.6%), and proportionately more 10- to 14-year-olds (39.0%; Table 1).

TABLE 2 Psychotropic Drug Class and Subclass Use in Monotherapy or Concomitant Therapy Dispensed to 472 Youth in Foster Care

Monotherapy or Concomitant Therapy, Class and Subclass	1 (N = 130)		2 (N = 147)		3 (N = 120)		4 (N = 65)		≥5 (N = 10)		Totals (N = 472)
	n	%	n	%	n	%	n	%	n	%	
Alpha agonists ^a	1	1	21	14	25	21	33	51	4	40	84
Antipsychotic agents ^a	18	14	74	50	91	75	58	89	10	100	251
Atypical ^b	17	94	74	100	90	99	58	100	10	100	NA
Conventional ^b	1	6	0	0	1	1	0	0	0	0	NA
Antidepressants ^a	52	40	75	51	86	72	46	71	9	90	268
SSRI ^b	34	65	44	30	50	42	32	49	5	50	NA
TCA ^b	6	12	2	1	5	4	1	2	0	0	NA
Other ^b	22	42	43	29	42	35	20	31	7	70	NA
Antianxiety drugs ^a	8	7	4	4	5	6	3	6	2	9	22
Hydroxyzine ^b	8	100	1	25	1	20	1	33	0	0	NA
Benzodiazepines ^b	0	0	4	100	2	40	1	33	1	50	NA
Other ^b	0	0	0	0	2	40	1	33	1	50	NA
ADHD drugs ^a	45	35	81	55	77	64	52	80	9	90	264
Amphetamines ^b	15	33	37	46	36	47	22	42	4	44	NA
Methylphenidate ^b	20	44	33	41	36	47	23	44	2	22	NA
Other ^b	13	29	12	15	10	13	9	17	3	33	NA
ATC-MSs ^a	5	4	32	22	47	39	38	58	10	100	132
Lithium ^a	0	0	2	1	6	5	3	5	0	0	11
Miscellaneous ^a	1	1	5	3	23	18	27	42	8	80	64
Total ^a	130	100.0	294	100.0	360	100.0	260	100.0	52	100.0	1202

TCA indicates tricyclic antidepressant; NA, not applicable.

^a Data show psychotropic medication users in each drug class by monotherapy or concomitant therapy.

^b Data show the proportional subclass distribution within each class. For example, amphetamines accounted for 33% of ADHD monotherapy-treated youth.

Several additional measures not shown in the table relate to the demographics of psychotropic use. For example, boys and girls each received an average of 1.9 psychiatric diagnoses. Race/ethnicity psychotropic medication disparities were greater for black than for Hispanic youth (white/black ratio, 1.52:1.00 and white/Hispanic ratio, 1.08:1.00). Boys received more different classes of psychotropic medication than girls (2.28 vs 2.06; $P < .04$).

Diagnostic Findings

Of the clinician-reported diagnoses within the sample, ADHD comprised 38.8%, depression 35.5%, adjustment/anxiety 33.7%, oppositional defiant disorder/conduct disorder comprised 20.6%, and 17.2% were identified as bipolar disorder. The diagnoses most prominent in the younger foster care population were ADHD and adjustment disorder. Depression was the most common diagnosis in 15- to 19-year-old youth. A small proportion of the youth had developmental delays ($n = 18$), child abuse ($n = 24$), and miscellaneous conditions ($n = 32$ [6.8%]), for example, substance abuse ($n = 6$) and enuresis ($n = 4$).

Concomitant Users According to Class and Subclass

In July 2004, 130 (27.5%) of the 472 medicated youth received monotherapy, and the rest received concomitant medications. The average number of medications per child was 2.55 (1202 medications for 472 children). The number of concomitant medications varied by drug class. Table 2 records that 195 (41.3%) of the 472 youth received ≥ 3 psychotropic medication classes concomitantly, 75 (15.9%) received ≥ 4 , and 10 (2.1%) received ≥ 5 classes.

Table 2 also presents the degree of monotherapy and

concomitant therapy by drug class and drug subclass. The α -agonists were more often prescribed concomitantly, followed by ATC-MSs and then antipsychotic agents. For youth with dispensings for 2 concomitant drug classes, ADHD medications were the most common class. For those receiving ≥ 5 concomitant classes, antipsychotic medications were the most prescribed. Between these extremes, antidepressants predominated. Concomitant medication therapy also varied by age. The mean number of psychotropic medication classes by age group was as follows: 1.43 (ages 0–4 years), 2.29 (ages 5–9 years), 2.54 (ages 10–14 years), and 2.28 (ages 15–19 years). The rank order of the most common concomitant psychotropic class combinations was as follows: antipsychotics with ADHD medications ($n = 134$), antipsychotics with antidepressants ($n = 132$), antidepressants with ADHD medications ($n = 125$), ATC-MSs with antipsychotic agents ($n = 93$), and ATC-MSs with antidepressants ($N = 77$).

The concomitant use of ≥ 2 drugs within the same class rose with the increasing number of medications dispensed. It increased steadily from 17.0% (25 of 147) in 2 drug combinations, 25.0% (30 of 120) in 3, 23.1% (15 of 65) in 4, and 60.0% (6 of 10) in those with 5 or 6 combinations.

Psychotropic Medication Entities Within and Among Classes

Table 3 presents the psychotropic medications dispensed to youth in foster care in July 2004 by drug entity within subclass and among classes. Less than 1% of the antipsychotic agents were of the conventional type. Even in the 0- to 4-year age group, nearly half (12 of 23) had been dispensed an antipsychotic agent (data not shown). Fifty-one percent of the antidepressants were in the SSRI subclass. As

TABLE 3 Leading Drug Entities Within Subclass and Class for a 1-Month Period in 472 Youth

Class and Subclass	<i>n</i>	Within Class, % ^a	Unduplicated Class, <i>n</i>	Unduplicated % of 472 Youth
ATC-MSs	140		132	28.0
Divalproex	66	47.1		
Oxcarbazepine	49	35.0		
Topiramate	14	10.0		
α-agonists	87		84	17.8
Guanfacine	21	24.1		
Clonidine	66	75.9		
Antianxiety drugs	23		22	4.7
Hydroxyzine	11	47.8		
Benzodiazepines	8	34.8		
Other	2	8.7		
Antidepressants	327		268	56.8
SSRI	167			
Escitalopram	65	38.9		
Sertraline	60	35.9		
Fluoxetine	19	12.0		
TCA	14			
Imipramine	10	71.4		
Other	146			
Trazodone	64	43.8		
Mirtazapine	29	35.6		
Bupropion	30	20.5		
Antipsychotic agents	265		251	53.2
Atypical	263			
Risperidone	99	37.4		
Quetiapine	75	28.3		
Aripiprazole	56	21.1		
Ziprasidone	12	4.5		
Conventional	2			
ADHD drugs	282		264	55.9
Amphetamine	117	41.5		
Methylphenidate	128	45.4		
Atomoxetine	37	13.1		
Lithium	11		11	2.3
Miscellaneous	67		64	13.6
DDAVP	43	64.2		

TCA indicates tricyclic antidepressant; DDAVP, desmopressin acetate.

to the drug entities, it is of note that prescriptions for oxcarbazepine and topiramate nearly equaled the number for divalproex. Also, of the SSRI antidepressants dispensed in July 2004, patent-protected sertraline and escitalopram comprised 74.8% of the total, whereas generic fluoxetine

comprised only 12.0% of the total. Many youth received concomitant drugs within a drug class that is accounted for in column 3 (drugs are listed below the class or subclass), whereas the total use of a class is presented as a percentage of either unduplicated classes (column 4) or unduplicated individuals (column 5). Overall, 56.8% had been dispensed an antidepressant, 55.9% had an ADHD drug, and 53.2% had an antipsychotic agent.

Psychotropic Medications According to Diagnosis

Table 4 presents the psychotropic medication patterns within the 3 leading psychiatric diagnostic groups. The diagnostic group most associated with ≥3 dispensed medication classes was depression followed by ADHD and adjustment/anxiety disorders. Generally, psychotropic treatment by medication class was not specific relative to the diagnosis for youth receiving ≥3 classes concomitantly. The only exception to this lack of specificity was the ADHD drug class that was used to a statistically greater degree in the ADHD diagnostic group ($df = 2, 227; P = .01$). In particular, antipsychotic class prescribing was similar (76%–84%) across all 3 of the leading diagnostic groups ($df = 2, 227; P$ value not significant). The range of medication class frequency by diagnosis was similar although somewhat broader (71%–85%) for antidepressants. Although 83.6% of the youth with an ADHD diagnosis received an ADHD drug, this class represented only 32.6% (153 of 470) of the medication classes dispensed for ADHD.

Psychotropic Medication Classes According to Prescriber Specialty

Psychiatrists prescribed 93% of the psychotropic agents prescribed for the youth in foster care. Proportionally, psychiatrists tended to prescribe more antipsychotic agents and lithium, whereas primary care physicians tended to prescribe a relatively greater proportion of anxiolytics and stimulants.

DISCUSSION

The major findings from this randomly selected 1-month (July) 2004 sample of 472 psychotropic drug-medicated, Medicaid-insured, youth in foster care can be summarized along 3 dimensions. First, concomitant use was highly prevalent, with 41.3% the youth receiving ≥3

TABLE 4 Medication Use in 3 Leading Diagnostic Groups

Class	ADHD (N = 183)				Adjust/Anxiety (N = 159)				Depression (N = 167)			
	1–2 (n = 91)		≥3 (n = 92)		1–2 (n = 93)		≥3 (n = 66)		1–2 (n = 85)		≥3 (n = 82)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Antidepressants	28	30.8	65	70.7	54	58.1	56	84.8	57	67.1	61	74.4
ADHD drugs	73	80.2	80	87.0	38	40.9	48	72.7	26	30.6	56	68.3
α-agonists	15	16.5	36	39.1	6	6.5	23	34.8	3	3.5	24	29.3
Antianxiety	2	2.2	3	3.3	5	5.4	5	7.6	2	2.4	68	7.3
Antipsychotic agents	32	35.2	70	76.1	32	34.4	50	75.8	26	30.6	69	84.1
ATC-MS	3	3.3	33	35.9	14	15.1	28	42.4	17	20.0	43	52.4
Lithium	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	4	4.9
Miscellaneous	1	1.1	28	30.4	1	1.1	16	24.2	3	3.5	22	26.8
Total	155	100.0	315	100.0	150	100.0	226	100.0	134	100.0	347	100.0

psychotropic drugs. Among these combinations, antidepressants (56.8%), ADHD medications (55.9%), and antipsychotic agents (53.2%) were most common. Combinations within the same class increased in frequency as the total concomitant regimen increased from 17% in 2-drug combinations to 60% in ≥ 5 -drug combinations. Second, medicated youth were more likely to be white or Hispanic, male, and 10 to 14 years of age. Third, the concomitant use of 3 or more psychotropic medication classes across diagnostic categories, particularly antidepressants, antipsychotic agents, and ATC-MSs, varied little by diagnosis, suggesting that the use of multiple classes may reflect a symptom-specific¹⁴ rather than a categorical approach. By emphasizing symptoms and their persistence rather than a more comprehensive approach that accounts for severity and functional status, comorbid conditions have tended to increase. Increased comorbid diagnoses can explain the greater use of concomitant psychotropic medication.¹⁴ This is borne out in the current study where there is an overlap of medication classes in youth across major diagnostic groups. Also of note is the prominent use of patent-protected, expensive psychotropic medications, which lack indications for use in most instances in this sample. For example, sertraline and escitalopram comprised 74% of SSRI use in the study month, although neither drug has a labeled indication for the treatment of depression in children and adolescents.

Comparison of Studies of Psychotropic Medication Prevalence for Youth in Foster Care

It is difficult from the available literature to accurately compare the prevalence of psychotropic medications in Medicaid-treated youth in foster care from different jurisdictions (county and state), different years, and using different age groups. However, the psychotropic medication prevalence from 3 county Medicaid foster care studies ranged from 30% to 43%.^{4,5,15} The prevalence from state Medicaid foster care findings ranged from 25.8% in year 2000 in a mid-Atlantic state⁶ to 34.7% in year 2005 among 0- to 17-year-olds¹ and 37.9% in the annual data (0–19 years; from September 2003 to August 2004) used to select a 1-month random sample of <20-year-olds for the present study. Compared with nonfoster care Medicaid enrollees, psychotropic drug treatment in the foster care population now equals or exceeds that of eligible youth in the SSI group¹⁶ and is 3.5- to fourfold more prevalent than in Medicaid-insured youth eligible by low family income.⁶

ADHD Treatment

In the present 1-month July analysis of Texas youth in foster care, stimulants represented a small portion of psychotropic drug burden in youth with a diagnosis of ADHD. In relation to the total psychotropic medications prescribed, the stimulant drug proportional use was 20.4% (245 of 1202). In 2 other studies by comparison, the proportion of stimulants within the total psychotropic medication burden was 32.6%⁴ and 33.4%.⁵

Antipsychotic Medication Treatment

Antipsychotic medication as a percentage of total psychotropic medication dispensed to Texas Medicaid-insured foster children was 22.0% (265 of 1202; Table 3). In 2 available comparison studies, the antipsychotic proportion of total psychotropic use was 4.5%² and 10.3%.⁴ This in part reflects the prominent increase in antipsychotic medication given to youth in Texas¹⁷ and elsewhere¹⁸ since the late 1990s. It should also be noted that the use of antipsychotic medication did not vary much across the 3 major diagnostic groups (19.8%, 21.8%, and 21.7% for depression, adjustment/anxiety, and ADHD, respectively). These diagnostic groups are subsets with different denominators than that of the total antipsychotic users ($251/147 = 53.2\%$).

Concomitant Psychotropic Medication Treatment

The use of concomitant psychotropic medication treatment for youth in foster care in this data set is sizably higher than that reported in other studies. In July 2004, 72.5% of psychotropic agent-medicated youth in foster care received ≥ 2 different classes of psychotropic medication, and 41.3% received ≥ 3 classes. By comparison, dosReis et al⁴ reported that 46% of their medicated sample ($n = 310$) had been administered ≥ 2 psychotropic medications in 1996. Likewise, in the dosReis et al¹⁹ study of Medicaid-enrolled youth in foster care diagnosed with ADHD, only 26.9% received ≥ 3 psychotropic medications. Ferguson et al,⁵ using year 2000 Medicaid data, reported that 52.7% of the medicated youth in foster care from 1 county were prescribed ≥ 2 psychotropic medications and that 8.8% received ≥ 4 during the 1-year period, half of the rate reported in this study (15.9%). Although the rate of psychotropic treatment for youth has increased during the last decade, the present data suggest that, in this state, youth in foster care have been prescribed psychotropic medications to a greater extent than elsewhere. This latter possibility is supported by a 3-state Medicaid comparison of psychotropic treatment of youth showing that this southwestern state had the highest prevalence.²⁰

Use of ≥ 2 Drugs Within Class Concomitantly

The use of ≥ 2 drugs within the same class of psychotropic medication concomitantly has increased of late partly in an effort to improve treatment response.⁸ In the present analysis, the occurrence of this pattern ranged from 17% for those receiving 2 psychotropic drug combinations to 60% receiving ≥ 5 concomitant psychotropic drug classes. Stahl²¹ emphasizes that when 2 antipsychotic agents are prescribed concomitantly, there are concerns about the increased risk of adverse events and the lack of an evidence base, as well as substantially increased expenditures. Unnecessary expenditures in the public sector are particularly critical in this era of diminished funding for state programs.²²

Off-label Psychotropic Medications for Youth

All of the atypical antipsychotic medications were off-label (without Food and Drug Administration–approved

labeling for an indication, a dose, or an age group) for youth in 2004, and all of the anticonvulsant drugs were off-label for psychiatric indications in youth.²³ Furthermore, only fluoxetine has Food and Drug Administration–approved labeling for the treatment of depression in youth, although its use in Texas foster children was infrequent in 2004. Although it is true that most drugs in pediatrics are off-label, it is still noteworthy that the ADHD medications with labeled indications for youth, such as stimulants, were used sparingly.

Limitations

Several limitations should be considered in assessing these data. The extent to which these patterns generalize to other state Medicaid foster care medication patterns is not possible to deduce precisely. Medicaid Analytic Extract data files are available from the Centers for Medicare and Medicaid and would allow cross-state comparisons. Consequently, additional national data reflecting youth in foster care should be analyzed. Second, data on dispensed prescriptions do not reflect the extent of consumption. However, the patterns described largely represent chronic therapy, and such continuing treatment generally reflects adherence with drug therapy.

Assessing Quality Improvement Programs

The major concern with among- and within-class concomitant use of psychotropic medications is the increased risk of adverse drug events, including drug interactions.^{24,25} Related concerns are escalating costs, therapeutic duplication, and confusion concerning which drug accounted for what treatment goal.²⁶

Guidelines listing inappropriate patterns of psychotropic medications prescribed for youth are few. The Texas Department of State Health Services panel,²⁷ composed of 6 child and adolescent psychiatrists, a research pharmacist, a child psychologist, a physician mental health administrator, and an adult psychiatrist, recently wrote practice guidelines for youth in foster care. They concluded that a department review should be required if antipsychotic agents and antidepressants were prescribed for youth under age 4 years, stimulants under age 3 years, if ≥ 2 drugs from the same class were prescribed concomitantly, and if ≥ 5 different classes of psychotropic medication were prescribed concomitantly.

More broadly, statewide Medicaid prescription class data can be useful to identify outliers, thereby suggesting the need for a psychotropic use review. Automated preset clinical guidelines have been used for several decades with the aim of monitoring drug use to assess and improve “quality.”²⁸ Sometimes the emphasis has been on cost containment, which occasionally results in negative consequences.²⁹ More recently, pharmaceutical industry-funded programs, such as Comprehensive Neuroscience, Inc.³⁰ have established consensus guidelines that recommend a review if ≥ 3 concomitant drugs are prescribed for psychiatric use in children. A Massachusetts-initiated multidisciplinary expert panel flags the use of ≥ 5 concomitant psychotropic agents in adults.³¹ The Arizona Department of Health Services³² clinical

practice protocol for psychotropic medication use in children, adolescents, and young adults requires justification if >2 within-class medications are prescribed and if >3 from different classes are prescribed concomitantly.

A “5-or-more” concomitant rule for adults is used frequently to monitor quality, although it is not evidence based. From a safety standpoint, taking ≥ 5 medications concomitantly has been commonly defined in the literature as polypharmacy. This level of use is generally perceived as a cause for concern, although the precise number of comedications to merit this label is not based on scientific findings.³³ When 5 drug combinations in adults or 3 drug combinations in youth are being monitored with Comprehensive Neuroscience, Inc. criteria, the patient record is flagged, and the prescribing physician is notified by mail. Numerous state Medicaid programs have adopted the Comprehensive Neuroscience, Inc. criteria,³⁰ although each state’s program administrators are free to tailor the criteria as they see fit. We were unable to locate studies verifying the outcomes or benefit-risk assessment for 3, 4, or 5 drug psychotropic regimens in a youth population. Although 3 is more reasonable than 5, determining the origin and validity of such rules for concomitant psychotropic use should go beyond expert opinion to evaluate outcomes in large cohorts of youth with well-defined conditions. Population-based clinical monitoring of concomitant regimens may be considered a nuisance by practitioners and needs to be refined so that individual case assessments of appropriateness and value will promote positive outcomes. However, the risks are substantial, because concomitant drug treatments are increasing in the absence of an evidence base.

CONCLUSIONS

Studies reveal that youth in foster care, as a group, have substantially more psychiatric disorders than their peers and that most disorders are behavioral in type.^{34,35} However, it is unclear whether the dispensing of ≥ 3 different psychotropic medication classes concomitantly to children in foster care represents a treatment advantage. Consequently, benefit/risk research assessments seem to be important for informing practitioners about the best treatment practices.

ACKNOWLEDGMENT

Support for this study was provided by the Office of the Comptroller of the State of Texas.

REFERENCES

1. Texas Health and Human Services Commission. 2006. Use of psychoactive medication in Texas foster children, state fiscal year 2005. Available at: www.hhs.state.tx.us/news/release/Analysis_062306.pdf. Accessed November 8, 2007
2. Zima BT, Bussing R, Crecelius GM, Kaufman A, Belin TR. Psychotropic medication treatment patterns among school-aged children in foster care. *J Child Adolesc Psychopharmacol*. 1999;9:135–147
3. McMillen JC, Scott LD, Zima BT, Ollie MT, Munson MR, Spitznagel E. Use of mental health services among older youths in foster care. *Psychiatr Serv*. 2004;55:811–817

4. dosReis S, Zito JM, Safer DJ, Soeken K. Mental health services for youths in foster care and disabled youths. *Am J Public Health.* 2001;91:1094–1099
5. Ferguson DG, Glesener DC, Raschick M. Psychotropic drug use with European American and American Indian children in foster care. *J Child Adolesc Psychopharmacol.* 2006;16:474–481
6. Zito JM, Safer DJ, Zuckerman IH, Gardner JF, Soeken K. Effect of Medicaid eligibility category on racial disparities in the use of psychotropic medications among youths. *Psychiatr Serv.* 2005;56:157–163
7. dosReis S, Zito JM, Safer DJ, Gardner JF, Puccia KB, Owens PL. Multiple psychotropic medication use for youths: a two-state comparison. *J Child Adolesc Psychopharmacol.* 2005;15:68–77
8. Safer DJ, Zito JM, dosReis SM. Concomitant psychotropic medication for youths. *Am J Psychiatry.* 2003;160:438–449
9. Duffy FF, Narrow WE, Rae DS, et al. Concomitant pharmacotherapy among youths treated in routine psychiatric practice. *J Child Adolesc Psychopharmacol.* 2005;15:12–25
10. Bhatara VS, Feil M, Hoagwood K, Vitiello B, Zima BT. Trends in combined pharmacotherapy with stimulants for children. *Psychiatr Serv.* 2002;53:244
11. Martin A, VanHoof T, Stubbe D, Sherwin T, Scahill L. Multiple psychotropic pharmacotherapy among child and adolescent enrollees in Connecticut Medicaid managed care. *Psychiatr Serv.* 2003;54:72–77
12. Martin A, Sherwin T, Stubbe D, Van Hoof T, Scahill L, Leslie D. Datapoints: use of multiple psychotropic drugs by Medicaid-insured and privately insured children. *Psychiatr Serv.* 2002;53:1508
13. Martin A, VanHoof T, Stubbe D. Multiple psychotropic pharmacotherapy: a study of Connecticut Medicaid recipients. Poster presented at: the 48th annual meeting of American Academy of Child and Adolescent Psychiatry; October 25, 2001; Honolulu, HI
14. Preskorn SH, Baker B. The overlap of DSM-IV syndromes: potential implications for the practice of polypsychopharmacology, psychiatric drug development, and the human genome project. *J Psychiatr Practice.* 2002;8:170–177
15. Hagen SR, Orbeck LA. The prescription of psychotropic medications in foster care children: a descriptive study in St. Louis County. 2006. Available at: www.d.umn.edu/sw/executive/hstacy.html. Accessed November 8, 2007
16. Harman JS, Childs GE, Kelleher KJ. Mental health care utilization and expenditures by children in foster care. *Arch Pediatr Adolesc Med.* 2000;154:1114–1117
17. Patel NC, Sanchez RJ, Johnsrud MT, Crismon ML. Trends in antipsychotic use in a Texas Medicaid population of children and adolescents: 1996 to 2000. *J Child Adolesc Psychopharmacol.* 2002;12:221–229
18. Cooper WO, Hickson GB, Fuchs C, Arbogast PG, Ray WA. New users of antipsychotic medications among children enrolled in TennCare. *Arch Pediatr Adolesc Med.* 2004;158:753–759
19. dosReis S, Owens PL, Puccia KB, Leaf PJ. Multimodal treatment for ADHD among youths in three Medicaid subgroups: disabled, foster care, and low income. *Psychiatr Serv.* 2004;55:1041–1048
20. Patel NC, Crismon ML, Hoagwood K, et al. Trends in the use of typical and atypical antipsychotics in children and adolescents. *Am Acad Child Adolesc Psychiatry.* 2005;44:548–556
21. Stahl SM. Focus on antipsychotic polypharmacy: evidence-based prescribing or prescribing-based evidence? *Int J Neuropsychopharmacol.* 2004;7:113–116
22. Bailit M, Burgess L, Roddy T. State budget cuts and Medicaid managed care: case studies of 4 states. 2004. Available at: www.nashp.org/files/MMC63_budget_cuts_in_four_states.pdf. Accessed November 8, 2007
23. American Hospital Formulary Service. *AHFS Drug Information.* 2006 ed. Bethesda, MD: American Society Health-Systems Pharmacists; 2006
24. Turner S, Nunn AJ, Fielding K, Choonara I. Adverse drug reactions to unlicensed and off-label drugs on paediatric wards: a prospective study. *Acta Paediatr.* 1999;88:965–968
25. Martinez-Mir I, Garcia-Lopez M, Palop V, Ferrer JM, Rubio E, Morales-Olivas FJ. A prospective study of adverse drug reactions in hospitalized children. *Br J Clin Pharmacol.* 1999;47:681–688
26. Gorard DA. Escalating polypharmacy. *Q J Med.* 2006;99:797–800
27. Texas Department of State Health Services. Psychotropic medication utilization parameters for foster children. 2005. Available at: www.dshs.state.tx.us/mhprograms/psychotropic/medicationutilizationparametersfosterchildren.pdf. Accessed November 8, 2007.
28. Lee D, Bergman U. Studies of drug utilization. In: Strom BL, ed. *Pharmacoepidemiology.* 4th ed. West Sussex, United Kingdom: John Wiley & Sons, Ltd; 2005:402–403
29. Soumerai SB, Ross-Degnan D, Avorn J, McLaughlin TJ, Choodnovskiy I. Effects of Medicaid drug-payment limits on admission to hospitals and nursing homes. *N Engl J Med.* 1991;325:1072–1077
30. Parks J, Surlis R. Using best practices to manage psychiatric medications under Medicaid. *Psychiatr Serv.* 2004;55:1227–1229
31. Ning A, Dubin WR, Parks JJ. Pharmacy costs: finding a role for quality. *Psychiatr Serv.* 2005;56:909–911
32. Arizona Department of Health Services DoBHS. Psychotropic medication use in children, adolescents, and young adults. 2006. Available at: www.azdhs.gov/bhs/guidance/psychotropic.pdf. Accessed November 8, 2007.
33. Viktil KK, Blix HS, Moger TA, Reikvam A. Polypharmacy as commonly defined is an indicator of limited value in the assessment of drug-related problems. *Br J Clin Pharmacol.* 2007;63:187–195
34. Horwitz SM, Owens P, Simms MD. Specialized assessments for children in foster care. *Pediatrics.* 2000;106:59–66
35. Simms MD, Dubowitz H, Szilagyi MA. Health care needs of children in the foster care system. *Pediatrics.* 2000;106:909–918

Psychotropic Medication Patterns Among Youth in Foster Care

Julie M. Zito, Daniel J. Safer, Devadatta Sai, James F. Gardner, Diane Thomas,
Phyllis Coombes, Melissa Dubowski and Maria Mendez-Lewis

Pediatrics 2008;121:e157-e163

DOI: 10.1542/peds.2007-0212

Updated Information & Services	including high-resolution figures, can be found at: http://www.pediatrics.org/cgi/content/full/121/1/e157
References	This article cites 27 articles, 15 of which you can access for free at: http://www.pediatrics.org/cgi/content/full/121/1/e157#BIBL
Citations	This article has been cited by 6 HighWire-hosted articles: http://www.pediatrics.org/cgi/content/full/121/1/e157#otherarticles
Post-Publication Peer Reviews (P³Rs)	One P ³ R has been posted to this article: http://www.pediatrics.org/cgi/eletters/121/1/e157
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Therapeutics & Toxicology http://www.pediatrics.org/cgi/collection/therapeutics_and_toxicology
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.pediatrics.org/misc/Permissions.shtml
Reprints	Information about ordering reprints can be found online: http://www.pediatrics.org/misc/reprints.shtml

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

