



Commonwealth of Kentucky
Department for Medicaid Services
Division of Medical Management

**Primary Care Provider (PCP) Management of
Attention Deficit Hyperactivity Disorder (ADHD)
Among Children and Adolescents Ages 4-18 Years,
Passport Health Plan Medicaid Managed Care,
Medical Record Review**

June 2012

TABLE OF CONTENTS

INTRODUCTION	1
Background.....	1
Objectives.....	2
METHODOLOGY	3
Eligible Population.....	3
Sampling.....	3
Data Collection.....	4
Disposition of Records.....	4
RESULTS	5
Demographics and ADHD History.....	5
Diagnosis and Evaluation for ADHD	6
Diagnostic Criteria	6
Evaluation	9
Co-Occurring Conditions.....	10
Treatment and Management of ADHD.....	12
Plan of Care	12
Provider Managing Care.....	12
Missed Appointments	12
Medication Prescription.....	12
Referral and Coordination of Care.....	14
Medication Management	15
Medications Prescribed.....	15
Follow-up and Assessment.....	16
Non-Pharmacologic Management.....	19
Treatment Type.....	21
Patient Education	21
GROUP COMPARISONS	23
Use of Diagnostic Criteria in Members With vs. Without an ADHD History.....	23
Medication Management in Members Newly vs. Previously Prescribed Medication	26
Medication Management in Members Prescribed Medication by PCP vs. Other Provider (Including UTD Provider)	28
Behavioral Health, ADHD History and Treatment Type by Age Group.....	29
Plan of Care and Treatment for Members With vs. Without Co-occurring Mental / Behavioral Health Disorders.....	30
DISCUSSION	31

LIST OF TABLES

Table 1. Overall Disposition of Records.....	4
Table 2. Demographic Characteristics and ADHD History	5
Table 3. Diagnostic Criteria	7
Table 4. Evaluation.....	9
Table 5. Comorbid Conditions	11
Table 6. Plan of Care and Treatment.....	13
Table 7. Referral and Coordination of Care	15
Table 8. Medication Management.....	17
Table 9. Non-Pharmacologic Management.....	20
Table 10. Treatment Type (n = 199)	21
Table 11. Member and Family Education	22
Table 12. Use of Diagnostic Criteria in Members With vs. Without an ADHD History.....	24
Table 13. Medication Management in Members Newly vs. Previously Prescribed Medication	26
Table 14. Medication Management in Members Prescribed Medication by PCP vs. Other Provider (Including UTD Provider)	28
Table 15. Behavioral Health, ADHD History and Treatment Type by Age Group	29
Table 16. Plan of Care and Treatment for Members With vs. Without Co-occurring Mental / Behavioral Disorders	30

INTRODUCTION

Background

In support of the Kentucky Department for Medicaid Services (KDMS) efforts to improve the quality of care for Medicaid Managed Care enrollees, Island Peer Review Organization (IPRO), the External Quality Review Organization (EQRO) for the Commonwealth of Kentucky, conducted a focus study to assess the management of Attention Deficit Hyperactivity Disorder (ADHD) by primary care providers (PCPs). The purpose of the study was to determine provider compliance with nationally-accepted clinical practice guidelines for the diagnosis, evaluation and treatment of ADHD. KDMS, Passport Health Plan (PHP) and IPRO collaborated to conduct this retrospective medical record review of PHP Medicaid members receiving care for ADHD.

Attention-Deficit/Hyperactivity Disorder is one of the most common neurobehavioral disorders of childhood, and it can persist through adolescence and into adulthood. Diagnosis and evaluation of ADHD involves multiple components, including symptom reports from parents, teachers and sometimes the child, and evaluation for comorbidity.¹

Symptoms associated with ADHD are clinically significant when they cause functional impairment in areas such as academic and social functioning at school and family and peer relationships at home.² The percentage of children who have been diagnosed with ADHD has been increasing, with parents reporting rates of 9% for children ages 5 -17 years in the National Health Interview Survey for 2007-2009.³ Rates of diagnoses of ADHD have been reported to be even higher for children whose families live in poverty. The use of the stimulant methylphenidate has also markedly increased in the U.S., and it is among the top ten most-prescribed drugs for PHP members according to PHP's quarterly statutory reports.⁴

There have recently been reports of increasing numbers of preschool-aged children who are identified with ADHD and who are being treated with ADHD medications.⁵ Assessing and managing ADHD is particularly challenging in preschool-aged children. While symptoms of ADHD frequently present at an early age, preschoolers often have co-occurring conditions such as oppositional behavior that can obscure the diagnosis. In addition, behavioral therapy rather than pharmacotherapy is considered first line treatment for children with ADHD in this age group.⁶ Diagnostic and treatment challenges in younger children have contributed to controversy regarding accurate diagnosis of ADHD and use of stimulants.⁷ The management of adolescents with ADHD also presents significant challenges, including the need for attention to high rates of comorbid substance use and driving risk.⁸

In October 2011, the American Academy of Pediatrics (AAP) published updated guidelines for the evaluation and management of ADHD, with an expanded age range that includes preschool-aged children and adolescents. The AAP indicated that the updated guidelines incorporate new information and evidence for diagnosis and treatment, as well as the results of surveys of clinicians conducted before and after the previous guidelines were published that identified the particular challenges that pediatricians face in the management of ADHD. The AAP guidelines are particularly relevant because most ADHD patients in the U.S. are cared for by pediatricians and family practitioners, while child psychiatrists, neurologists, and behavioral pediatricians tend to see refractory patients and those with psychiatric comorbidity.⁹

This study included a random sample of medical records to assess the quality of care provided to children with ADHD aged 4 - 18 years in the Medicaid managed care setting relative to the recommended guidelines. The study complements a concurrent analysis of administrative data

(Fee for Service and Passport Health Plan) which described the population of children ages 4 through 18 enrolled in PHP and diagnosed with ADHD. In that study, analysis of encounter data characterized utilization patterns, comorbidity, medication prescribed, behavioral therapy provided and type of practitioner providing care. This medical record review study allowed for a more in-depth exploration of ADHD diagnostic and treatment practices among PCPs providing care to KY Medicaid managed care-enrolled children.

Objectives

The aim of this medical record review study is to provide actionable information regarding quality of ADHD care that will lead to effective, targeted quality improvement interventions.

The specific objectives of the study include, but are not limited to:

- Assess the quality of care for ADHD provided by PCPs to PHP members aged 4 - 18 years in the following domains:

Evaluation

- Diagnostic criteria
- Sources of information (e.g., parent, school)
- Use of validated assessment tools
- Comprehensive assessment
- Assessment of comorbidity

Management

- Pharmacologic management and follow-up
- Behavioral/Non-pharmacologic management and follow-up
- Care planning
- Monitoring
- Member and family education
- Referrals

Care coordination

- Coordination with behavioral health provider
- Coordination with schools

- Assess the quality of care provided to specific age groups as defined in AAP guidelines: preschool-age, school age, and adolescent
- Identify specific areas within the above domains to target for improvement

METHODOLOGY

Eligible Population

The study intent was to target PHP members who were newly-diagnosed with ADHD. After pilot testing submitted charts, it was found that some children were previously diagnosed with ADHD (prior to the index year) and may have been on medication immediately prior to the review period. Two questions were added to the tool in order to identify these children. Analysis was stratified by items that pertain to newly diagnosed children and items that pertain to previously diagnosed children. Other items were analyzed in aggregate.

The eligible population was identified using modified HEDIS® criteria, with an expanded age range to accommodate populations of interest identified in the updated AAP guidelines, and inclusion of members based on having had visits for ADHD, and/or prescription of ADHD-related medications. Members were eligible for this study if during the index year – January 1, 2010 through December 31, 2010 – they were:

- (1) Age 4 - 18 years
- (2) Had at least one visit with a PCP
- (3) Filled an ADHD-related prescription and/or had at least two outpatient visits with a diagnosis of ADHD
- (4) Had no ADHD medications dispensed for either new or refill prescriptions for a period of 120 days (4 months) prior to the earliest prescription dispensing date for an ADHD medication during the index year (the Index Prescription Start Date or IPSD)
- (5) If eligible due to two outpatient visits rather than ADHD medication dispensed, had a negative outpatient visit history for a period of 120 days (4 months) prior to the first ADHD visit
- (6) Were continuously enrolled for 120 days prior to the IPSD or first ADHD visit through 270 days after the IPSD or first ADHD visit

IPRO utilized pharmacy and encounter data from the IPRO data warehouse as provided by KDMS. Fee for Service (FFS) Behavioral Health Claims data for PHP members was provided by KDMS in the form of a txt file. Both of these sources were used to identify members who filled a prescription for stimulants or non-stimulant psychotropic medications and/or had outpatient visits for ADHD plus a PCP visit during the measurement year.

Sampling

A stratified random sample of managed care members meeting the inclusion criteria were selected for the study. A total of 45 records for preschool-aged children (ages 4-5) and 180 records for children ages 6-18 were selected, representing a target of 200 records plus oversample to account for exclusions. A target of 200 records was chosen to allow for a 95% confidence interval with a maximal margin of error of 7%.

The sample was stratified by pre-school (ages 4-5) and older children (ages 6-18) to allow for a focused evaluation of preschool-aged children, who represent a high risk group due to reported

difficulty in diagnosis and management. This sampling strategy yielded 214 members that were eligible on the basis of an ADHD medication dispensing event, and 11 members were eligible based on 2 ADHD visits without an ADHD medication dispersing event.

Data Collection

Records were abstracted by IPRO nurse reviewers using an electronic tool that included all study indicators. Inter-rater reliability testing was performed during abstractor training and internal quality control (IQC) monitoring occurred throughout the data collection to ensure consistency of the reviews.

The Medical Record Review Period varied by member. The Review Period started four (4) months prior to the member's IPSD or first outpatient visit for ADHD and concluded nine (9) months after the IPSD or first outpatient visit for ADHD. This review period was selected to allow for initial diagnostics prior to medication to be evaluated, as well as follow-up management subsequent to treatment. PHP was asked to provide medical records from the PCP associated with each member's PCP visit during the index year, and to provide records from September 2009 through September 2011.

Disposition of Records

Two hundred and twenty-five records were requested from providers by PHP, and 216 records were received and forwarded to IPRO. All 216 records were reviewed, but 17 were found to have no medical record entries during the member's review period; therefore, these records were excluded from analysis. All analysis was performed on the remaining 199 records unless otherwise noted. The disposition progression is shown in **Table 1**.

Table 1. Overall Disposition of Records

Category	N	%
Total Members Selected	225	
Total Records Received	216	
Total Records Reviewed	216	100
Exclusions	17	8
Final Study Sample*	199	92

* Total with medical record entries during the Review Period. The remaining analyses will be based on these members, unless otherwise noted.

RESULTS

This study on ADHD quality of care focuses on three domains of care – evaluation, management, and coordination of care. Study indicators were categorized based on these domains of care. As a result, the report sections each address a domain of care, in addition to the following section characterizing the demographics of the study population and history of ADHD.

Demographics and ADHD History

Demographic characteristics and member history of ADHD are presented in **Table 2**.

Because the PHP dataset had been selectively sampled to ensure inclusion of preschool and adolescent-aged children, 21.6% of the study sample included children age 4 – 5 years, 42.2% age 6 – 11 years, and 36.2% age 12 – 18 years. The racial distribution was 63.1% white and 35.8% black, comparable to the general PHP membership as reported for HEDIS 2011 (67.85% white and 32.15% black). Male children accounted for 69.8% of the sample, and residence was primarily urban (57.3%)

Of the 199 members included in the study, almost half had been diagnosed with ADHD prior to the review period (99 children, 49.7% of sample). One third of the children (62, 31.2%) were already on medication for ADHD at the beginning of the review period.

Table 2. Demographic Characteristics and ADHD History

Survey Item		N	%
	Age (n=199)		
	4 - 5	43	21.6
	6 - 11	84	42.2
	12 - 18	72	36.2
	Race (n=176)		
	White	111	63.1
	Black	63	35.8
	Other	2	1.1
	Gender (n=199)		
	Male	139	69.8
	Female	60	30.2
	County (n=199)		
	Jefferson – Urban	114	57.3
	Other - Rural	85	42.7
2a	Member diagnosed with ADHD prior to review period (n=199)		
	Yes	99	49.7
	No	100	50.3
2b	Member on ADHD Medication prior to review period (n=199)		
	Yes	62	31.2
	No	137	68.8

Diagnosis and Evaluation for ADHD

Diagnostic Criteria

The individual components upon which a diagnosis of ADHD is based are presented in **Table 3**. Twenty six members did not have a PCP diagnosis of ADHD in the medical record during the review period, although 5 had a diagnosis of “rule out ADHD”.

One hundred and fourteen children (57.3%) had documentation of at least one symptom based on DSM IV (Diagnostic and Statistical Manual of Mental Disorders) criteria. Predominant symptoms included difficulty sustaining attention (73.7% of 114) and perpetually being “on the go” (58.8%). In 38 cases (19.1%), ADHD Type was documented. Of those, the most common diagnoses were Combined Type – Inattentive / Hyperactivity-impulsivity (47.4%).

Only 39 records (19.6%) documented age of onset, with 35 of these children (89.7%) exhibiting symptoms before 7 years of age. Twenty records noted duration of symptoms / impairment, with no member experiencing symptoms for less than 6 months.

Impairment in a major life setting was documented for 139 children (69.8%), most notably in school (89.9% of the 139) and at home (53.2%). Similarly, 138 records noted significant impairment in a major functional area (69.3%), again in academic performance (90.6%) and family relations (47.1%).

The DSM IV Criteria for ADHD diagnosis stipulates all the following must be present: 6 symptoms in the inattention domain OR 6 symptoms across the hyperactivity – impulsivity domains AND symptoms in 2 or more settings AND significant impairment in at least 1 major functional area. Symptoms must have occurred before age 7 and persisted for more than 6 months.

Symptom criteria were met by only 21.1%, life setting criteria by 35.2%, and functional area criteria by 69.3% of this sample (data not shown). As noted few records noted age at onset or duration of symptoms. Analysis showed 16.1% (32 children) met the combination of only the first 3 criteria needed to make a definitive diagnosis (data not shown).

Table 3. Diagnostic Criteria

Survey Item		N	%
1	Provider documented a diagnosis of ADHD in medical record during review period (n=199)		
	Yes	173	86.9
	No	26	13.1
1b ◆	Provider documented a diagnosis of “rule out ADHD” (n=26)		
	Yes	5	19.2
	No	21	80.8
3 @ ◆	Documentation that the member exhibits symptoms based on DSM IV criteria (n=199)		
	Yes	114	57.3
	No	85	42.7
	Symptoms (n=114)		
	Inattentive Dimension		
	m Lacks attention to details; makes careless mistakes	41	36.0
	m Difficulty sustaining attention	84	73.7
	m Does not seem to listen when spoken to directly	45	39.5
	m Does not follow through on instructions	53	46.5
	m Fails to finish schoolwork or chores	51	44.7
	m Difficulty organizing tasks and activities	42	36.8
	m Avoids engaging in tasks requiring sustained mental effort	39	34.2
	m Loses things necessary for tasks or activities	37	32.5
	m Easily distracted by extraneous stimuli	54	47.4
	m Forgetful in daily activities	40	35.1
	Hyperactive Domain		
	m Fidgets with hands or feet; squirms in seat	51	44.7
	m Leaves seat in situations where remaining seated is expected	47	41.2
	m Runs about or climbs excessively where inappropriate	37	32.5
	m Difficulty playing or engaging in leisure activities quietly	37	32.5
	m “On the go” or acts as if “driven by a motor”	67	58.8
	m Talks Excessively	53	46.5
	Impulsive Domain		
m Blurts out answers	40	35.1	
m Difficulty awaiting turn	41	36.0	
m Interrupts or intrudes on others	47	41.2	
4 ◆	Age at onset of symptoms documented (n=199)		
	Yes	39	19.6
	No	160	80.4
	Age Onset (n=39)		
	Prior to age 7	35	89.7
	At or after age 7 but prior to age 12	4	10.3
At or after age 12	0	0.0	

Table 3. Diagnostic Criteria

Survey Item		N	%
5 @ ◆	Impairment in following major life settings documented (n=199)		
	Yes	139	69.8
	No	60	30.2
	Impairment documented (n=139)		
	Home	74	53.2
	Daycare/Pre-School	7	5.0
	School	125	89.9
	Social	16	11.5
	Occupational	0	0.0
Other	1	0.7	
6 @ ◆	Clinically significant impairment in at least 1 major functional area (n=199)		
	Yes	138	69.3
	No	61	30.7
	Major Functional area (n=138)		
	Family Relations/Function	65	47.1
	Academic Performance/Function	125	90.6
	Peer Relations/Social Function	36	26.1
	Occupational Function	0	0.0
Adaptive Skills	26	18.8	
7 ◆	Duration of impairment/symptoms documented (n=199)		
	Yes	20	10.1
	No	179	89.9
	Duration (n=20)		
	< 6 months	0	0.0
	>= 6 months but < 9 months	3	15.0
>= 9 months	17	85.0	
8 ◆	Provider documented the ADHD TYPE in medical record (n=199)		
	Yes	38	19.1
	No	161	80.9
	Type (n=38)		
	Predominately Inattentive Type	11	28.9
	Predominately Hyperactive Type	9	23.7
	Combined Type (Inattentive Hyperactivity-Impulsivity)	18	47.4
	ADHD NOS (Not Otherwise Specified)	0	0.0
N/A–Not applicable–there is no diagnosis of ADHD (n=199)	23	11.6	

@Multiple responses

◆ Items based on skip pattern

Evaluation

The use of outside sources of information, standardized assessment tools, patient history and the physical exam are displayed in **Table 4**.

Corroborating information was sought primarily from three sources: parents (75.4% of cases), teachers (27.1%) and mental health providers (11.6%). Information was reliably obtained from parents (99.3% of 150 queried) and teachers (88.9% of 54) and slightly less so from mental health providers (73.9% or 17 of 23 contacted).

A standardized, validated assessment tool was used to evaluate 29.6% of members. By far, the most frequently used tool was the Vanderbilt Rating Scale (81.4%). The Conners Parent and Teacher Rating Scales were reported to have been used only twice, and the SNAP-IV-C / SNAP-IV-R (Swanson, Nolan and Pelham, Revised) Rating Scales not at all.

History-taking was a fairly consistent component of evaluation, with 86.9% of records showing documentation of a history. Of the 173 medical records containing a history, 97.1% included a medical history, 82.7% a psychosocial history, and 60.1% a family history.

Likewise, 89.4% of children had a physical exam within the first two visits for ADHD. Of the 178 children with a documented exam, an assessment of height, weight, blood pressure, pulse, cardiovascular and neurologic systems occurred routinely (more than 70% to 90% of the time), while hearing / vision tests and direct observation of behavior were noted in approximately 40% of the exams.

Table 4. Evaluation

Survey Item		N	%
9 ♦	Attempted to Obtain Information (n=199)		
	Parent(s)	150	75.4
	Teacher / School/Special Ed	54	27.1
	Pre-School	3	1.5
	Day Care	2	1.0
	Community / Group Leader	0	0.0
	Mental Health Clinic/Provider	23	11.6
	Child / Adolescent Report	9	4.5
	School Reports and Documents	6	3.0
	Other	6	3.0
	Obtained Information/Documentation		
	Parent(s) (n=150)	149	99.3
	Teacher / School/Special Ed (n=54)	48	88.9
	Pre-School (n=3)	2	66.7
	Day Care (n=2)	2	100.0
	Community / Group Leader (n=0)	n/a	n/a
	Mental Health Clinic/Provider (n=23)	17	73.9
	Child / Adolescent Report (n=9)	9	100.0
	School Reports and Documents (n=6)	5	83.3
	Other (n=6)	6	100.0

Survey Item		N	%
10 @ ◆	Documentation validated/standardized ADHD assessment tool used for diagnosis (n=199)		
	Yes	59	29.6
	No	140	70.4
	Tool (n=59)		
	Vanderbilt Rating Scale	48	81.4
	Conners Parent and Teacher Rating Scales (revised)	2	3.4
	SNAP-IV-C / SNAP-IV-R Rating Scale (revised)	0	0.0
	ADHD Rating Scale IV	1	1.7
	Other Tool	9	15.3
11 @ ◆	Documentation history taken (n=199)		
	Yes	173	86.9
	No	26	13.1
	History (n=173)		
	Medical history	168	97.1
	Family history	104	60.1
	Psychosocial History	143	82.7
UTD	3	1.7	
12 @ ◆	Documentation of physical exam within FIRST 2 VISITS for ADHD (n=199)		
	Yes	178	89.4
	No	21	10.6
	Physical Exam (n=178)		
	Height	141	79.2
	Weight	174	97.8
	Pulse	125	70.2
	Blood Pressure	153	86.0
	Cardiovascular	163	91.6
	Hearing	74	41.6
	Vision	75	42.1
	Neurologic	132	74.2
	Direct observation of behavior	67	37.6
UTD components of exam	0	0.0	

@Multiple responses

◆ Items based on skip pattern

Co-Occurring Conditions

While records were examined for the presence of developmental and mental / behavioral health assessments during the review period, disorders may have been diagnosed at any time (e.g., the member had a history of a learning disorder which continued to be documented during the review period). Current assessments and prevalent disorders are displayed in **Table 5**.

Core ADHD symptoms often overlap with those of developmental and physical disorders as well. In this group 38.2% had a co-occurring physical disorder, although most were categorized as 'other' and consisted of unrelated chronic illnesses such as asthma (data not shown). Of note was the high number of children with nocturnal enuresis (data not shown).

Sixty-four percent of members had a documented mental / behavioral health assessment and 48% a developmental assessment. Note the Vanderbilt Rating Scale evaluates both ADHD and behavioral symptoms, contributing to the high rate of mental health assessments in this sample.

ADHD is frequently associated with coexisting psychiatric disorders, and one-third of members with ADHD (32.7%) also had a mental health diagnosis. Most frequently recorded was depression / mood disorder (36.9% of 65 members with a mental health diagnosis). Over another third also carried diagnoses of oppositional defiant and/or conduct disorder (38.5%). The majority of emotional disorders characterized as 'other' were behavioral problems (e.g., anger) not rising to the level of a specific diagnosis (data not shown). Although no substance abuse was documented, it remains of concern in this population.

Developmental disorders were identified in 19.6% of members. Of the 39 members with developmental disorders, 11 (28.2%) had a learning disorder, 21 (53.8%) had a language disorder, and 14 (35.9%) had a neurodevelopmental disorder.

Table 5. Comorbid Conditions

Survey Item		N	%
13 @ ◆	Documentation of co-occurring physical health disorder(s) identified (n=199)		
	Yes	76	38.2
	No	123	61.8
	Health Disorders (n=76)		
	Tics / Tourette Syndrome	2	2.6
	Sleep Apnea or other sleep disorder	19	25.0
	Seizure disorder	11	14.5
	Hyperthyroidism	0	0.0
	Other	61	80.3
14	Mental/behavioral health assessment documented (n=199)		
	Yes	128	64.3
	No	71	35.7
15 @ ◆	Documentation of co-occurring emotional / behavioral health disorder(s) ever identified (n=199)		
	Yes	65	32.7
	No	134	67.3
	Health disorders (n=65)		
	Anxiety disorder	8	12.3
	Depression/mood disorder	24	36.9
	Mania / bi-polar disorder	9	13.8
	Oppositional defiant disorder	15	23.1
	Conduct disorder	10	15.4
	Disruptive behavior disorder	4	6.2
Substance Use / Abuse	0	0.0	
Other	24	36.9	
16	Developmental assessment documented (n=199)		
	Yes	96	48.2
	No	103	51.8

Survey Item		N	%
17	Documentation of co-occurring developmental disorder(s) ever identified (n=199)		
	Yes	39	19.6
	No	160	80.4
@	Developmental disorders (n=39)		
◆	Learning disorder	11	28.2
	Language disorder	21	53.8
	Developmental coordination disorder	3	7.7
	Other neurodevelopmental disorder	14	35.9
	Other	1	2.6

@Multiple responses

◆ Items based on skip pattern

Treatment and Management of ADHD

Plan of Care

Table 6 provides data regarding treatment plans, the provider responsible for managing care, evidence and follow-up of missed appointments. Forty percent of records (80) contained a written treatment plan; however, very few of those plans included specific, measurable goals. A total of 88.8% of treatment plans (71) had no goals specified at all. Most treatment plans (75.0%) contained general prescriptive statements regarding plans for medication titration, follow-up or referral ('other' data not shown). In only one case was a written management plan provided to the member or parent.

Provider Managing Care

The PCP was involved in managing care for 79.9% of members, and was primarily responsible for care in 66.8% of cases. Notably, mental health providers were involved in managing care for only 22.6% of members, and were primarily responsible for care only 12.6% of the time.

Missed Appointments

PCP missed appointments during the review period were documented in 18.1% of records; 47.2% of these included documentation of follow up of the missed appointment. Twelve records (6.0%) documented missed appointments with other providers – and 10 were followed up on (83.3%) as noted by the PCP.

Medication Prescription

As noted earlier 62 or 31.2% of children had an active prescription for medication at the beginning of the study period, but as seen in Table 6, 93 (46.7%) had a history of medication use any time prior to the review period. One hundred and eighty-three (92%) were prescribed ADHD or other psychotropic medications during this review. Only 5 charts documented a rationale (31.3% of 16 children not on medication) for not prescribing ADHD medication. Reasons included refusal, need for further evaluation, use of behavioral therapy exclusively, and other – in 2 records there was no clear ADHD diagnosis despite the use of ADHD diagnosis codes in the administrative data used for record selection. There was no documentation any members had been asked about the use of herbal or botanical agents.

Table 6. Plan of Care and Treatment

Survey Item		N	%
18	Documentation of written treatment plan / plan care (n=199)		
	Yes	80	40.2
	No	119	59.8
19 @ ◆	Treatment plan includes (n=80)		
	Member / child / behavioral goal(s)	4	5.0
	Parent / family goal(s)	3	3.8
	School / academic goal(s)	1	1.3
	Social / peer relation goal(s)	2	2.5
	Measureable goal(s)	2	2.5
	Other	60	75.0
	No goals specified on the treatment plan	71	88.8
20 ◆	Does treatment plan include at least one family-focused intervention (n=80)		
	Yes	15	18.8
	No	65	81.3
21 ◆	Evidence a written management plan was given to member/parent (n=80)		
	Yes	1	1.3
	No	79	98.8
25a @	Type of provider involved in managing member's ADHD (n=199)		
	PCP	159	79.9
	Mental Health Provider	45	22.6
	Other Specialist	11	5.5
	UTD	32	16.1
25b	Type of provider primarily managing the member's ADHD (n=199)		
	PCP	133	66.8
	Mental Health Provider	25	12.6
	Other Specialists	2	1.0
	Shared / Co-Managed	3	1.5
	UTD	36	18.1
26	Evidence of missed PCP appointment(s) in medical record (n=199)		
	Yes	36	18.1
	No	163	81.9
27 ◆	Documentation of follow-up for missed PCP appointment(s) (n=36)		
	Yes	17	47.2
	No	19	52.8
28	Evidence of missed appointment(s) with other providers of care for ADHD (n=199)		
	Yes	12	6.0
	No	187	94.0
29 ◆	Documentation of follow-up missed appointment(s) with other providers (n=12)		
	Yes	10	83.3
	No	2	16.7

Table 6. Plan of Care and Treatment

Survey Item		N	%
30	Documentation the parent was asked about herbal or botanical agents / therapies (n=199)		
	Yes	0	0.0
	No	199	100.0
31	Documentation of ANY PRIOR use of medication for ADHD (n=199)		
	Yes	93	46.7
	No	106	53.3
32	Documentation of any ADHD or other psychotropic medications prescribed during review period (n=199)		
	Yes	183	92.0
	No	16	8.0
33 @ ◆	Documentation of reason for not prescribing ADHD medication (n=16)		
	Yes	5	31.3
	No	11	68.8
	Reason (n=5)		
	Patient / Family refusal or resistance	1	20.0
	Further evaluation needed	1	20.0
	Contraindications	0	0.0
	Alternative therapy (behavioral therapy)	1	20.0
	Prior adverse reaction	0	0.0
	Prior failure to respond	0	0.0
	Condition improved	0	0.0
	Watchful waiting	0	0.0
	Other	2	40.0

@ Multiple responses

◆ Items based on skip pattern

Referral and Coordination of Care

Evidence of PCP referral and coordination of care with other providers is presented in **Table 7**. Sixty-nine (34.7%) of children were referred to specialists; by far the majority were referred to child psychiatrists (24, 34.8%) and other mental health providers (43, 62.3%). Other mental health provider was the category typically selected by the record reviewer when the member was referred to a clinic, and the specialties of the providers who would be seeing the child was unknown. For 53.6% of referred members, the PCP documented whether the appointment had been kept.

However, the member did not have to be referred by the PCP during the review period to be under the care of a specialist. The referral may have happened prior to the review period or care may have been sought at the request of the school or independently. The Weisskopf Child Evaluation Center and Seven Counties Services, Inc. were frequently cited as involved in the member's care. Documentation of coordination of care was noted in 32 (16.1%) of the 199 study records, in the form of consultant reports, entries by the referring provider or other evidence – child evaluation reports, admission and discharge summaries, or release of information forms to obtain such information.

Table 7. Referral and Coordination of Care

Survey Item		N	%
22	Documentation that member was referred to a mental health provider or other specialist by the PCP (n=199)		
	Yes	69	34.7
	No	130	65.3
22b @ ◆	Provider (n=69)		
	Developmental Behavioral Pediatrician	2	2.9
	Child Neurologist	4	5.8
	Child Psychiatrist	24	34.8
	Child / School Psychologist	2	2.9
	Clinical Social Worker	1	1.4
	Other Mental Health Provider	43	62.3
	Other Specialist	11	15.9
Unable to determine provider type	4	5.8	
23 ◆	Documentation of follow up to determine if referral appointment kept (n=69)		
	Yes	37	53.6
	No	32	46.4
24 @ ◆	Evidence of coordination of care in medical record (n=199)		
	Yes	32	16.1
	No	81	40.7
	NA	86	43.2
	Evidence (n=32)		
	Consultant Report	11	34.4
	Information from referring provider	13	40.6
	Other	11	34.4

@Multiple responses

◆ Items based on skip pattern

Medication Management

Frequencies associated with medications prescribed, prescribers, follow-up contacts, assessments, adverse effects, and medication discontinuation are presented in **Table 8**.

Medications Prescribed

As noted above, 92% of children (183) were prescribed medication during the review period. All data in Table 8 are based on these 183 members.

Stimulant medications were most frequently prescribed, with 171 members (93.4%) receiving at least one stimulant (data not shown). Methylphenidate (Concerta, Ritalin) was used by 39.9% of members at least one time during the review period, lisdexamfetamine dimesylate (Vyvanse) 32.2%, dextromethylphenidate (Focalin) 26.8% and mixed amphetamine salts (Adderall) 23%. There was no documented use of dextroamphetamine (Dexedrine) or methamphetamine hydrochloride (Desoxyn), although choices may have been influenced by plan prescription coverage.

Forty-seven members (25.7%) received at least one non-stimulant medication (data not shown). Clonidine had been prescribed for 13.1% of members, and atomoxetine (Strattera) and Guanfacine (Intuniv, Tenex) for 6.6% of members each. Only 2 members received a tricyclic antidepressant (Imipramine) and no members received the atypical antidepressant bupropion (Wellbutrin).

A total of 7.1% of medications were categorized as 'other ADHD medication,' which consisted of melatonin, commonly used for sleep, and included 2 records which stated only "ADHD medication" (data not shown). Psychotropic medications were prescribed for 29 children (15.8%). Of those 29 children, 20 (69%) were prescribed antipsychotic, and 8 (27.6%) antidepressant medication (data not shown).

Only 2 records documented a reason for choosing an alternative medication and both described medication trials to control behavior (data not shown).

Medication was prescribed by the PCP for 79.2% of members (145) and other specialists for 15.8% (29). In 10.4% (19) member records, reviewers were unable to determine who had prescribed medication for ADHD. Children may have been prescribed multiple medications sequentially during the review period as titration of stimulants could occur as often as weekly, and changes to other categories of stimulants or non-stimulants were continued until maximum benefit and minimal side effects were achieved.

Follow-up and Assessment

As seen in Table 8, 39 children (21.3%) had no follow-up visits post-medication initiation or prescription in the review period. The records of an additional 15 children who were identified as receiving medication for ADHD in administrative data included no PCP visits in which ADHD was addressed (data not represented in table). The majority of children (29.5%) had one follow-up visit. Accounting for the addition of telephone contacts, the majority (25.7%) still had one follow-up contact.

Table 8 also presents rates of assessment for medication adherence, therapeutic response and adverse effects. Sixty-five percent of children were evaluated for adherence to their medication regimen; 70.5% were evaluated for therapeutic response to dosage. Most clinicians (96.9%) documented a qualitative assessment of response, although 26 (20.2%) used quantitative scales, and one measured progress toward treatment goals.

Most children (117, 63.9%) were assessed for adverse effects at follow-up visits. Most frequently reported were 'other' adverse effects (40.2%), appetite / weight problems (in either direction) (37.6%), sleep problems (33.3%), and nervousness / irritability (13.7%). Other adverse effects included stomach ache, headache, drowsiness and mood changes (data not shown). Eighteen children were assessed for suicidal ideation, but among the 12 children on atomoxetine, only 3 had a suicide assessment (25%) (data not shown). Most children (86.3%) also had physical parameters (height, weight, blood pressure or pulse) evaluated at follow-up visits.

In 35 charts (19.1%), there was evidence of medication discontinuation, most often by the member or parent (71.4%). The most common reason was adverse effects (62.1%) followed by school holiday (27.6%). Five children (17.2%) stopped their medication because they were feeling better and 2 (6.9%) because they or their caregiver felt it was not working. Two stopped

for other reasons – persistent noncompliance and a belief one would “grow out of” the condition (data not shown).

Among pre-school aged children receiving medication, 37.5% had documentation of a rationale. The most common reasons were moderate to severe continuing disturbance in function (80%) and symptoms in both home and other settings (66.7%).

Table 8. Medication Management

Survey Item (Among 183 cases with ADHD Medication)		N	%
M1	Number follow-up visits documented post-medication review period (n=183)		
	0	39	21.3
	1	54	29.5
	2	39	21.3
	3	23	12.6
	4+	28	15.3
M2	Documentation of telephone follow-up with member by PCP post medication prescription (n=183)		
	Yes	36	19.7
	No	147	80.3
M3	Total number of post-medication follow-up contacts (visit plus telephonic) during review period (n=183)		
	0	38	20.8
	1	47	25.7
	2	38	20.8
	3	24	13.1
	4+	36	19.7
M4 @	Generic medications prescribed during review period (n=183)		
	Psychostimulant Medications		
	m Methylphenidate	73	39.9
	m Dextromethylphenidate	49	26.8
	m Dextroamphetamine	0	0.0
	m Methamphetamine hydrochloride	0	0.0
	m Lisdexamfetamine Dimesylate	59	32.2
	m Mixed amphetamine salts	42	23.0
	Non-Stimulant Medications		
	m Atomoxetine	12	6.6
	m Clonidine	24	13.1
	m Guanfacine	12	6.6
	m Tricyclic Antidepressants (TCAs)	2	1.1
	m Bupropion	0	0.0
	Other ADHD Medication	13	7.1
Psychotropic Medication	29	15.8	
M5 @	Who prescribed ADHD medication (n=183)		
	PCP	145	79.2
	Other Specialist	29	15.8
	UTD	19	10.4

Table 8. Medication Management

Survey Item (Among 183 cases with ADHD Medication)		N	%
M6	Documentation of reasons(s) for choosing an alternate medication(s) (n=183)		
	Yes	2	1.1
	No	6	3.3
	NA	175	95.6
M7	Documentation of assessment for adherence to medication regimen at visits following initial prescription date (n=183)		
	Yes	119	65.0
	No	64	35.0
M8 @ ◆	Documentation of assessment of effect of medication dosage on therapeutic response or symptoms, visits following initial prescription date (n=183)		
	Yes	129	70.5
	No	54	29.5
	Documentation (n=129)		
	Informal: Query / inquiry / qualitative assessment	125	96.9
	Formal: use of validated ADHD assessment tool / rating scale / quantitative assessment	26	20.2
M9 @ ◆	Assessment of progress toward treatment goals	1	0.8
	Documentation of assessment for adverse effects at follow-up visit(s) (n=183)		
	Yes	117	63.9
	No	66	36.1
	Adverse Effects (n=117)		
	Appetite / Weight	44	37.6
	Sleep problems	39	33.3
	Nervousness / Irritability	16	13.7
Nausea / Vomiting	3	2.6	
Other	47	40.2	
M10	Documentation of assessment for suicidal ideation (n=183)		
	Yes	18	9.8
	No	165	90.2
M11 ◆	Documentation that medication was discontinued (n=183)		
	Yes	35	19.1
	No	148	80.9
	Discontinued by (n=35)		
	Provider	6	17.1
	Member / Parent	25	71.4
UTD	4	11.4	

Table 8. Medication Management

Survey Item (Among 183 cases with ADHD Medication)		N	%
M12 @ ◆	Rationale for discontinuance documented (n=35)		
	Yes	29	82.9
	No	6	17.1
	Discontinuance documented (n=29)		
	Adverse effects	18	62.1
	Ineffective / Medication not working	2	6.9
	School holiday	8	27.6
	Feeling better	5	17.2
	Inconvenient schedule	0	0.0
	Other	2	6.9
M13 @ ◆	Documentation of assessment of any of below at any visit following initiation of medication (n=183)		
	Yes	158	86.3
	No	25	13.7
	Documented (n=158)		
	Pulse	107	67.7
	Blood Pressure	127	80.4
	Height	120	75.9
	Weight	154	97.5
M14 @ ◆	Documentation of clinical rationale for pre-school aged child (4-5-years) prescribed ADHD medications (n=40)		
	Yes	15	37.5
	No	25	62.5
	Documented (n=15)		
	Lack of response / failure of behavioral therapy	0	0.0
	Persistent symptoms for >=9 months	3	20.0
	Moderate to severe continuing disturbance in function	12	80.0
	Symptoms in both home and other setting(s)	10	66.7
	Other	3	20.0

@Multiple responses

◆ Items based on skip pattern

Non-Pharmacologic Management

The frequency of communication between PCP and school, behavioral / non-pharmacologic management, and substance abuse treatment are presented in **Table 9**. As noted in Table 4, information from the member's school was requested for 54 cases (27.1%), and received for 48 (88.9%); communication was ongoing in 45 instances (22.6% of members).

Forty-one members (20.6%) or their families received non-pharmacologic treatment as documented in their medical record. The largest proportion attended counseling or therapy (56.1%), followed by Behavior Parent Training (22%) and school programs (19.5%). Few participated in the other treatment modalities utilized in the treatment of ADHD. However, the specific type of behavior therapy was not always documented ('other' category – 29.3%). Eleven children receiving non-pharmacologic therapy (5.5%) were informally reassessed by the

PCP regarding their ADHD symptoms. As noted, no members reported substance abuse, and correspondingly, there were no treatment plans in place to address substance abuse.

Table 9. Non-Pharmacologic Management

Survey Item		N	%
34	Documentation of follow-up feedback / communication with school (n=199)		
	Yes	45	22.6
	No	154	77.4
35 @ ◆	Documentation of behavioral / non-pharmacologic management (n=199)		
	Yes	41	20.6
	No	158	79.4
	Documentation (n=41)		
	Behavior Therapy / Behavior Modification Program	5	12.2
	Cognitive Behavioral Therapy	1	2.4
	Social Skills Training	2	4.9
	Behavior Parent Training (BPT)	9	22.0
	Behavioral classroom management	2	4.9
	Behavioral peer interventions	1	2.4
	School program and supports	8	19.5
	Problem-solving strategies	2	4.9
	Study/organization skills coaching	1	2.4
	Exercise / sports	3	7.3
	Dietary modifications	0	0.0
	Counseling / therapy	23	56.1
Other	12	29.3	
36 @ ◆	Documentation of reassessment of ADHD symptoms for children receiving non-pharmacologic management during review period (n=199)		
	Yes	11	5.5
	No	20	10.1
	NA	168	84.4
	Documented (n=11)		
	Informal: Query / inquiry / qualitative assessment	8	72.7
	Formal: use of validated ADHD assessment tool / rating scale / quantitative assessment	2	18.2
Assessment of progress toward treatment goals	2	18.2	
38	Plan to treat / address substance abuse disorder prior to treatment for ADHD (n=0; all cases were N/A)		
	Yes	0	0.0
	No	0	0.0

@Multiple responses

◆ Items based on skip pattern

Treatment Type

In summary, 143 (71.9%) of members received medication only, 1 (0.5%) behavioral therapy only, and 40 (20.1%) a combination of treatment modalities. Fifteen members (7.5%) diagnosed with ADHD were not being treated with either modality (**Table 10**).

Table 10. Treatment Type (n = 199)

Survey Item		N	%
	Medication Only	143	71.9
	Behavioral Therapy Only	1	0.5
	Both	40	20.1
	Neither	15	7.5

Patient Education

The frequencies of members / family members receiving general education and information on specific topics related to ADHD are presented in **Table 11**. Seventy members (35.2%) received some form of patient education. Of those 70, 40% received information about potential adverse effects of medication, parenting skills training (18.6%) and mechanism of action (15.7%). No patients or family members received information regarding over-medication, long term effects, or the elimination of triggers from their child's environment. Ten or fewer members received education on all remaining aspects of ADHD treatment and management.

Almost half of adolescents (49.3%) received age-specific education. Most frequently documented were 'other risk behaviors' (24 or 72.7% of members counseled) which most often addressed injury prevention (17 of those 24 or 71%, data not shown), and substance use and abuse, in line with Anticipatory Guidance for this age group.

Table 11. Member and Family Education

Survey Item		N	%
37 @ ◆	Documentation of parent / family and member education (n=199)		
	Yes	70	35.2
	No	129	64.8
	Type of Education (n=70)		
	Diagnosis of ADHD	10	14.3
	Explanation of disorder	5	7.1
	Symptoms	2	2.9
	Assessment process	2	2.9
	Treatment choices	9	12.9
	Long term effects	0	0.0
	How to interact with schools / family-school partnership	3	4.3
	Advocacy and support groups	3	4.3
	Medication: Adherence	5	7.1
	Medication: Mechanism of action	11	15.7
	Medication: Titration / trials	5	7.1
	Medication: Duration of action	2	2.9
	Medication: Adverse effect	28	40.0
	Medication: Signs of over medication	0	0.0
	Medication: Danger signs / treatments	6	8.6
	Elimination of triggers	0	0.0
Behavioral modification / treatments	10	14.3	
Parenting skills training	13	18.6	
Other	32	45.7	
39 @ ◆	Were the following addressed with adolescents (n=67)		
	Yes	33	49.3
	No	34	50.7
	Addressed (n=33)		
	Empowerment / Self-management / Advocacy	0	0.0
	Medication coverage for driving / traffic accidents	1	3.0
	Substance Use / Abuse	14	42.4
	Risky sexual behaviors	9	27.3
Other risk behaviors	24	72.7	
Misuse / Diversion of ADHD medication	0	0.0	

@Multiple responses

◆ Items based on skip pattern

GROUP COMPARISONS

The objective of these comparisons is to compare (1) use of diagnostic criteria between the group of members newly diagnosed and those with a history of ADHD with or without medication use at the beginning of the review period, (2) medication management between those newly prescribed medication (even if on medication in the remote past but not at the beginning of the review period) and those already on medication at the beginning of the review period, (3) medication follow-up by provider type and (4) behavioral health assessments and disorders by age group.

To test for differences in proportions, chi-square analyses were employed for all group comparisons. In the tables, items that yielded statistical significance at the .05 level display the corresponding p value, whereas items that were not statistically significant are denoted with the abbreviation n.s.

In the following cross-tabulation tables, only cells with a denominator of at least 20 are displayed, unless otherwise noted.

Use of Diagnostic Criteria in Members With vs. Without an ADHD History

In **Table 12**, DSM IV diagnostic criteria are compared across 3 categories of members: (1) those with no history of ADHD prior to the review period – the newly diagnosed, (2) those with a history of ADHD but not taking medication at the beginning of the review period and (3) those with both with a diagnosis of ADHD and active prescription for medication at the beginning of the review period.

In the area of symptom assessment, little difference is seen between the 3 groups, although those with a history of ADHD and not on medication had a higher rate of documentation that the member exhibited DSM IV-based symptoms (67.6%), whereas those with both a history and medication had the lowest rate of 41.9%. When evaluated by discrete symptoms, those with no history were documented to have higher rates of poor follow-through, failing to finish schoolwork, avoiding tasks requiring sustained mental effort, being easily distracted, having difficulty playing quietly, being on the go and intruding on others – as might be expected at first presentation. Those with no history of ADHD also showed a higher rate of impairment in the home (65.3%) and in family relations (58.6%).

In addition, members with no history were more likely to have age at symptom onset, duration of impairment/symptoms, ADHD type documented, communication with the school, to have used a validated/standardized ADHD assessment tool, and documentation of direct observation of behavior.

Table 12. Use of Diagnostic Criteria in Members With vs. Without an ADHD History

Survey Item		No History (n=100)	History No Med (n=37)	History & Med (n=62)	P value
3 @ ◆	Documentation that the member exhibits symptoms based on DSM IV criteria (n=199)	63.0	67.6	41.9	.012
	Symptoms (n=114)				
	Inattentive Dimension				
	m Lacks attention to details; makes careless mistakes	44.4	24.0	26.9	n.s.
	m Difficulty sustaining attention	76.2	84.0	57.7	n.s.
	m Does not seem to listen when spoken to directly	44.4	32.0	34.6	n.s.
	m Does not follow through on instructions	58.7	36.0	26.9	.012
	m Fails to finish schoolwork or chores	58.7	28.0	26.9	.004
	m Difficulty organizing tasks and activities	44.4	36.0	19.2	n.s.
	m Avoids engaging in tasks requiring sustained mental effort	44.4	20.0	23.1	.037
	m Loses things necessary for tasks or activities	41.3	20.0	23.1	n.s.
	m Easily distracted by extraneous stimuli	60.3	32.0	30.8	.009
	m Forgetful in daily activities	42.9	28.0	23.1	n.s.
	Hyperactive Domain				
	m Fidgets with hands or feet; squirms in seat	54.0	32.0	34.6	n.s.
	m Leaves seat in situations where remaining seated is expected	50.8	32.0	26.9	n.s.
	m Runs about or climbs excessively where inappropriate	41.3	16.0	26.9	n.s.
	m Difficulty playing or engaging in leisure activities quietly	42.9	20.0	19.2	.031
	m "On the go" or acts as if "driven by a motor"	69.8	36.0	53.8	.012
	m Talks Excessively	54.0	40.0	34.6	n.s.
Impulsive Domain					
m Blurts out answers	41.3	32.0	23.1	n.s.	
m Difficulty awaiting turn	42.9	32.0	23.1	n.s.	
m Interrupts or intrudes on others	54.0	28.0	23.1	.008	
4	Age at onset of symptoms documented (n=199)	30.0	18.9	3.2	.000
5 @ ◆	Impairment in following major life settings documented (n=199)	72.0	73.0	64.5	n.s.
	Impairment documented (n=139)				
	Home	65.3	44.4	37.5	.011
	Daycare / Pre-School	8.3	0.0	2.5	n.s.
	School	84.7	96.3	95.0	n.s.
	Social	15.3	7.4	7.5	n.s.
	Other	1.4	0.0	0.0	n.s.

Table 12. Use of Diagnostic Criteria in Members With vs. Without an ADHD History

Survey Item		No History (n=100)	History No Med (n=37)	History & Med (n=62)	P value
6 @ ◆	Clinically significant impairment in at least 1 major functional area (n=199)	70.0	73.0	66.1	n.s.
	Major Functional area (n=138)				
	Family Relations / Function	58.6	37.0	34.1	.023
	Academic Performance / Function	88.6	92.6	92.7	n.s.
	Peer Relations / Social Function	30.0	22.2	22.0	n.s.
	Adaptive Skills	27.1	14.8	7.3	.030
7	Duration of impairment/symptoms documented (n=199)	16.0	10.8	0.0	.004
8	Provider documented the ADHD TYPE in medical record (n=199)	30.0	2.7	11.3	.000
	N/A–Not applicable–there is no diagnosis of ADHD (n=199)	16.0	2.7	9.7	n.s.
9 ◆	Attempted to Obtain Information (n=199)				
	Parent(s)	80.0	78.4	66.1	n.s.
	Teacher / School / Special Ed	37.0	21.6	14.5	.005
	Pre-School	3.0	0.0	0.0	n.s.
	Day Care	2.0	0.0	0.0	n.s.
	Mental Health Clinic / Provider	110	8.1	14.5	n.s.
	Child / Adolescent Report	4.0	2.7	6.5	n.s.
	School Reports and Documents	5.0	0.0	1.6	n.s.
	Other	4.0	0.0	3.2	n.s.
10	Documentation validated/standardized ADHD assessment tool used for diagnosis (n=199)	42.0	24.3	12.9	.000
11 @ ◆	Documentation history taken (n=199)	84.0	89.2	90.3	n.s.
	History (n=173)				
	Medical history	97.6	97.0	96.4	n.s.
	Family history	67.9	45.5	57.1	n.s.
	Psychosocial History	83.3	81.8	82.1	n.s.
	UTD	0.0	3.0	3.6	n.s.
12 @ ◆	Documentation of physical exam within FIRST 2 VISITS for ADHD (n=199)	88.0	89.2	91.9	n.s.
	Physical Exam (n=178)				
	Height	73.9	84.8	84.2	n.s.
	Weight	97.7	97.0	98.2	n.s.
	Pulse	71.6	81.8	61.4	n.s.
	Blood Pressure	83.0	100.0	82.5	.036
	Cardiovascular	90.9	93.9	91.2	n.s.
	Hearing	38.6	39.4	47.4	n.s.
	Vision	37.5	36.4	52.6	n.s.
	Neurologic	76.1	78.8	68.4	n.s.
	Direct observation of behavior	46.6	24.2	31.6	.040

@Multiple responses

◆ Items based on skip pattern

Medication Management in Members Newly vs. Previously Prescribed Medication

The cross-tabulation in **Table 13** was performed to evaluate differences in medication management and follow-up between the group of patients newly prescribed medication (those with no history of ADHD or a history of ADHD but taking no medication in the previous analysis) and patients already taking medication at the beginning of the review period. No significant difference was seen between the groups in the number of follow-up contacts (face-to-face visits or telephone contacts), the type of ADHD medications prescribed, medication discontinuance and assessment for adherence, therapeutic response, adverse effects and suicidal ideation. The PCP prescribed most often without significant difference between groups.

The 2 differences noted were the higher rate of psychotropic medication use in the group previously prescribed medication (24.2%) and a higher rate of documented pulse rates in the group newly prescribed medication (74.5%).

Table 13. Medication Management in Members Newly vs. Previously Prescribed Medication

Survey Item		Newly Prescribed (n=121)	Previously Prescribed (n=62)	P value
M1	Number follow-up visits documented post-medication review period (n=183)			n.s.
	0	22.3	19.4	
	1	24.8	38.7	
	2+	52.9	41.9	
M2	Documentation of telephone follow-up with member by PCP post medication prescription (n=183)	21.5	16.1	n.s.
M3	Total number of post-medication follow-up contacts (visit plus telephonic) during review period (n=183)			n.s.
	0	20.7	21.0	
	1	24.8	27.4	
	2+	54.5	51.6	
M4 @	Generic medications prescribed during review period (n=183)			
	Psychostimulant Medications			
	m Methylphenidate	41.3	37.1	n.s.
	m Dextromethylphenidate	28.9	22.6	n.s.
	m Lisdexamfetamine Dimesylate	31.4	33.9	n.s.
	m Mixed amphetamine salts	21.5	25.8	n.s.
	Non-Stimulant Medications			
	m Atomoxetine	6.6	6.5	n.s.
	m Clonidine	11.6	16.1	n.s.
	m Guanfacine	5.8	8.1	n.s.
	m Tricyclic Antidepressants (TCAs)	0.0	3.2	n.s.
	Other ADHD Medication	8.3	4.8	n.s.
	Psychotropic Medication	11.6	24.2	.027

Survey Item		Newly Prescribed (n=121)	Previously Prescribed (n=62)	P value
M5 @	Who prescribed ADHD medication (n=183)			
	PCP	78.5	80.6	n.s.
	Other Specialist	14.0	19.4	n.s.
	UTD	12.4	6.5	n.s.
M6	Documentation of reasons(s) for choosing an alternate medication(s) (n=183)			n.s.
	Yes	0.8	1.6	
	No	2.5	4.8	
	NA	96.7	93.5	
M7	Documentation of assessment for adherence to medication regimen at visits following initial prescription date (n=183)	66.9	61.3	n.s.
M8 @ ◆	Documentation of assessment of effect of medication dosage on therapeutic response or symptoms, visits following initial prescription date (n=183)	72.7	66.1	n.s.
	Documentation (n=129)			
	Informal: Query / inquiry / qualitative assessment	97.7	95.1	n.s.
	Formal: use of validated ADHD assessment tool / rating scale / quantitative assessment	20.5	19.5	n.s.
	Assessment of progress toward treatment goals	0.0	2.4	n.s.
M9 @ ◆	Documentation of assessment for adverse effects at follow-up visit(s) (n=183)	64.5	62.9	n.s.
	Adverse Effects (n=117)			
	Appetite / Weight	38.5	35.9	n.s.
	Sleep problems	38.5	23.1	n.s.
	Nervousness / Irritability	15.4	10.3	n.s.
	Nausea / Vomiting	1.3	5.1	n.s.
	Other	39.7	41.0	n.s.
M10	Documentation of assessment for suicidal ideation (n=183)	9.1	11.3	n.s.
M11 ◆	Documentation that medication was discontinued (n=183)	15.7	25.8	n.s.
M13 @ ◆	Documentation of assessment of any of below at any visit following initiation of medication (n=183)	87.6	83.9	n.s.
	Documented (n=158)			
	Pulse	74.5	53.8	.009
	Blood Pressure	84.0	73.1	n.s.
	Height	79.2	69.2	n.s.
	Weight	97.2	98.1	n.s.

@Multiple responses

◆ Items based on skip pattern

Medication Management in Members Prescribed Medication by PCP vs. Other Provider (Including UTD Provider)

As seen in **Table 14**, there were significantly higher rates of follow-up – both in the office (56.6% with 2 or more visits) and office visit plus telephone contact (61.4% with 2 or more contacts) in the group prescribed medication by their PCP. Rates of assessment for adherence (74.5%), therapeutic response (80%), adverse effects (73.1%) and patient education (43.4%) were all higher in the group prescribed medication by their PCP.

Table 14. Medication Management in Members Prescribed Medication by PCP vs. Other Provider (Including UTD Provider)

Survey Item (Among 183 cases with ADHD Medication)		PCP (n=145)	Other (n=38)	P value
M1	Number follow-up visits documented post-medication review period (n=183)			.000
	0	15.2	44.7	
	1	28.3	34.2	
	2+	56.6	21.1	
M3	Total number of post-medication follow-up contacts (visit plus telephonic) during review period (n=183)			.000
	0	14.5	44.7	
	1	24.1	31.6	
	2+	61.4	23.7	
M7	Documentation of assessment for adherence to medication regimen at visits following initial prescription date (n=183)	74.5	28.9	.000
M8 ♦	Documentation of assessment of effect of medication dosage on therapeutic response or symptoms, visits following initial prescription date (n=183)	80.0	34.2	.000
	Formal: use of validated ADHD assessment tool / rating scale / quantitative assessment (n=129)	22.4	0.0*	n.s.
M9	Documentation of assessment for adverse effects at follow-up visit(s) (n=183)	73.1	28.9	.000
37	Documentation of parent / family and member education (n=199)	43.4	18.4	.005

♦ Items based on skip pattern

*Note: denominator is 13.

Behavioral Health, ADHD History and Treatment Type by Age Group

Table 15 examines differences in behavioral health assessments, comorbidities, referrals, provider type and treatment type between the groups preschool age (4-5 years), school age (6-11 years) and adolescent (12-18 years). There were no significant differences in the rate of mental / behavioral health assessments or disorders between the age groups; however preschool age children more often received a developmental assessment (81.4%) and referral to a mental health specialist (55.8%).

The PCP was the primary provider and medication use did not differ statistically across all 3 groups. Preschool-aged children were more likely to receive behavioral therapy (41.9%) and a combination of medication and behavioral therapy (39.5%); they were least likely to receive medication alone (53.5%).

Preschool-aged children were most likely to have no history of ADHD diagnosis or medication at the beginning of this study (79.1%).

Table 15. Behavioral Health, ADHD History and Treatment Type by Age Group

Survey Item		Age 4-5 (n=43)	Age 6-11 (n=84)	Age 12-18 (n=72)	P value
14	Mental/behavioral health assessment documented (n=199)	79.1	57.1	63.9	n.s.
15	Documentation of co-occurring emotional / behavioral health disorder(s) ever identified (n=199)	44.2	26.2	33.3	n.s.
16	Developmental assessment documented (n=199)	81.4	42.9	34.7	.000
22	Documentation that member was referred to a mental health provider or other specialist by the PCP (n=199)	55.8	33.3	23.6	.002
25b	Type of provider primarily managing the member's ADHD (n=163)*				n.s.
	PCP	85.7	77.6	83.6	
	Other	14.3	22.4	16.4	
32	Documentation of any ADHD or other psychotropic medications prescribed during review period (n=199)	93.0	92.9	90.3	n.s.
35	Documentation of behavioral / non-pharmacologic management (n=199)	41.9	19.0	9.7	.000
	No History Group (n=199)				.000
	No History (items 2a and 2b = no; see Table 2)	79.1	52.4	30.6	
	All others	20.9	47.6	69.4	
	Treatment Type (n=199)				.004
	Medication Only	53.5	73.8	80.6	
	Behavioral Therapy Only	2.3	0.0	0.0	
	Both	39.5	19.0	9.7	
	Neither	4.7	7.1	9.7	

*Excludes UTD

Plan of Care and Treatment for Members With vs. Without Co-occurring Mental / Behavioral Health Disorders.

Table 16 shows evidence that members with a co-occurring mental / behavioral health disorder have higher rates of referrals to mental health providers or other specialists (61.5%) and behavioral / non-pharmacologic treatment (29.2%). The rate at which the PCP primarily managed ADHD did not differ between the groups.

Table 16. Plan of Care and Treatment for Members With vs. Without Co-occurring Mental / Behavioral Disorders

Survey Item		No (n=134)	Co-morbidity (n=65)	P value
22	Documentation that member was referred to a mental health provider or other specialist by the PCP (n=199)	21.6	61.5	.000
25b	Type of provider primarily managing the member's ADHD (n=163)*			n.s.
	PCP	85.0	75.0	
	Other	15.0	25.0	
35	Documentation of behavioral / non-pharmacologic management (n=199)	16.4	29.2	.036

*Excludes UTD

DISCUSSION

Diagnoses of Attention Deficit/ Hyperactivity Disorder (ADHD) are increasing, with estimated prevalence of ADHD reported to be 8% to up to 9.5% among U.S. children.^{10,11} ADHD is even more prevalent among certain subgroups, including children of low socioeconomic status.¹² This study was conducted to evaluate Primary Care Providers' (PCPs) care of Kentucky Medicaid children enrolled in Passport Health Plan (PHP) relative to national guidelines. This study is intended to complement a study of ADHD utilization using encounter data that was conducted on behalf of KDMS in 2012, and to further explore the opportunities for improvement that were identified.

ADHD is a chronic condition that requires care consistent with principles of the chronic care and medical home models, such as communication and coordination with other providers, schools, parents and children. Guidelines issued by the American Academy of Pediatrics (AAP) in 2011 note that PCPs are reported to care for most patients with ADHD, in part due to issues such as limited access to mental health clinicians in some areas of the U.S. For most children in the study sample (79.9%), PCPs were involved in the management of ADHD, and for 66.8% of the children, the PCP was identified as primarily managing this chronic condition. This finding underscores the importance of ensuring PCP awareness of and adherence to clinical guidelines, and coordination with other providers when more than one provider is involved in ADHD care.

The diagnosis and management of ADHD presents particular challenges for PCPs, since appropriate care is time consuming, and recommended care includes establishing contacts with schools, ongoing contacts with children and families and, in some cases, coordination of care with mental health providers.¹³ However, effective treatments and primary care-specific guidelines for ADHD diagnosis and management are available. It should be noted that in the ADHD utilization study, a substantial proportion of members (32%) only saw behavioral health providers for ADHD care. Therefore, some children in the KY ADHD utilization study may not have had a PCP visit during the measurement year, but a PCP visit was required for this medical record review study. Therefore, some children that were included in the KY ADHD utilization study may not have been eligible for this study.

Males are reported to be twice as likely as females to be diagnosed with ADHD.¹⁴ In this study, as in the Kentucky ADHD utilization study, children identified with ADHD were found to be predominantly male (69.8% vs. 30.2%). There were more urban than rural residents, which also mirrors national demographic patterns of children identified with ADHD. While disparity in the prevalence of ADHD among racial and ethnic groups has historically been reported, prevalence has recently become similar among racial groups.¹⁵ A total of 35.8% of the study population was identified as black, which is similar to the distribution of race in the PHP reporting for HEDIS® for the measurement year, indicating that black children were likely not over or under-represented in the study population. Preschool-aged children were selectively sampled for the study, and comprised almost 22% of the study sample, while adolescents were well-represented and comprised 36% of the study sample.

This study was intended to focus on children who were newly prescribed ADHD medication or newly diagnosed with ADHD, based on new ADHD medication dispensing or ADHD visit events in the measurement year. However, the record review revealed that 31.2% of the children were actively taking ADHD medication during the four months prior to the dispensing event. This

could be due in part to members not consistently taking medication that was previously prescribed, either because of non-adherence, which is particularly common among adolescents, or planned drug holidays (structured treatment interruptions when medication may not be needed) on weekends or when school was not in session.¹⁶ In addition, HEDIS criteria that were used to identify eligible members address only new dispensing events and do not identify children who may have ADHD but are not recently on medication. Most of the children were identified through HEDIS criteria, and almost half of the children (49.7%) in the study sample were found to have been previously diagnosed with ADHD, and almost half (46.7%) had been prescribed medication for ADHD in the remote past (more than four months prior to review period).

Appropriate diagnosis is a critical part of ADHD care, and diagnosis can be impacted by cultural factors that inform differences in parent and teacher perception of symptoms and behaviors. Because the use of stimulants has markedly increased over the past few years, there is controversy regarding misuse or overuse of these drugs, and the debate is generally centered on appropriately identifying children in need of such medication through accurate diagnosis.¹⁷ Accurate diagnosis is particularly difficult for the populations newly included in AAP's guideline: preschoolers and adolescents.

All children in the study sample had evidence of an ADHD diagnosis in administrative data, but a small percentage of children (13%) had no documentation in the PCP record of having an ADHD diagnosis. Although a few other children had a "rule out" ADHD diagnosis, the absence of documentation of an ADHD diagnosis in the remaining PCP records suggests that PCPs were not focused on this diagnosis or were unaware of it for this group of children. This finding, as well as the observation that mental health providers were involved in the care of almost 23% of children with ADHD, highlight the need for coordination of care of ADHD with other providers.

Diagnosis of ADHD is contingent on the presence of evidence-based symptom and dysfunction criteria delineated in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV). DSM-IV criteria for ADHD include the presence of inattention or hyperactivity symptoms or both, age of onset prior to age 7, duration of symptoms for at least 6 months, clinically significant functional impairment and impaired functioning due to symptoms in two or more settings.¹⁸ These evidence-based criteria for ADHD allow for consistent case identification and facilitate communication across provider types. At least one DSM-IV symptom/problem behavior was documented for 57.3% of children, with significantly higher rates of documentation of at least one symptom among children who were newly diagnosed or newly medicated. Children who were newly diagnosed or newly medicated may have been undergoing a diagnostic evaluation or confirmation of an ADHD diagnosis prior to being prescribed medication, and therefore may have been more likely to have symptoms documented in the medical record. Although the majority of children had at least one symptom documented, only 21.1% of children were documented to have the required constellation of symptoms as described in the DSM-IV to meet criteria for ADHD, i.e. 6 or more inattentive or hyperactive/impulsive symptoms or both. It is important to note that medication is not indicated for children who do not meet DSM-IV criteria, although behavioral therapy may be of benefit for isolated problem behaviors.

Children must also have significant functional impairment to be diagnosed with ADHD, and impairment criteria are the most difficult to accurately assess.¹⁹ The documentation of impairment did not differ based on prior history of ADHD, likely because impairment may be commonly monitored to ascertain treatment efficacy. Impairment was documented in the majority of children, with 69.3% noted to have significant clinical impairment in at least one major functional area, most commonly academic performance followed by family relationships,

and 69.8% of children documented to have impairment in at least one setting. However, DSM-IV criteria require impairment in two or more clinical settings for ADHD diagnosis, and only 35.2% of children met this criterion, with only 16% of children meeting DSM-IV criteria of 6 or more core symptoms, clinically significant impairment and impairment in two settings.

The two other DSM-IV required components for ADHD diagnosis were infrequently documented, with 19.6% of children having age of symptom onset documented and only 10.1% having duration of symptoms documented. These criteria were documented at higher rates for newly diagnosed children than for other children, although rates were still low for newly diagnosed children (30% for age of onset and 16% for duration). Interestingly, it is anticipated that DSM-V criteria will increase the age of onset criterion to presentation prior to 12 years rather than 7 years. Of the small percentage of children who had age of onset documented, 10.3% were noted to have age of onset consistent with anticipated DSM-V criteria rather than DSM-IV criteria (onset prior to age 12 not prior to age 7). Since so few children, including the newly diagnosed, had documentation of all DSM-IV criteria, which are essential for diagnosis, targeting education and decision support for accurate diagnosis of ADHD is an area with opportunity for improvement. This is particularly important in light of PHP quarterly statutory reports that note stimulants to be among the most prescribed drugs, and the necessity of DSM-IV criteria being met for these drugs to be indicated. It is likely that for some children ADHD was diagnosed by a provider other than the PCP, but since the PCP was primarily managing ADHD for 66.8% of the children and actively prescribing ADHD medication for 79.2% of the children receiving medication, ensuring documentation of accurate diagnosis is important for PCPs.

The subtype of ADHD (inattentive versus hyperactive, or both) was infrequently documented (19.1%). This rate is not surprising since only 21.1% had 6 or more symptoms from either inattentive or hyperactive/impulsive domains documented, which would have allowed subtypes to be identified. In addition, the identification of subtypes of ADHD from DSM-IV criteria may not be valid for preschoolers, who were overrepresented in our sample by design.²⁰

Information from multiple informants facilitates the characterization of symptoms and functional impairment in more than one setting. Parents were most frequently the source of information (75.4%), and although the most common impairment was noted to be academic performance, with the schools the most common setting in which impairment was documented, information was sought from schools in only 27.1% of cases. Information was also sought from preschools and school reports in a small percentage of cases (1.5% and 3% respectively). Children newly diagnosed with ADHD had a higher rate of information sought from schools than other children, but the rate was still only 37%. Schools were contacted in follow-up after treatment in only 22.6% of cases. Establishing connections with schools, as recommended by the AAP, may be difficult for PCPs but would be of particular value if school performance is the major identified problem.

Validated rating scales for diagnosis, assessment of comorbidity, and treatment monitoring of ADHD facilitate accurate documentation and tracking of treatment efficacy. These ADHD rating scales typically include tools for teacher reporting as well as parent reporting, which can facilitate PCPs' coordination with schools and documentation of symptoms for diagnosis as well as treatment efficacy monitoring. The use of validated ADHD rating scales in initial visits for ADHD was documented in 29.6% of records, most commonly Vanderbilt scales. However, use of these scales was documented more frequently in newly diagnosed children, at a rate of 42%. There were only three records in which the Conner Comprehensive Behavior Rating Scales or ADHD Rating Scale IV were documented, though these are the only DSM-IV-based scales

validated in preschool-aged children.²¹ It is possible that these scales were not documented in initial visits with the PCP for some children because the child had been diagnosed elsewhere. However, the use of rating scales can facilitate coordination with schools and documentation of symptoms necessary to not only make the diagnosis of ADHD but also monitor improvement after therapy is initiated. Validated tools were infrequently used for follow-up monitoring of children receiving medication or behavioral therapy. The provision of tools to PCPs may enhance appropriate diagnosis and monitoring.

Initial evaluation included historical information regarding medical, family and psychosocial history for most children. There were high rates of evaluation of parameters that must be followed for children on stimulant medication, such as vital signs, weight and cardiovascular status. Hearing and vision assessment were less frequently documented (41.6% and 42.1%), although problems in these areas can affect school performance. This finding may have been impacted by a limited look back period, and the child may have had these evaluations prior to the review period.

There are many comorbid conditions that are known to coexist with ADHD, including emotional/behavioral disorders (anxiety, depression, oppositional defiant disorder and conduct disorder), developmental disorders (learning disorders, language disorders and neurodevelopmental disorders) and physical disorders (tic disorders, sleep apnea). There is good evidence that identifying comorbid conditions facilitates appropriate treatment planning for children with ADHD.²² Since psychiatric, behavioral and learning disorders are prevalent among children with ADHD, it is important to assess for these conditions. Assessment for developmental problems was documented in almost half (48.2%) of records, but the majority of children were assessed for mental health/behavioral comorbidity (64.3%), including those children who were assessed for comorbidity using standardized ADHD tools such as the Vanderbilt. As might be expected, preschool-aged children, for whom such evaluation should be routine, had higher rates of developmental assessment than other age groups, and had a documented developmental assessment in most cases (81.4%). The AAP guidelines recommend that if an ADHD diagnosis is considered for adolescents who have not been previously given an ADHD diagnosis (30.6% of adolescents in the study sample), alternative and co-occurring conditions for which they are at increased risk should be considered, including substance use, depression and anxiety. Although adolescents are generally at increased risk for mood and anxiety disorders, the rates of mental health/behavioral assessment were not higher for adolescents than for other age groups.

The prevalence of documented comorbid mental health/behavioral disorders were low relative to the prevalence of these comorbidities among children with ADHD that is reported in the literature, and also low relative to the prevalence of comorbid conditions seen in the KY ADHD utilization study, in which over 64% of children were identified with at least one of these conditions. Only 32.7% of children in the study sample were documented to have a comorbid mental health/behavioral health disorder. It should be noted that approximately 32% of children in the KY utilization study saw behavioral health providers only, and these children are not represented in this study, which focused on children with ADHD who had at least one PCP visit. However, the KY utilization study did not identify an association between children having emotional/behavioral comorbidity and seeing behavioral health providers only. There may have been comorbid conditions among children in the study that were not known to the PCPs caring for them, or the PCPs could have been focused on conditions other than behavioral health and therefore not documenting behavioral health conditions. The rates of emotional/behavioral comorbidity did not differ across age groups, so the targeted sampling of preschool-aged

children, who were overrepresented in our sample, did not impact the documented prevalence of these conditions.

There are specific behavioral health comorbidities that appear to be documented infrequently relative to prevalence in published reports and the KY utilization study. Prevalent comorbidities among children with ADHD include oppositional defiant disorder (ODD), anxiety, and depression. ODD is estimated to occur in approximately one third of children with ADHD, but was noted in only 15 of the 199 children in the study (7.5%).²³ Anxiety is also prevalent among children with ADHD, reported to occur in more than one fourth of these children, but in our study anxiety was only documented in 8 of 199 records (4%).²⁴ Few children were noted to have bipolar disorder in this study (9 children, 4.5%), though prevalence of bipolar disorder diagnosis has been reported to be increasing among children with ADHD, and it was noted to be fairly prevalent in the KY ADHD utilization study (15%). Depression was the most commonly identified behavioral health comorbidity, with 24 of 199 children identified with depression.

Comorbid learning disorders are reported in older published studies to occur in 12% of children with ADHD, and a more recent study estimates co-occurrence of learning disorders in children with ADHD to be 20% to 30%, typically identified by a psycho-educational assessment.²⁵ However, learning disorders were infrequently documented in this study, with only 11 of 199 (5.5%) children documented to have a learning disorder.

These discrepancies in prevalence of common comorbid disorders could reflect a lack of PCP awareness of comorbid conditions that are being managed by behavioral health clinicians or schools, or lack of assessment for these conditions. The assessment, identification and management/follow-up of comorbid conditions are areas that should be further explored, and should be part of educational initiatives for providers.

Physical health disorders that co-occur with ADHD were noted in small numbers, and included sleep disorders, seizure disorders and tic disorders, all of which can complicate management. Several children were also noted to have enuresis, which has been documented to co-occur with ADHD.²⁶

ADHD should be recognized as a chronic condition, and management should adhere to principles of the chronic care model and medical home. PCPs were involved in managing ADHD and prescribing medication for most of the children in the study. The AAP guidelines recommend that PCPs have a management strategy for children with ADHD, even if ADHD is diagnosed by a specialist, to ensure a medical home for the child and work with parents to address both physical and mental health needs. Developing such a strategy involves communication with and coordination with other providers, schools, parents and children.

Goal-oriented treatment planning should be a part of ADHD management, since it is a chronic condition. Management plans with information for parents, such as those used for other chronic conditions like asthma, can facilitate the management of ADHD.²⁷ Less than half of the records included documentation of an ADHD treatment plan, and the treatment plans that were documented included only rudimentary information, such as medication dosages and need for follow-up appointment. There was almost no documentation of goals for therapy, and only two records included measureable goals as part of the treatment plan. Care planning for ADHD is an area with opportunity for improvement.

More than a third of the children were referred to other providers, mostly psychiatrists or other mental health providers. The AAP notes in their guidelines that referrals are indicated if the PCP feels unable to successfully diagnose and manage a child with ADHD, citing a child's age as one possible factor that could complicate diagnosis and management. Children of preschool age had higher rates of referral to a mental health provider or other specialist than older children, perhaps due to the complexity of this age group and PCP uncertainty regarding diagnosis and management. These preschool-aged children were referred more often, even though they were primarily managed by PCPs at the same rate as other age groups. Children with comorbidity, whose care may also be complicated, were referred to mental health providers more than children without comorbidity. This is consistent with the AAP's observation that children with comorbid conditions, such as severe mood or anxiety, could benefit from consultation with or referral to specialists for assessment and management.

Once referred, only about half of cases (53.6%) included documentation of attention to follow-up of the referral. There was evidence of coordination of care among providers for 16% of all children with ADHD, although mental health providers were involved in managing ADHD for 22.6% of members. Some of these coordination efforts consisted of requests for information or Release of Information forms, which may not have been successful in securing information. These findings suggest that care coordination may have been lacking for some cases in which there were multiple providers managing a child's ADHD.

Appropriate treatment of ADHD can control ADHD symptoms and improve overall functioning. Treatment with either medication or evidence-based behavior training is strongly recommended by the AAP. A total of 7.5% of children had no documented treatment for their ADHD, which is of concern since lack of treatment for this chronic condition can lead to continued dysfunction and risk for poor long term outcomes. FDA-approved medications for ADHD have a solid evidence base for efficacy, with strongest evidence for stimulants.²⁸ There is also evidence that supports the use of the non-stimulant medications atomoxetine, extended-release guanfacine and extended-release clonidine. Nearly all the children were prescribed medication for ADHD during the review period (92%). Medication refusals did not appear to impact treatment, since there was only one documented medication therapy refusal among the records. Children were most frequently prescribed stimulants medication. Stimulants were prescribed for 93.4% of the children on medication, with only 25.7% receiving non-stimulants (data not shown in tables.) Atomoxetine was rarely prescribed (6.6%), which is consistent with reports documenting a decrease in the use of this medication for ADHD following an FDA warning and increased public awareness of potential adverse effects of atomoxetine, such as suicidal ideation. Notably, of the 12 children prescribed atomoxetine, only 3 (25%) were assessed for suicidal ideation. A total of 13.1% of children were prescribed clonidine, which has been prescribed more frequently in recent years, particularly for children with comorbidities and complex ADHD.²⁹ Sleep disorder were noted as a comorbid condition for 19 children, and sleep disturbance due to medication was noted for 39 children. Many of the records noted that clonidine was being prescribed for sleep, while other records noted a prescription of melatonin for sleep (11 cases).

Almost 16% of the children were prescribed a non-ADHD psychotropic medication. These included antidepressants (10 children) and, interestingly, antipsychotics (20 children, or 10% of the study sample). While 13 of the 20 children were noted to have a comorbid condition, only four of these children were documented to be diagnosed with bipolar disorder, and there was one child in the sample who had a psychosis documented. Antipsychotics may also be used in tic disorders, but only 2 children had a documented diagnosis of tic disorder. It is not clear what the indication for the antipsychotic was for the remaining children, as no other applicable diagnoses were documented. It is possible that these medications were prescribed elsewhere

and that the PCP was unaware of the relevant diagnoses, but since these drugs can be associated with major adverse effects, the use of these drugs for KY Medicaid children could be further explored.

Follow-up of children prescribed ADHD medication is essential to ensure adherence, since non-adherence is frequent, and to monitor for drug efficacy and adverse effects. AAP guidelines recommend that children prescribed pharmacologic therapy have a face to face visit to assess efficacy and adverse effects by the fourth week of therapy, with subsequent monthly visits until optimally managed and then every three months for the first year. After the first year, children on ADHD medication should be monitored at least twice a year. Children who were prescribed ADHD medication during the measurement year were documented to have a visit after the initial date of dispensing in most cases, but there was a substantial percentage (21.3%) with no PCP visit, and another 29.5% with only one PCP visit in the nine months following the initial ADHD dispensing date. These rates did not differ significantly between children newly prescribed medication in the review period and those who had previously been prescribed medication, though visits should be more frequent for children newly prescribed medication.

The study revealed that PCPs followed children more closely if they prescribed ADHD medication for the child than if another provider prescribed the medication. The PCP was the prescriber for most of the children with newly prescribed as well as children with previously prescribed medication. Children for whom the PCP was the prescriber had higher rates of 2 or more follow-up contacts, assessment for adherence, assessment of medication efficacy and assessment of adverse effects than children prescribed medication by another provider. These results are encouraging, since PCPs who are prescribing ADHD medication are monitoring their effect fairly closely. There were still areas for improvement, however, since 15% of children prescribed medication by PCPs had no follow-up contacts, and another 28% only had one, which is less than the recommended visit schedule, even for stable patients after one year of treatment. Telephone follow-up is an acceptable form of follow-up for titration of medication during the first month of medication treatment, this form of follow-up was used infrequently (20%).³⁰ Although academic performance was prominently noted as an area of impairment, school follow-up to assess progress after any treatment was sought in only 22.6% of cases.

Finally, rates of follow-up with the PCP were very low for members who were prescribed medication by other providers. Due to the high rate of adverse effects, at least one of which was noted in 66.7% of medicated children in our study sample (data not shown), and the high rate of non adherence to treatment that is reported among children with ADHD, it is important that follow-up with a prescribing provider is ensured. Care should be coordinated by the PCP in accordance with medical home principles for this chronic condition.

While the majority of children (70.5%, 80% if PCP prescribed) were assessed for therapeutic response to medication, few were assessed using validated follow-up tools, with most assessed through informal inquiry. Validated tools, which facilitate monitoring for efficacy, were used for only 22% of children prescribed medication by PCPs. The majority of children were assessed for adverse effects (64% overall), and adverse effects were fairly prevalent, particularly appetite and weight changes (37.6% of assessed children) and sleep problems (33.3% of assessed children). These problems are among the most commonly reported adverse effects of stimulants, and the prevalence of sleep problems may be reflected in the frequency of clonidine and melatonin prescriptions. While only 19% of medications were noted to be discontinued, the most common reason documented for discontinuation was adverse medication effect, which was documented in 18 records. Documentation of monitoring of weight and vital signs after medication initiation was present in most records. Evaluating these parameters is essential for

safety monitoring of children on stimulant medication.³¹ These parameters were monitored at high rates at some point in the review period after medication was prescribed (86.3%), though not universally and not frequently as noted in visit frequency.

There is evidence for the efficacy of specific types of behavior therapy in management of ADHD, and studies show that combined behavior and stimulant treatment have some therapeutic advantage in school-aged children in the first 14 months of therapy. Only 20.6% of members had any documented behavioral therapy. As would be expected, children with behavioral health comorbidity were more likely to have behavioral therapy than other children, since many of these conditions require behavioral therapy for successful management. However, most of the behavioral therapy was general counseling, with only small numbers of children documented to have evidence-based behavioral therapy. Of those with behavioral therapy documented, only 22% had Behavior Parent Training and 12% had behavior therapy/behavior modification. Behavioral classroom management, which the AAP notes can also be beneficial, was noted in only two records.

Education of parents is a critical component of the chronic care model and particularly important for medication titration. The receipt of any education was documented in only 35.2% of records, and the education documented was mostly general and medication-related. Education was somewhat better for children with medication prescribed by the PCP, but even these children received education in only 43.4% of cases. Only 17 children were documented to receive any safety or injury prevention education. This is an important area of focus, since children with ADHD are at risk for injury-related ED visits, as seen in the KY ADHD utilization study.

The AAP expanded the age range covered in its clinical practice guideline for ADHD to include preschool-aged and adolescent children, since there is evidence that the condition can be diagnosed in these age groups. Each of these populations presents unique challenges in diagnosis and management.

Adolescents with ADHD present particular management challenges, including the need for screening and management of co-occurring substance abuse, for which these adolescents are at risk. Substance abuse has been reported to be particularly prevalent among adolescents presenting without prior history of ADHD, which characterizes 30.6% of the adolescents in our sample.³² None of the children were documented to have a substance abuse disorder, which could truly reflect prevalence or reflect a lack of screening for this condition. Substance abuse in general was discussed with 14 of the 67 adolescents in the sample.

Because adolescents with ADHD have been reported to have more risky sexual and other behaviors than other adolescents, counseling for risk behaviors are particularly important for this population. About half of the adolescents in the sample had any counseling, and of those that did, only 27% had risky sexual behaviors addressed. General risk behaviors were discussed with 73% of adolescents who had counseling.

Children of preschool age, who represented 21.6% of the study sample, are particularly difficult to diagnose. Symptoms such as developmentally excessive inattention and over-activity that can be present at an early age may be difficult to separate from co-occurring behaviors like aggression and temper tantrums.³³ In addition, preschoolers may not have independent observers other than family, and if they do they might be less qualified to judge behaviors. First line treatment for preschool-aged children is evidence-based parent or teacher administered behavior therapy. Studies have shown that many children aged 4-5 have improvement in symptoms with behavior therapy alone, and evidence for this therapy in this age group is

strong.³⁴ Preschool-aged children were more likely than other children to have behavioral therapy, but only 41.9% of these children had any behavioral therapy, though most were newly diagnosed (79.1%). While ADHD medication is recommended only for children with moderate to severe dysfunction, medication is not indicated for preschool-aged children who do not meet DSM-IV criteria for diagnosis of ADHD. Only 2.3% of preschool-aged children were treated with behavioral therapy only, while 93% of children were prescribed medication and 39.5% received combined behavioral and medication therapy. Interestingly, although these children are known to be difficult to manage, the PCP was primarily managing the child's ADHD in 85.7% of cases. Most preschool-aged children (62.5%) did not have a rationale for medication documented, and of the reasons for medication documented, most were symptoms causing functional disturbance. None of the children were noted to have failed a trial of behavioral therapy as a rationale for medication therapy.

Limitations

Since this study was a medical record review, results reflect only documentation, and it is possible that not all interventions were documented. Although administrative data identified children as newly prescribed medication, some children were noted to be on medication at the start of the review period; therefore, sample size of children newly prescribed medication was smaller than anticipated. This study was limited to children already identified with ADHD, and so practices related to screening and case finding of ADHD could not be evaluated. Finally, only PCP records were reviewed, so children who saw only behavioral health providers were not included in the study, and behavioral health provider management of ADHD was not assessed.

Conclusion

As has been noted in other studies, PCPs were found to care for most children with ADHD in the study sample, including high risk populations such as preschool-aged children. Most children did not meet DSM-IV criteria, although having at least one problem behavior. PCPs were the prescriber of ADHD medication for most of the children on medication, and were found to follow children for whom they had prescribed medication more closely than other children. Opportunities for improvement exist in ensuring accurate diagnosis according to DSM-IV criteria, coordination of care, and frequent monitoring of children on medication for adverse effects and symptom improvement. Particular attention should be given to ensuring accurate diagnosis and appropriate treatment for preschool-aged children.

Recommendations for PHP

- PCPs should be provided with education and given tools for the identification and management of ADHD, and screening for comorbid conditions and adverse medication effects, since they provide the majority of ADHD care. Education efforts should include attention to increased risk for injury in this population, and management of teen drivers.
- Care coordination for children on ADHD medication should be promoted and facilitated where possible.
- The plan should carefully monitor high risk populations, such as preschool-aged children on ADHD medication and children on antipsychotic medication.

Recommendations for KDMS

- Future study could focus on antipsychotic medication use in children, which was noted in several children in the study sample although indications were unclear.
- Facilitation of care coordination through data sharing among physical and behavioral health should continue to be a focus for Medicaid children.

-
- ¹ Akinbami LJ, Liu X, Pastor PN, Reuben CA. Attention deficit hyperactivity disorder among children aged 5-17 years in the United States 1998-2009. NCHS Data Brief No. 70; August, 2011. Available at <http://www.cdc.gov/nchs/data/databriefs/db70.pdf>.
- ² Akinbami LJ. NCHS Data Brief No. 70, August 2011.
- ³ Akinbami LJ. NCHS Data Brief No. 70, August 2011.
- ⁴ Charach A, Dashti B, Carson P. et al. Attention deficit hyperactivity disorder: effectiveness of treatment in at-risk preschoolers; long term effectiveness in all ages; and variability in prevalence, diagnosis and treatment. Comparative Effectiveness Review No. 44. (Prepared by the McMaster University Evidence-based Practice Center under Contract No. MME2202 290-02-0020.) AHRQ Publication No. 12-EHC003-EF. Rockville, MD: Agency for Healthcare Research and Quality. October 2011. Available at: www.effectivehealthcare.ahrq.gov/reports/final.cfm.
- ⁵ Charach A. AHRQ Comparative Effectiveness Review No. 44, October 2011.
- ⁶ American Academy of Pediatrics. Subcommittee on Attention-Deficit/Hyperactivity Disorder, Steering Committee on Quality Improvement and Management. ADHD: clinical practice guideline for the diagnosis, evaluation and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics* 2011; 128(5):1-16.
- ⁷ Charach A. AHRQ Comparative Effectiveness Review No. 44, October 2011.
- ⁸ American Academy of Pediatrics. *Pediatrics* 2011; 128(5):1-16.
- ⁹ American Academy of Pediatrics. *Pediatrics* 2011; 128(5):1-16.
- ¹⁰ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.
- ¹¹ Garfield CF, Dorsey ER, Zhu S et al. Trends in attention deficit hyperactivity disorder ambulatory diagnosis and treatment in the United States, 2000-2010. *Academic Pediatrics* 2012; 12:110-116.
- ¹² Akinbami LJ, Liu X, Pastor PN, Reuben CA. Attention deficit hyperactivity disorder among children aged 5-17 years in the United States 1998-2009. NCHS Data Brief 2011; Number 70.
- ¹³ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.
- ¹⁴ Akinbami LJ, Liu X, Pastor PN, Reuben CA. NCHS Data Brief 2011; Number 70
- ¹⁵ Akinbami LJ, Liu X, Pastor PN, Reuben CA. NCHS Data Brief 2011; Number 70
- ¹⁶ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.
- ¹⁷ Attention deficit hyperactivity disorder: effectiveness of treatment in at-risk preschoolers; long term effectiveness in all ages; and variability in prevalence, diagnosis and treatment. Effective Health Care Program, Comparative Effectiveness Review Number 44. AHRQ Publication No. 12-EHC003-EF. Rockville, MD. Agency for Healthcare Research and Quality. October 2011. Available at www.effectivehealthcare.ahrq.gov/reports
- ¹⁸ American Psychiatric Association. Task Force on DSM-IV. Diagnostic and statistical manual of mental disorders: *DSM-IV-TR*. 4th ed. 2000, Washington, DC: American Psychiatric Association. xxxvii, p. 943.
- ¹⁹ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. American Academy of Pediatrics. Supplemental information. Implementing the key action statements: an algorithm and explanation for process of care for the evaluation, diagnosis, treatment and monitoring of ADHD in children and adolescents. *Pediatrics* 2011; 128(5):1-16.
- ²⁰ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.
- ²¹ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.

²² American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.

²³ Diagnosis of Attention-Deficit/Hyperactivity Disorder. Clinical Focus. Publication No. 99-0050. Agency for Healthcare Research and Quality, October 1999. Rockville, MD.
<http://www.ahrq.gov/clinic/tp/adhddtp.htm>

²⁴ Diagnosis of Attention-Deficit/Hyperactivity Disorder. Clinical Focus. Publication No. 99-0050. Agency for Healthcare Research and Quality, October 1999. Rockville, MD.

²⁵ Bennett AE, Power TJ, Eiraldi RB, et al. Identifying learning problems in children evaluated for ADHD: the Academic Performance Questionnaire. *Pediatrics* 2009;124:e633–e639

²⁶ Shreeram S, He JP, Kalaydjian A et al. Prevalence of enuresis and its association with attention-deficit/hyperactivity disorder among U.S. children: results from a nationally representative study. *Journal of the American academy of Child and Adolescent Psychiatry* 2009;48(1):35-41

²⁷ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.

²⁸ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.

²⁹ Yoon EY, Rocchini A, Kershaw D, Clark SJ. Clonidine utilization trends for Medicaid children. *Clinical Pediatrics* 2012; DOI 10.1177/000992812441661

³⁰ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. American Academy of Pediatrics. Supplemental information. Implementing the key action statements: an algorithm and explanation for process of care for the evaluation, diagnosis, treatment and monitoring of ADHD in children and adolescents. *Pediatrics* 2011; 128(5):1-16.

³¹ Zima BT, Hurlburt MS, Knapp P, et al. Quality of publicly-funded outpatient specialty mental health care for common childhood psychiatric disorders in California. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2005 Feb; 44(2):133-44.

³² American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.

³³ Comparative Effectiveness Review Number 44. AHRQ Publication No. 12-EHC003-EF. Rockville, MD. Agency for Healthcare Research and Quality. October 2011.

³⁴ American Academy of Pediatrics. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. *Pediatrics* 2011; 128(5):1-16.