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ANTIPSYCHOTIC USE IN CHILDREN AND ADOLESCENTS FROM 1996 TO 2001: EPIDEMIOLOGY, PRESCRIBING PRACTICES, AND RELATIONSHIPS WITH SERVICE UTILIZATION

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Dedication

This dissertation is dedicated to my wife, Brooke Rennels Patel, and my parents, Sharda and Chandu Patel, who have always believed in me and supported me throughout my career.

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ANTIPSYCHOTIC USE IN CHILDREN AND ADOLESCENTS FROM 1996 TO 2001: EPIDEMIOLOGY, PRESCRIBING PRACTICES, AND RELATIONSHIPS WITH SERVICE UTILIZATION

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The purpose of this study was to examine prevalence rates of antipsychotic use in children and adolescents from 1996 to 2001 in three state Medicaid programs and one private managed care organization; prescriber types and diagnoses associated with antipsychotic prescribing; and, trends in service utilization of youths receiving antipsychotic treatment.

Prescription claims were used to evaluate total, age-specific, and gender-specific prevalence of antipsychotic use. Prescription claims from the Texas Medicaid system were used to examine prescriber types, and data from the Texas Department of Mental Health and Mental Retardation from 1998 to 2001 were

used to examine diagnoses and service utilization of children and adolescents receiving antipsychotic treatment.

From 1996 to 2001, the prevalence of total antipsychotic use increased in each insurance program (Ohio Medicaid: 4.7 to 14.3 per 1,000; Texas Medicaid: 6.3 to 15.5; California Medi-Cal: 4.5 to 6.9; and, Managed Care Organization: 1.5 to 3.4). The prevalence of atypical antipsychotic use dramatically increased (Ohio Medicaid: 1.4 to 13.1 per 1,000; Texas Medicaid: 2.5 to 14.9; California Medi-Cal: 0.3 to 6.2; and, Managed Care Organization: 0.4 to 2.7). Across all systems, the use of antipsychotics increased in children and adolescents above the age of five years, and in both males and females.

In the Texas Medicaid system, psychiatrists accounted for the highest number of antipsychotic prescriptions for children and adolescents. Disruptive behavioral disorders were most commonly associated with antipsychotic prescribing.

The mean number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment and mental health care services from TDMHMR increased, as the mean number of hospital days per hospitalized youth decreased. Utilization of assessment services, counseling and psychotherapy, medication-related services, service coordination, and skills training increased. The mean duration of enrollment in assessment services, medication-related services, and skills training decreased, while the mean duration of enrollment in crisis intervention and service coordination increased.

Given the limited efficacy and safety data with antipsychotics in children and adolescents, additional studies of atypical antipsychotics and other treatment modalities are needed on what, how, and when the best treatments can be provided to children and adolescents across health care settings.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

Introduction and Literature Review

CHAPTER OVERVIEW

Chapter One provides a thorough review of the literature on epidemiological and pharmacoepidemiological studies, the use of antipsychotics, and concerns of increased use of atypical antipsychotics in children and adolescents.

A brief discussion regarding the advantages and need for epidemiological studies evaluating the prevalence of psychiatric and behavioral disorders in youths in the United States is provided. Large-scale, prevalence studies, such as the National Institute of Mental Health (NIMH) Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study and the Great Smoky Mountains Study (GSMS), are detailed. Following a brief introduction of pharmacoepidemiological studies of psychotropic medications, a review of pivotal studies examining prevalence rates of psychotropic medication use in children and adolescents is presented. With the focus being on the use of antipsychotics, a complete presentation of a study evaluating antipsychotic use in Texas Medicaid children and adolescents ensues.

As the studies demonstrate the increased use of antipsychotics, specifically atypical antipsychotics, in children and adolescents, discussion regarding the current uses of these agents is warranted. Furthermore, it is important to examine

the available evidence from randomized, controlled trials supporting the safety and efficacy of atypical antipsychotics in youths. Finally, arguments for and against the use of antipsychotics in children and adolescents, as well as recommendations for future research, are presented.

At the conclusion of Chapter One, the specific aims of the research study are discussed. Hypotheses and supporting rationales are presented, and descriptive analyses are listed.

Introduction to Child and Adolescent Psychiatric Epidemiological Studies

Child psychiatric epidemiological studies aim to provide estimates of the number of children and adolescents having a psychiatric or behavioral problem. A majority of child psychiatric epidemiological studies report the prevalence of mental problems, which refers to both new and existing cases of a condition observed during a specific period of time (period prevalence) or at a point in time (point prevalence).[1] Very few studies have reported the incidence of these conditions, which refers to the occurrence of new cases during a designated period of time. [1]

It is important to recognize that psychiatric epidemiological studies offer more than patterns of mental illness in the population. These types of studies further the knowledge and understanding of the etiology, natural course, and treatment of psychiatric and behavioral problems.[2,3] The identification of risk and protective factors to the onset, maintenance, and remission of mental illness allows the opportunity to develop future studies to evaluate treatment strategies

that may prevent the onset of illness, alter the course of disease, or improve patient outcomes. Epidemiological studies can provide information regarding prevalence rates, and disease severity and characteristics, across specific population subgroups, such as gender, ethnicity, age, socioeconomic status, and region.[4] These types of data are essential for the development of public policy relating to mental health services.[2,3,4] Data on patterns of service utilization and barriers to service utilization are necessary to appropriately and adequately design, fund, and allocate mental health services.

As early as 1958, large-scale epidemiological studies have been conducted in child psychiatry.[5] Past studies provided prevalence rates of global impairment of adaptive functioning, not specific psychiatric disorders among children. Gould and colleagues reviewed 25 prevalence studies conducted in the United States (U.S.) between 1928 and 1975, and estimated the median prevalence of clinical maladjustment at 11.8 percent.[6] In the studies reviewed by Gould et al., a single informant and a single method were employed to identify and characterize mentally impaired children and adolescents, which resulted in much variability of prevalence estimates. More recently, Roberts and colleagues reviewed 52 child psychiatric epidemiological studies of samples from over 20 different countries conducted over a 33-year period (1963 to 1996).[7] The overall mean prevalence was 15.8 percent, and the median prevalence was estimated at 13.7 percent. Prevalence rates varied greatly, ranging from one percent to 51 percent, and depended on methods of case ascertainment and definition. Roberts et al. speculated that problems with sampling, case ascertainment and definition, and

data analyses and presentation continue to hinder the ability of epidemiological studies to provide valuable, informative data.

Significant advances in sampling methodologies, types of measures, and case definitions have improved the reliability and validity of the findings of more recent child psychiatric epidemiological studies.[2] For example, an improvement in the reliability and validity of diagnostic assessment tools for psychiatric disorders in children and adolescents is exemplified by the development of the NIMH Diagnostic Interview Schedule for Children (DISC).[4] Specific for eliciting the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R) criteria for childhood psychiatric diagnoses, Version 2.3 of the DISC (DISC-2.3) has been used to estimate the prevalence rates of psychiatric disorders in the large-scale, multi-site MECA Study.[7] With increased sophistication of study design and diagnostic assessment, newer generation epidemiological studies have been able to produce more homogenous results than earlier studies, and more accurately report prevalence rates of child and adolescent psychiatric and behavioral disorders.

Prevalence Studies of Psychiatric and Behavioral Problems in Children and Adolescents

Psychiatric and behavioral problems have been recognized as a common and major cause of disability in children and adolescents.[8] Community studies of children and adolescents in the 1980s reported prevalence rates of moderate to severe psychiatric disorders ranging from 14 to 20 percent.[2] Newer, methodologically sound, epidemiological studies conducted in the 1990s, such as the NIMH MECA Study and the GSMS of Youth, have suggested that up to 30

percent of children and adolescents may suffer from some form of a mental disorder.[7,9] Additionally, these studies have identified patterns of mental health service utilization, indicating the need for these services among children and adolescents who have psychiatric or behavioral problems.[10,11]

The National Institute of Mental Health (NIMH) Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study

In 1989, the NIMH called for "a methodological study to develop feasible, reliable, and valid methods for the assessment of mental disorders, risk factors, and service utilization in youths aged nine through 17 years in large-scale, population-based surveys." A multisite collaboration with researchers from Columbia University, Emory University, the University of Puerto Rico, and Yale University resulted in the NIMH MECA Study.[4]

For the development of acceptable methods for large-scale child psychiatric epidemiological studies, the MECA study aimed to address eight issues:

1. To determine the acceptability of lengthy interviews of children and their caretakers and to assess adequacy of response rates from heterogeneous community samples;
2. To evaluate the psychometric properties of structured diagnostic interviews based upon DSM-III-R criteria (DISC-2.3);
3. To develop methods to appropriately diagnose a youth using multiple informants;
4. To develop reliable and valid measures of impairment to distinguish severity of psychiatric illness;

5. To develop measures of service utilization and identify barriers to service utilization;
6. To develop measures used to identify potential risk factors of psychopathology that can be employed in large-scale, population-based surveys;
7. To develop the appropriate methodologies necessary to conduct a multisite epidemiological study; and,
8. To estimate the prevalence of psychiatric disorders, to be used for the planning of future epidemiological research in children and adolescents. [4]

All children and adolescents between the ages of nine and 17 years living in a housing unit were targeted for the MECA study. The sample was drawn from four geographic areas near the collaborative universities: (1) Westchester County, New York (Columbia University); (2) DeKalb, Rockdale, and Henry counties, Georgia (Emory University); (3) San Juan, Puerto Rico (University of Puerto Rico); and, (4) Hamden, East Haven, and West Haven, Connecticut (Yale University). Potential subjects were drawn from housing units, which were defined differently according to study site, to avoid potential biases associated with other sampling sites, such as schools. Additionally, subjects were required to have lived in the housing unit for at least the previous six months to ensure that the caretaker would have adequate knowledge about the child for the six-month time frame for the diagnostic interview. [4]

Over 7,000 sampling housing units across the four geographic sites were counted, and from these, 1,523 youths were considered eligible. Of those eligible

for the study, 1,285 (84.4%) youths and their adult caretaker were interviewed using the DISC-2.3 (Youth version [DISC-C] and Parent version [DISC-P], respectively). The DISC-2.3 was developed and refined to extract DSM-III-R criteria for 31 childhood psychiatric diagnoses: overanxious disorder, separation anxiety disorder, avoidant disorder, simple phobia, social phobia, agoraphobia, panic disorder, generalized anxiety disorder, obsessive-compulsive disorder, attention-deficit hyperactivity disorder, oppositional defiant disorder, conduct disorder, major depressive disorder, dysthymic disorder, mania, hypomania, tic disorders, elimination disorders, anorexia nervosa, bulimia, and substance abuse. The DISC-2.3 also screened for possible psychosis. All diagnoses made by the DISC-2.3 were labeled as current, indicating the occurrence of symptoms during a six-month period prior to the structured interview.[4] Overall severity of disturbance was assessed using the Children's Global Assessment Scale (CGAS). Based upon the Global Assessment Scale (GAS) for adults, the CGAS is a unidimensional, global measure of social and psychiatric functioning for children between the ages of four and 16 years. CGAS scores between 61 and 70 indicate mild impairment, such as difficulty in a single area, but overall functioning is good; scores between 51 and 60 suggest moderate impairment, indicating a need for frequent or considerable supervision; and, scores less than 50 denote severe impairment, requiring constant supervision.[7]

Prevalence rates were estimated for four varying case definitions: (1) a case meeting DSM-III-R symptom, onset, and duration criteria only; (2) a case meeting DSM-III-R criteria and with a CGAS score less than 70, less than 60, or

less than 50; (3) a case meeting DSM-III-R criteria and symptoms resulted in impairment at school, at home, or among friends; and, (4) a case meeting DSM-III-R criteria, having a CGAS score less than 70, 60, or 50, and with significant impairment due to symptoms. Prevalence rates for disorders were also reported based upon a child's self-assessment, parental assessment, and a "combined" assessment using information from both the DISC-C and DISC-P.[7]

The interviewed sample (N=1,285) consisted of 53 percent males. Fifty-one percent of the youths were of non-Hispanic white ethnicity and 28 percent were Hispanic.[4] Non-Hispanic white subjects were drawn only from the U.S. mainland sites, while the Hispanic sample was drawn primarily from Puerto Rico. Ninety percent of the adult respondents paired with the interviewed youths were biological mothers; only three percent of the adults were fathers of the youths. Forty-two percent of the sample had household incomes ranging from $25,000 to $64,999.

The six-month combined prevalence rate for any psychiatric disorder based upon DSM-III-R criteria with the DISC-2.3 only was 32.8 percent (Table 1.1, page 9).[7] Without diagnoses of simple phobia and elimination disorders, the combined prevalence rate for any disorder decreased slightly to 29.9 percent. The highest six-month prevalence was for any anxiety disorder (20.5%), followed by any disruptive disorder (11.5%) and any depression (7.2%). With regard to specific DSM-III-R diagnoses, prevalence was highest for overanxious disorder (7.7%), followed by social phobia (7.6%) and oppositional defiant disorder (6.5%). As the level of social and psychiatric functioning decreased, prevalence

Table 1.1. Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study Prevalence Rates for DSM-III-R Diagnoses[7]

	DSM-III-R Criteria without DISC				DSM-III-R Criteria with DISC			
DSM-III-R Diagnosis	Criteria Only	CGAS ≤ 70	CGAS ≤ 60	CGAS ≤ 50	Criteria Only	CGAS ≤ 70	CGAS ≤ 60	CGAS ≤ 50
ANY ANXIETY								
Parent	21.0	7.7	4.6	2.0	9.8	5.3	3.0	1.2
Youth	23.7	10.0	4.4	1.9	12.3	7.1	3.3	1.6
Combined	39.5	18.5	9.6	4.3	20.5	13.0	7.2	3.2
ANY DEPRESSION								
Parent	3.9	3.1	2.3	1.2	3.7	3.0	2.2	1.2
Youth	6.0	4.7	2.3	1.3	4.3	3.4	2.0	1.1
Combined	8.8	7.5	4.5	2.6	7.2	6.2	4.2	2.3
ANY DISRUPTIVE								
Parent	8.1	5.8	3.7	1.7	7.6	5.8	3.7	1.7
Youth	7.1	5.7	3.0	1.6	4.7	0.4	2.3	1.3
Combined	14.3	11.8	7.2	3.9	11.5	10.3	6.4	3.7
ANY DISORDER								
Parent	30.3	12.1	6.5	3.2	19.2	10.2	5.5	2.7
Youth	32.2	15.3	7.2	3.4	19.6	12.3	6.1	2.8
Combined	50.6	24.7	12.8	6.2	32.8	20.9	11.5	5.4

Note: Values are percentages.

rates of psychiatric disorders decreased expectedly. Disagreement between youth- and parent-derived prevalence rates existed across certain diagnoses, including attention-deficit hyperactivity disorder and oppositional defiant disorder. Prevalence rates of disorders based upon DSM-III-R criteria without the

DISC-2.3 were consistently higher compared to those based upon DSM-III-R criteria with the DISC-2.3.

Youths and their parents involved in the NIMH MECA Study were interviewed to determine the utilization of mental health and substance abuse services.[10] The services component of the interview was designed to collect information about the youths' contacts with health, school-based, social services, and other service providers due to emotional, behavioral, drug, or alcohol problems. Twenty-five percent of the youths reported some contact for mental health services, and among these, only 36.5 percent met criteria for a psychiatric diagnosis. In each of the four communities under study, no more than 29.0 percent of youths with a psychiatric diagnosis and significant impairment (CGAS < 61) received mental health specialty services.

The findings from the MECA Study significantly furthered the field of child and adolescent psychiatric epidemiology along multiple fronts. First, the study provided preliminary prevalence estimates of psychiatric disorders in children and adolescents between nine and 17 years of age. The estimated prevalence rate for any psychiatric disorder was approximately 30 percent, suggesting that mental health conditions indeed are common among U.S. communities. Second, the study provided evidence suggesting that parental report and child report may not have much in common. Possible factors influencing disagreement included situation-specific problems, and differences in perception of symptom severity and impairment.[7] Third, the MECA Study exposed the need to establish an appropriate definition of a case. Higher levels of global

impairment, as indicated by CGAS scores, resulted in lower prevalence rates. Although the level of global impairment directly affected prevalence rates, it was unclear whether the impairment is associated with the specific disorder. Finally, the MECA study identified a need for mental health services for children and adolescents with a psychiatric or behavioral problem. Youths with a psychiatric diagnosis and significant impairment may not be receiving adequate mental health services.

The Great Smoky Mountains Study (GSMS) of Youth

The GSMS of Youth examined "the development of, the need for, and use of mental health services" in children and adolescents in the southeastern U.S.[9] The GSMS was designed with three major objectives: (1) case finding; (2) prevalence estimation; and, (3) generalizability.

A total of 12,000 children aged nine, 11, and 13 years in the southern Appalachian mountain region of North Carolina were identified as potential subjects using public schools' databases. Within age categories, each child had an equal probability of being chosen for the initial screening sample of 4,500 children (1,570 9-year-olds; 1,590 11-year-olds; and, 1,340 13-year-olds). Children were screened using the externalizing scale items of the Child Behavior Checklist (CBCL) to identify those with psychiatric symptoms and a high probability of mental health service use.[12] Children scoring in the top 25 percent of the sample, and a one in ten sample of those below the cutoff score were recruited for the study. A total of 1,346 children were recruited, including 1,009 children who scored high on the screening measure and 337 randomly selected

children who scored low. Of these, 1,071 children enrolled, and 1,015 were interviewed during the first wave of the study. This sample of children was comprised of 79 African-American, three Asian-American, six Hispanic, 11 mixed race, and 916 white subjects.

The Child and Adolescent Psychiatric Assessment (CAPA) was administered to the subjects to draw information about diagnoses and symptoms.[13] Both child and parent versions were used to assess the occurrence of symptoms during the preceding three months. Similar to the MECA Study, computer algorithms produced diagnoses based upon combined information from the child and parent diagnostic interviews. The CAPA was also used to measure functional impairment or incapacities in relationships with family, peers, and teachers, in activities at school, at home, and in the community.

The three-month combined prevalence rates for any DSM-III-R disorder was 20.3 percent (Table 1.2, page 13).[9] The highest prevalence rate was associated with any core disorder (12.1%), which included any emotional or behavioral disorder, schizophrenia, obsessive-compulsive disorder, anorexia, bulimia, Tourette disorder, trichotillomania, posttraumatic stress disorder, elective mutism, and encopresis. For the total sample, enuresis (5.1%) was the most common specific DSM-III-R diagnosis, followed by motor tics (3.5%), separation anxiety (3.5%), conduct disorder (3.3%), and oppositional defiant disorder (2.8%). For males, enuresis (7.7%), conduct disorder (5.4%), motor tics (4.3%), and oppositional defiant disorder (3.1%) were the most frequent. For females, separation anxiety (4.3%), motor tics (2.7%), enuresis (2.5%), and generalized

Table 1.2. The Great Smoky Mountains Study (GSMS) Prevalence Rates of Psychiatric Disorders[9]

Diagnosis	Female	Male	Total
Any anxiety disorder	7.0	4.5	5.7
Any depressive disorder	1.4	1.7	1.5
Any emotional disorder	8.0	5.7	6.8
Any behavioral disorder	3.5	9.5	6.6
Any tic disorder	2.9	5.5	4.2
Any other disorder (encopresis, enuresis, tics, Tourette disorder, obsessive-compulsive disorder, bulimia, trichotillomania)	5.9	15.0	10.5
Any emotional or behavioral disorder	10.8	13.0	11.9
Comorbid emotional and behavioral diagnoses	0.8	2.2	1.5
Any core disorder	10.9	13.3	12.1
Any disorder	15.5	24.9	20.3

Note: Values are percentages.

anxiety disorder (2.4%) were most common. Rare disorders, defined as fewer than five cases per the total sample, included agoraphobia, panic disorder, avoidant disorder, elective mutism, posttraumatic stress disorder, anorexia nervosa, bulimia, major depression, dysthymia, hypomania, manic episode, substance abuse/dependence, vocal tics, Tourette disorder, and schizophrenia. Comorbidity was quite common, as 100 (32.6%) of the 307 children were diagnosed with more than one disorder (Figure 1.1, page 15).

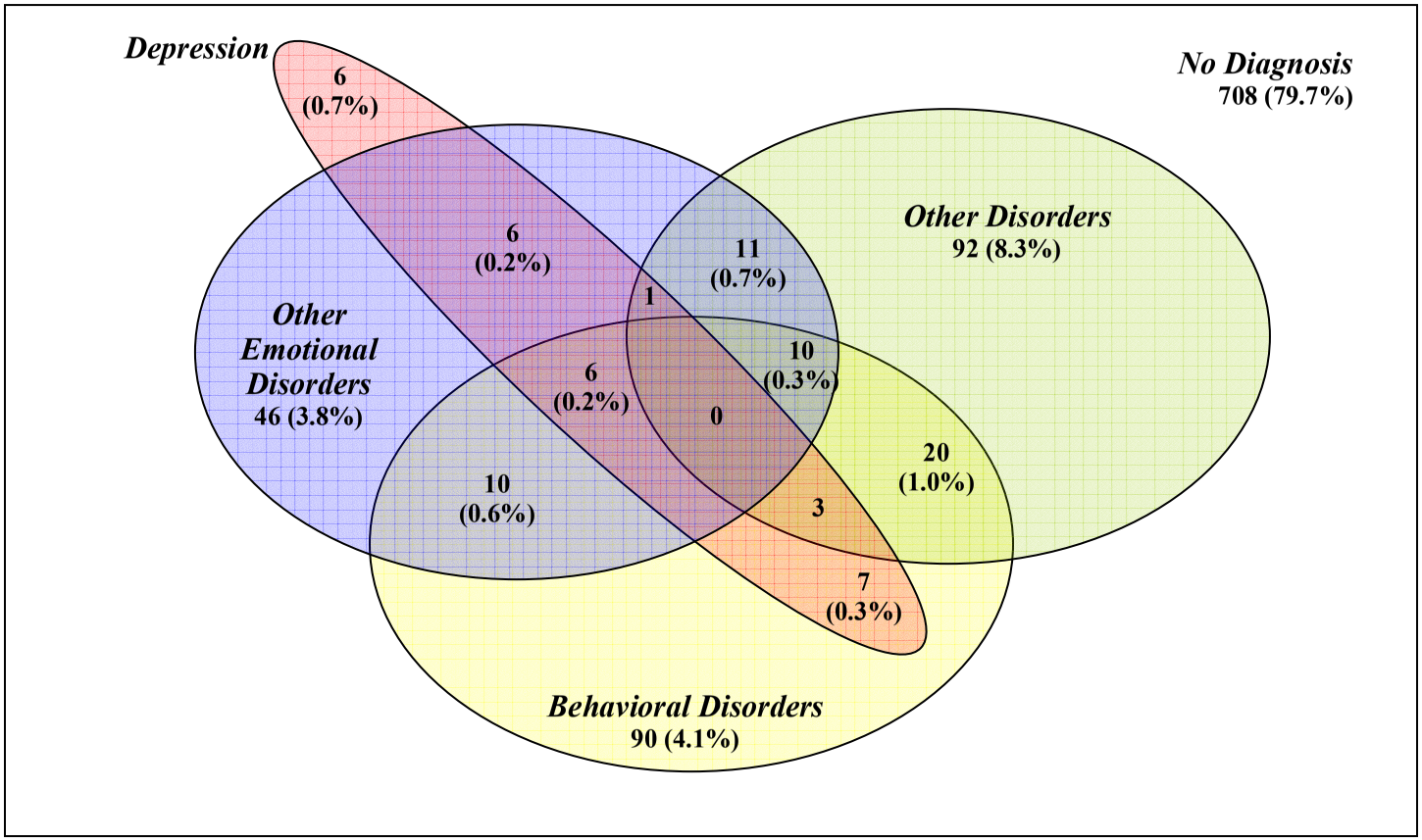
Males were more likely to have a diagnosis for a psychiatric disorder compared to females, predominantly due to behavioral disorders and enuresis.[9] Within age categories, separation anxiety, tics, and enuresis significantly differed between nine- and 11-year-olds. African-American children had higher rates of

functional enuresis compared to white children. Children from households with the lowest income were at increased risk for any psychiatric disorder, with the highest risk for behavioral disorders. Additionally, those from low-income families were at higher risk for comorbidity, particularly behavioral and emotional disorders. No significant differences in prevalence rates existed between income-adjusted urban and rural children.

Eleven percent of subjects with a DSM-III-R diagnosis had serious emotional disturbance.[14] The most common diagnoses associated with serious emotional disturbance included enuresis or encopresis (3.9%), conduct disorder (2.9%), anxiety disorder (2.6%), and oppositional defiant disorder (2.5%). Two percent of subjects with serious emotional disturbance had more than one diagnosis.

The GSMS also examined service utilization patterns of children and adolescents across five service sectors: specialty mental health services, education, general medicine, juvenile justice, and child welfare.[11] Data were collected using the Child and Adolescent Services Assessment (CASA), a questionnaire designed to gather information from parents and youths about more than 30 types of services that youths may use to address emotional, behavioral, or substance abuse problems. Three-year population estimates of service use suggested that 33.6 percent of youths used "any service", with education being the sector most often utilized (24.1%). Specialty mental health services were estimated to be used by 14.2 percent of the youth population, followed by general medicine (9.6%), juvenile justice (3.8%), and child welfare (3.5%). Among

Figure 1.1. The Great Smoky Mountains Study (GSMS) Rates of Comorbidity Among Diagnoses[9]



youths receiving any services during the three-year period, 38 percent received services for three months or less, 47 percent received services for three to 12 months, and 14 percent received services for 12 months or more.

The prevalence rates of psychiatric disorder in the GSMS sample were similar to those previous studies, suggesting approximately 20 percent of children had mental health problems. Furthermore, the results indicated that prevalence rates in the rural area were comparable with those extracted from urban areas. Comorbidity of psychiatric conditions was quite frequent in this study, which causes concern about future risk and poorer long-term patient outcomes. The GSMS also furthered the understanding of disease, as it examined those factors influencing the prevalence rate of psychiatric disorders, such as gender, race, and household income. Similar to findings of the MECA Study, the GSMS demonstrated the need for mental health specialty services for youths with psychiatric, behavioral, or substance abuse problems. Mental health services may be equally needed in rural areas as they are in urban areas, as prevalence rates of psychiatric conditions in rural versus urban areas were comparable.

Other Recent Prevalence Studies of Psychiatric and Behavioral Problems in Children and Adolescents

Halfon and Newacheck conducted a study using the National Health Interview Survey (NHIS) to estimate the number of children with parent-reported psychiatric conditions from 1992 to 1994.[15] Conducted annually by the U.S. Bureau of Census, the NHIS surveys approximately 45,000 households nationwide.[16] Information regarding chronic, disabling conditions is collected from parents, and diagnoses are assigned by trained staff at the National Center

for Health Statistics (NCHS) using the International Classification of Diseases (ICD) coding system.

During 1992 to 1994, an estimated 1,448,000 (2.1%) children between the ages of zero and 18 years in the U.S. were reported to suffer from a chronic, disabling mental health condition. Approximately 1,378,000 children were considered moderately to severely impaired. Higher rates of disabling mental health conditions were associated with children from the following groups: African-Americans (2.6%), males (2.9%), low socioeconomic status (3.3%), one-parent households (3.1%), and households whose head was less educated (3.1%). Regionally, prevalence rates were significantly greater in the Midwest (2.6%) compared to the Northeast (1.9%) and West (1.7%); no difference between the Midwest and the South (2.3%) existed.

The most common chronic, disabling mental health condition was mental retardation, as parents reported 1,054 cases per 100,000 children (1.0%). Attention-deficit hyperactivity disorder (505 per 100,000; 0.5%) and learning disability (279 per 100,000; 0.3%) were also frequently reported by parents. The prevalence of mental health conditions, particularly mental retardation and attention-deficit hyperactivity disorder, significantly increased as children became older. Among children suffering from mental retardation, high prevalence rates were associated with males, children from poor families, and children whose head of household was less educated. Compared to the West, mental retardation was more prevalent in the Midwest, South, and Northeast. Among children with attention-deficit hyperactivity disorder, higher prevalence rates were related to

males, poor family income, one-parent households, and family sizes less than five members.

Garland and colleagues examined prevalence rates of psychiatric disorders in children and adolescents across five public sectors of care in San Diego, California: alcohol and drug services, child welfare, juvenile justice, mental health, and public school services for serious emotional disturbance.[17] Between October 1997 and January 1999, 1,618 youths between the ages of six and 18 years were randomly selected and administered the computer-assisted version of the Diagnostic Interview Schedule for Children (C-DISC-IV).[18] Similar to its predecessor DISC-2.3, the C-DISC-IV was designed to elicit childhood diagnoses based upon the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV).

A majority of the sample (54.5%) was drawn from the mental health sector. Sixty-six percent of the total sample was males, and the distributions in age categories were similar (6-11 years: 25.1%; 12-15 years: 30.0%; 16-18 years: 44.9%). Youths were from a variety of racial/ethnic backgrounds: Caucasian (39%), Latino (26%), African American (21%), Asian American/Pacific Islander (6%), mixed ethnicity (5%), and other/unknown (3%).

The total prevalence rate of psychiatric disorders among youths in five sectors of public care was 54 percent. The prevalence of attention-deficit hyperactivity disorder and disruptive disorders was highest at 49.7 percent. Anxiety and mood disorders had prevalence rates of 9.9 percent and seven percent, respectively. Across sectors of care, prevalence rates were highest

among youths in public school services for serious emotional disturbance (70.2%), followed by mental health (60.8%), alcohol and drug services (60.3%), juvenile justice (52.1%), and child welfare (41.8%). Additionally, attention-deficit hyperactivity disorder and disruptive disorders were the most common diagnoses in each public sector of care.

Changes in the Prevalence of Child and Adolescent Psychiatric and Behavioral Problems

One of the major questions in child and adolescent psychiatry is whether or not the prevalence rates of psychopathology are increasing over time. Little is known about changes in the prevalence rates of mental disorders in children and adolescents. Most epidemiological studies in child psychiatry have examined point prevalence, while few studies have examined changes in prevalence rates across multiple years.[5]

In an attempt to answer this question, Roberts et al. grouped epidemiological studies in children and adolescents based upon date, and examined prevalence rates for studies.[5] The mean prevalence was 15.4 percent for studies conducted prior to or in 1970. The mean prevalence for studies conducted between 1971 and 1980 was 14.1 percent, and for studies between 1981 and 1990, 13.8 percent. Studies conducted after 1990 had a significantly higher mean prevalence rate at 26 percent (range=12.1% to 50.6%). Due to significant variability in methods for case ascertainment and definition across the studies, Roberts and colleagues felt it was difficult to draw valid conclusions about changes in the prevalence rates over time.

Kelleher and colleagues conducted a retrospective, cohort study to examine the trends of psychosocial problems in children and adolescents from 1979 to 1996.[19] The first cohort were subjects recruited from the Monroe County Study (MCS) of 1979, which consisted of over 18,000 children between the ages of zero and 18 years from 30 pediatric offices in and around Rochester, New York. Data on a total of 9,612 children between four and 15 years of age were utilized from the MCS. These data were compared to data from the Child Behavior Study (CBS) of 1996. This cohort was comprised of 21,065 children, ages four through 15 years, from 204 practices in 44 states, the Commonwealth of Puerto Rico, and four provinces in Canada. Sixty-six percent of the CBS clinicians were pediatricians, and 26 percent were family practice physicians.

In the MCS, clinicians identified the presence of a psychosocial problem by responding "yes" to the following question: "Regardless of the purpose of this visit, in your opinion, does this patient have a behavioral, emotional or school problem, treated or untreated?" In the CBS, clinicians indicated a psychosocial problem by responding "yes" to the following question: "Is there a new, ongoing, or recurrent psychosocial problem?" Clinicians from these studies also used the World Health Organization (WHO) classification scheme to further identify the type of psychosocial problem present.[20] Kelleher and colleagues defined psychosocial problems as "any mental disorders, psychological symptoms or social situations warranting clinical attention or intervention."

Clinician-identified psychosocial problems among children significantly increased over the 17-year period, as 6.8 percent of children in 1979 were

identified compared to 18.7 percent in 1996 (Table 1.3, page 22). The greatest absolute percent changes were associated with attention-deficit/hyperactivity disorder (7.8%), and behavioral/conduct problems (6.5%). Modest increases in other types of psychosocial problems were reported, with the exception of mental retardation which decreased from 1.1 percent in 1979 to 0.4 percent in 1996. Increases in the percentages of children and adolescents with psychosocial problems paralleled increases in childhood poverty and single-parent households, suggesting the role of environmental factors in the development of psychosocial problems.

Summary

Beyond providing estimates of the number of children and adolescents affected by mental illness, psychiatric epidemiological studies are valuable sources of information for understanding disease characteristics and progression. Moreover, these types of studies inform about current states of mental health care service utilization and associated costs. Subsequently, these data are used to formulate service utilization policies. Earlier psychiatric epidemiological studies of children and adolescents were plagued with methodological problems, which resulted in much variability in prevalence estimates. Variations in prevalence estimates of mental disorders in children and adolescents may be due to variations in case assessment, particularly with regard to the specificity of the measure. Improved study designs and assessment tools, as seen with the NIMH MECA Study and the GSMS, have produced more accurate prevalence estimates of

Table 1.3. Monroe County Study (MCS) and Child Behavior Study (CBS) Prevalence Rates of Psychosocial Problems[19]

	Monroe County Pediatricians (1979) N = 9612	CBS Monroe County Pediatricians (1986) N = 1387	CBS Clinicians (1986) N = 21065
Clinician-identified problem	6.8	16.1	18.7
Adaptation/adjustment reaction	2.3	3.9	4.4
Attention deficit/hyperactivity disorder	1.4	7.6	9.2
Specific developmental delays (learning disabilities, speech, and language delays)	1.5	3.5	2.1
Behavioral/conduct problems	1.0	4.4	7.5
Childhood psychosis	0.0	0.0	0.2
Physical manifestations (psychosomatic disorders, anorexia)	0.1	2.9	3.9
Mental retardation	1.1	0.2	0.4
Emotional problems (anxiety, sadness, personality disorder, neurotic disorder)	0.2	2.0	3.6
Other (substance abuse, family problems, unspecified others)	0.0	1.9	3.9

Note: Values are percentages.

mental disorders in this population. Twenty to thirty percent of U.S. children suffer from mental health conditions, suggesting that these conditions are commonplace, and increasing numbers of youths are affected. Attention-deficit hyperactivity disorder and disruptive behavioral disorders, such as conduct and oppositional defiant disorder, are diagnoses frequently present in children and adolescents. Pharmacological treatment is considered a suitable option for some childhood and adolescent psychiatric disorders. Given the significant, growing

number of U.S. youths with mental illness, it is important to determine the extent and growth of psychotropic medication use in this population.

Pharmacoepidemiological Studies of Psychotropic Medications in Children and Adolescents

In past years, the utilization of psychotropic medications for the treatment of psychiatric and behavioral problems in children and adolescents has received much attention. Public concern concerning the use of psychotropic medications in youths stems from the lack of safety and efficacy data for these agents in this population. Without such information, it is difficult to make conclusions regarding the type of response and possible short-term and long-term effects children and adolescents will experience secondary to the administration of psychotropic drugs.

Little data exist regarding national utilization patterns of overall and specific classes of psychotropic medications in children and adolescents. Results from earlier studies examining the prevalence rates of psychotropic medication use have been limited in their generalizability to national populations of youths, mainly because of confinement to geographic settings, and institutional or clinic settings.[21] Additionally, pharmacoepidemiological studies utilizing national data examined prevalence rates of methylphenidate use alone.[22,23] More recent studies of prevalence rates of psychotropic medication use have improved the representativeness of the sampled population, thus increasing the generalizability of their findings.[21,24,25] These studies have suggested that over the past few decades, there has been a substantial increase in the utilization of psychotropic

medications for the treatment of psychiatric and behavioral disorders in children and adolescents. The increase in the use of psychotropic medications in youths has translated into a significant increase in costs. In 1998, the use of psychotropic medications in this population accounted for nine percent (approximately $1.1 billion) of all expenditures for mental health.[26]

Prevalence Rates of Psychotropic Medication Use in Children and Adolescents

Kelleher and colleagues reported that in 1985, 1.5 percent of physician office visits by children and adolescents less than 18 years of age included the prescription of a psychotropic agent.[19] Psychostimulants were the most frequently prescribed agents, and psychiatrists were associated with the highest prescription rates per office visit. As subsequent evidence from other pharmacoepidemiological studies of psychotropic medication use suggested increased prevalence rates, the findings from the Kelleher study were limited in applicability and did not inform as to the current rates of psychotropic medication prescribing in children and adolescents.

In order to determine more current rates of psychotropic medication prescribing in youths, Jensen and colleagues conducted a study in which data from the 1995 National Ambulatory Medical Care Survey (NAMCS) and the 1995 National Disease and Therapeutic Index (NDTI) were used to estimate prevalence rates of psychotropic use.[21] Data from the NAMCS consisted of 36,875 patient record forms from a sample of 1,883 physicians across the U.S. This sample included nonfederally employed physicians who are primarily engaged in office-based, ambulatory, direct patient care, and excluded those

physicians in the medical specialties of anesthesiology, radiology, and pathology. Since NAMCS data were derived from office visits only, prescribing rates were reported as frequency of psychotropic medication prescription per office visit. Data from the NDTI included all patient contacts, office, hospital, face-to-face, or phone, from 2,940 office-based physicians. Prescribing rates were reported as drug "mentions," which includes every time a drug was prescribed, refilled, recommended, or provided to the patient as a sample. Based upon estimates of the population for July 1995 provided by the U.S. Bureau of Census, it was estimated that 697,082,010 physician office visits were made in 1995.

Prescribing rates for 11 categories of psychotropic medications were examined: anticonvulsant mood stabilizers (carbamazepine and valproate), antipsychotics, benzodiazepines, bupropion, buspirone, central adrenergic agonists (clonidine and guanfacine), lithium, other antidepressants (nefazodone, trazodone, and venlafaxine), selective serotonin reuptake inhibitors (SSRIs), stimulants (amphetamine compounds, methylphenidate, and pemoline), and tricyclic antidepressants (TCAs). National prescribing rates for the categories of psychotropic medications were determined using the total number of visits (NAMCS) and mentions (NDTI) from the samples and projecting these numbers to the estimated population (697,082,010 visits).

From both the NAMCS and NDTI databases, stimulants were the most commonly prescribed or mentioned class of psychotropic medication for patients less than 18 years of age (Table 1.4, page 27). Over 2,000,000 physician office visits resulted in the prescribing of a stimulant, and nearly 6,000,000 drug

mentions for stimulants occurred in 1995. SSRIs were the second most frequent psychotropic medications in both databases, as there were 358,616 visits resulting in SSRI prescriptions and 1,083,000 SSRI drug mentions occurring. Other commonly prescribed psychotropic drug classes included anticonvulsant mood stabilizers, TCAs, benzodiazepines, and central adrenergic agonists. Other commonly mentioned psychotropic medications included TCAs, central adrenergic agonists, antipsychotics, and benzodiazepines.

Although the NAMCS and NDTI databases did not allow for estimations of actual numbers of children and adolescents receiving psychotropic medications, the results indirectly indicate that psychotropic medications are commonly prescribed for U.S. youths by physicians. In addition, the extent of exposure of these agents exceeded the available scientific evidence supporting their safety and efficacy in children and adolescents in 1995.

Table 1.4. National Estimates of Drug Visits and Mentions for Children and Adolescents from the 1995 National Ambulatory Medical Care Survey (NAMCS) and National Disease Therapeutic Index (NDTI)[21; a,b,c]

Number of Drug Visits by Youths for Psychiatric Diagnoses (1995 NAMCS)			Number of Drug Mentions for Youths with Psychiatric Diagnoses (1995 NDTI)		
Drug Category	N	Estimated Drug Visits	Drug Category	N	Estimated Drug Mentions
Stimulants	129	2069488	Stimulants	1410	5971000
SSRIs	43	358616	SSRIs	316	1083000
Central adrenergic agonists	26	202032	TCAs	298	969000
Anticonvulsant mood stabilizers	25	318971	Central adrenergic agonists	132	431000
TCAs	23	268770	Antipsychotics	108	355000
Benzodiazepines	15	218523	Benzodiazepines	92	280000
Antipsychotics	9	71863	Anticonvulsant mood stabilizers	55	185000
Lithium	8	63584	Lithium	51	175000
Bupropion	3	25069	Non-TCA, non-SSRI antidepressants	35	106000
Non-TCA, non-SSRI antidepressants	3	15345	Buspirone	17	55000
Buspirone	2	10692	Bupropion	47	42000

[a] SSRI = Selective serotonin reuptake inhibitors; TCA = tricyclic antidepressants.
[b] Estimates from NAMCS considered unreliable if based on < 30 records from the actual sample.
[c] Estimates from NDTI considered unreliable if less than 100000 of the extrapolated estimates.

To correct for variations in prescription-to-person ratios, Olfson and colleagues designed and conducted a database study to provide direct estimations of the number of children and adolescents receiving psychotropic medications in 1987 and 1996.[25,27] Data were collected from the 1987 National Medical Expenditure Survey (NMES) and the 1996 Medical Expenditure Panel Survey

(MEPS), both sponsored by the Agency for Healthcare Research and Quality and conducted as national probability samples of the U.S. civilian, noninstitutionalized population. Data from the NMES were derived from 15,590 dwelling units, which included 10,389 children and adolescents less than 18 years old. The MEPS data were obtained from 9,400 households, including 6,490 youths under the age of 18 years. Both surveys asked for "each prescribed medicine bought or otherwise obtained" by participants during 1987 (NMES) and 1996 (MEPS). Responses to the above question were categorized into one of the following groups: stimulants, antidepressants, and other psychotropic medications. Rates of psychotropic medication use per 100 persons were determined for each survey year, and further stratified according to demographic variables.

Between 1987 and 1996, the number of children and adolescents who received psychotropic medications increased dramatically, from 1.4 to 3.9 per 100 youths. Significant increases in overall psychotropic medication use were reported in children and adolescents between the ages of six and 18 years; males and females; youths of African-American, Hispanic, and Caucasian ethnic backgrounds; privately and publicly insured children and adolescents; and, youths residing in the Northeast, Midwest, and South. When examining specific therapeutic classes, the largest increase in use was observed with psychostimulants, as children were 3.9 times more likely to use a stimulant in 1996 than in 1987 (0.6 versus 2.4 per 100 children and adolescents). Rates of stimulant use increased most in children and adolescents between 15 and 18 years

of age, and of African-American descent. Antidepressant use also increased significantly from 1987 to 1996, as an additional 0.7 per 100 children and adolescents were likely to use these agents in 1996. The increase in antidepressant use was most evident in children and adolescents aged 15 to 18 years. An increase in the rate of use of other psychotropic medications increased from 0.6 (1987) to 1.2 (1996) per 100 youths.

In a more recent study by Zito and colleagues, changes in the prevalence rates of psychotropic medication use in children and adolescents less than 20 years of age were examined from 1987 to 1996.[24] Data were drawn from computerized administrative claims and medical records from geographically distinct health care systems: a mid-Atlantic Medicaid state (MAM), a midwestern Medicaid state (MWM), and a northwestern group-model health maintenance organization (HMO). In 1987, total enrollments for children and adolescents less than 20 years of age were as follows: MAM, 138,018; MWM, 627,187; and, HMO, 111,686. In 1996, total enrollments were as follows: MAM, 121,700; MWM, 645,356; and, HMO, 130,638.

Medicaid fee-for-service reimbursement claims for psychotropic medications and the HMO computerized psychotropic medication dispensing records were organized into medication categories defined by the American Hospital Formulary Service (AHFS).[28] Major therapeutic classes included antidepressants, anxiolytics, hypnotics, lithium, neuroleptics, and stimulants. These categories were further stratified into relevant subclasses: alpha-adrenergic agonists (clonidine and guanfacine); antianxiety-antihistamine (hydroxyzine);

antidepressants (SSRIs, TCAs, and other [trazodone, bupropion, maprotiline, and venlafaxine]); anxiolytics and hypnotics (benzodiazepines and nonbenzodiazepines); mood stabilizers (valproate, carbamazepine, and gabapentin); and, stimulants (methylphenidate, amphetamines, and pemoline). Prevalence of use was defined as the number of children and adolescents with a prescription claim for any psychotropic medication per 100 (or 1,000) enrolled youths. Period prevalence rates were determined annually from 1987 to 1996 for total, class-specific, subclass-specific psychotropic medication use. In addition, prevalence rates of use were determined for age-specific, gender-specific, and ethnicity-specific categories.

Over the ten-year period, there was a significant increase in the prevalence of psychotropic medication use in the MAM, MWM, and HMO (Table 1.5, page 31). While the MWM experienced a 2.2-fold increase in use, the MAM and HMO more than tripled in prevalence of use (3.3-fold and 3.2-fold, respectively). The greatest increase in the prevalence of class-specific psychotropic medication use was associated with alpha-adrenergic agonists. In the MAM system, the prevalence rate of alpha-adrenergic agonist use increased from 0.04 (1987) to 6.6 (1996) per 1,000 enrolled. In the MWM, a 53-fold increase in use was observed, as the prevalence rate increased from 0.1 (1987) to 7.3 (1996). The prevalence rate of alpha-adrenergic agonist use increased from 0.1 (1987) to 3.9 (1996) per 1,000 enrolled youths in the HMO. Upon closer examination of annual prevalence rates, the substantial growth in alpha-adrenergic agonist use occurred after 1991.

Table 1.5. Prevalence Rates of Psychotropic Medication Use in Children and Adolescents Less Than 20 Years of Age in Two Medicaid Systems and One Health-Maintenance-Organization from 1987 to 1996[24; a]

	Mid-Atlantic Medicaid (MAM)				Midwestern Medicaid (MWM)				Health-Maintenance Organization (HMO)			
	Prevalence				Prevalence				Prevalence			
	1987	1991	1996	Prevalence Ratio	1987	1991	1996	Prevalence Ratio	1987	1991	1996	Prevalence Ratio
Number of Enrolled	138018	165502	121700	-	627187	669164	645356	-	111686	131038	130638	-
Any Psychotropic Medications	18.4	36.8	61.6	3.3	28.3	31.7	62.6	2.2	18.6	27.1	59.1	3.2
Alpha-adrenergic agonists	0.04	0.44	6.6	153.0	0.14	0.51	7.3	53.0	0.10	0.37	3.9	36.0
Anticonvulsants, mood stabilizers	2.2	5.9	12.8	5.9	4.9	6.6	10.8	2.2	1.1	1.9	2.7	2.5
Antidepressants	1.9	10.1	20.5	10.4	5.6	8.3	20.4	3.6	2.7	5.7	16.6	6.2
Anxiolytics	1.0	3.4	4.5	4.4	6.2	4.2	4.8	0.8	1.6	1.8	5.5	3.4
Hydroxyzine	0.86	2.3	3.1	3.6	1.8	1.7	2.7	1.5	4.3	7.0	9.5	2.2
Hypnotics	0.28	3.7	1.5	5.2	2.8	2.2	1.8	0.7	2.2	2.2	1.6	0.7
Lithium	0.25	2.6	3.7	14.8	0.32	0.9	1.6	5.1	0.16	0.5	0.8	4.9
Neuroleptics	1.5	4.5	8.0	5.5	3.3	3.3	5.4	1.6	0.41	0.5	1.0	2.3
Stimulants	14.3	16.2	38.4	2.7	10.1	12.9	37.2	3.7	3.6	6.5	25.4	7.0

[a] Prevalence per 1000 enrolled youths.

In 1996, the most commonly prescribed psychotropic medications across the three systems were psychostimulants. Prevalence rates of stimulant use in 1996 ranged from 37.2 to 38.4 per 1,000 enrolled Medicaid children and adolescents, and 25.4 per 1,000 enrolled HMO youths. Although methylphenidate accounted for a majority of the prescriptions, amphetamines were related to the most significant increase in prevalence rates in the MAM (seven-fold increase) and HMO (14-fold increase). Antidepressants were the second most commonly prescribed psychotropic medications for youths less than 20 years of age. Within this class, SSRI use represented approximately half of the total antidepressant use in 1996. Other antidepressants, namely nefazodone and venlafaxine, were also associated with considerable use during the mid-1990s. Despite increases in use of SSRIs and other antidepressants, prevalence rates of TCA use remained relatively steady during the ten-year study period.

In the Medicaid healthcare systems (MAM and MWM), children and adolescents between the ages of ten and 14 years used the most psychotropic medications in 1996 (Table 1.6, page 33). Within the HMO, adolescents of 15 to 19 years of age were associated with the highest prevalence rate of psychotropic medication use in 1996. Males were the highest utilizers of psychotropic medications in the MAM and MWM, while females had higher prevalence rates in the HMO. White youths had the highest prevalence rates in the MAM and MWM (86.6 and 75.2 per 1,000 youths, respectively). However, African-American children and adolescents in the MAM experienced the most dramatic

increase in prevalence of psychotropic medication use (4.8-fold increase from 1987 to 1996).

Table 1.6. Prevalence Rates of Psychotropic Medication Use for Age-Specific, Gender-Specific, and Ethnicity-Specific Categories[24; a]

	Mid-Atlantic Medicaid (MAM)		Midwestern Medicaid (MWM)		Health Maintenance Organization (HMO)	
	1996 Prevalence	1996-1987 Prevalence Ratio	1996 Prevalence	1996-1987 Prevalence Ratio	1996 Prevalence	1996-1987 Prevalence Ratio
Age Group (Years)						
0-4	9.8	2.3	15.3	1.1	17.7	1.5
5-9	95.4	2.5	86.8	2.6	58.5	3.1
10-14	129.4	4.8	105.1	3.4	72.0	4.0
15-19	54.5	7.2	81.5	2.0	82.8	3.3
Gender						
Male	87.9	3.1	83.0	2.6	59.1	3.5
Female	37.5	4.0	42.7	1.8	68.5	2.8
Ethnicity						
White	86.6	2.5	75.2	2.2	N/A	N/A
African-American	51.3	4.8	34.6	2.2	N/A	N/A

[a] Prevalence per 1000 enrolled youths.

Prevalence Rates of Antipsychotic Use in Children and Adolescents

Most pharmacoepidemiological studies of psychotropic medication use in children and adolescents have been limited to the late 1980s and early to mid-1990s. While these studies are beneficial in characterizing overall psychotropic medication use, they have not addressed the impact of newer medications on

utilization, particularly atypical antipsychotics. Clozapine was introduced to the market in 1989, but its use has been limited due to the risk of agranulocytosis.[29] Risperidone was the second atypical antipsychotic introduced in 1993, followed by olanzapine in 1996, quetiapine in 1997, ziprasidone in 2001, and aripiprazole in 2002.

Antipsychotic use in children and adolescents increased from 1987 to 1996, ranging from a 1.6-fold (MWM) to 5.5-fold (MAM) increase.[24] Closer examination of the data from the MWM demonstrated a trend of increased use of all antipsychotics starting in 1993.[30] The overall increase in use was solely attributed to an increase in the use of atypical antipsychotics, as the use of typical antipsychotics decreased from 1994 to 1996. Although prevalence estimates during the mid-1990s suggest an increased trend of atypical antipsychotic use among children and adolescents, these findings may not fully represent the current trends in use, primarily because no safety and efficacy data in youths were available at that time.

To date, the only published study examining more current trends in antipsychotic use in children and adolescents was conducted by Patel and colleagues.[31] Data were collected from paid prescription claims records from the Texas Medicaid Vendor Drug database from 1996 to 2000. Eligibility data were provided from the Research and Forecasting Department of the Texas Health and Human Services Commission (HHSC), and annual enrollment of children and adolescents, less than 20 years of age, was defined as the December enrollment for each study year (Table 1.7, page 35).

Table 1.7. Texas Medicaid Eligibility Data for Children and Adolescents from 1996 to 2000[31; a]

Year	Total	Male	Female	<2 y	2-4 y	5-9 y	10-14 y	15-19 y
1996	1143025	567712	575313	237220	267800	345133	184152	108720
1997	1046609	520458	526151	218973	232130	313909	184895	96702
1998	993021	495489	497532	210515	206552	284085	171052	120817
1999	976291	487737	488554	212276	197366	271776	165967	128906
2000	1002341	525692	476649	226490	201444	269988	170722	133697

[a] y = Years.

A total of 304,402 prescription claims records for 28,540 children and adolescents receiving typical and atypical antipsychotics were examined. Prevalence was defined as the number of youths with at least one Medicaid prescription claim record for an antipsychotic per 1,000 enrolled children and adolescents. Prevalence rates of total, subclass-specific (typical and atypical), and specific atypical (clozapine, olanzapine, quetiapine, and risperidone) antipsychotic use were determined annually over a five-year period (1996 to 2000). Age-specific (<2, 2-4, 5-9, 10-14, and 15-19 years old) and gender-specific (male and female) prevalence rates were also determined using annual descriptive analyses.

From 1996 to 2000, the prevalence of total antipsychotic use increased 160 percent, as an additional 12.3 children and adolescents per 1,000 enrollees received antipsychotics (Table 1.8, page 36). This overall increase was due to a substantial increase of 494 percent in the prevalence of atypical antipsychotic use (2.7 [1996] to 16.0 [2000] per 1,000 enrolled youths). The use of typical

antipsychotics decreased from 4.9 (1996) to 3.9 (2000) per 1,000 children and adolescents, representing a 21 percent decrease over the five-year period. With the exception of clozapine, prevalence rates of specific atypical antipsychotics steadily increased. Risperidone was the most frequently used during each study year, followed by olanzapine, quetiapine, and clozapine.

Table 1.8. Annual Prevalence Rates of Antipsychotic Use in Children and Adolescents, Less Than 20 Years of Age, in the Texas Medicaid Program[31;a]

Antipsychotics	1996	1997	1998	1999	2000
Total	7.63	10.76	13.85	16.99	19.88
Typical	4.94	4.69	4.19	3.87	3.89
Atypical	2.69	6.07	9.66	13.11	15.98
Clozapine	0.04	0.03	0.04	0.04	0.05
Olanzapine	0.07	1.02	2.15	3.31	4.18
Quetiapine	0	0.05	0.50	1.35	1.96
Risperidone	2.57	4.95	6.95	8.42	9.78

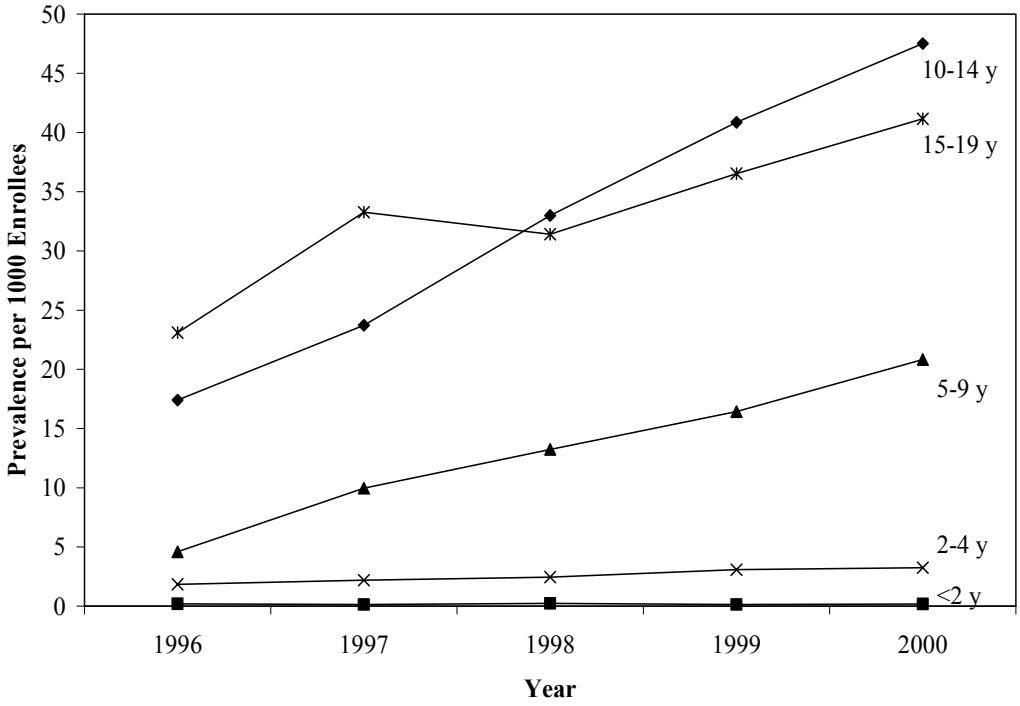
[a] Prevalence per 1000 enrolled youths.

With regard to age, significant increases in total antipsychotic use were associated with age categories greater than two years old (Figure 1.2, page 38). Prevalence rates increased 354 percent (+16.2 per 1,000 enrollees) for children between the ages of five and nine years, and 173 percent (+30.1) for those between ten and 14 years old. Antipsychotic use increased approximately 75 percent for children aged two to four years (+1.4) and adolescents aged 15 to 19 years (+18.1). Male prevalence rates of total antipsychotic use increased 157

percent, from 10.0 in 1996 to 25.7 in 2000 (Figure 1.3, page 39). Similarly, female prevalence rates were 5.3 in 1996 and 13.5 in 2000, indicating a 152 percent increase over the five-year period.

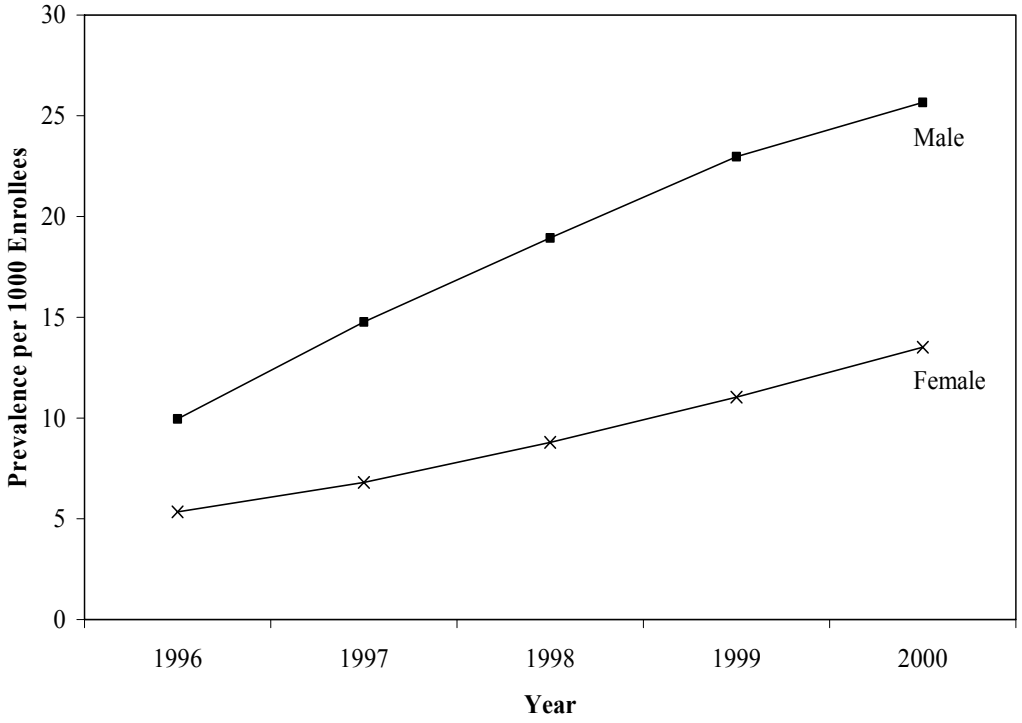
Total expenditures for antipsychotics in the Texas Medicaid child and adolescent population were $2,278,134 in 1996, and increased by 473 percent to $13,730,220 in 2000. The increase in expenditures was related to the increase in use and payments for atypical antipsychotics (+$11,171,862 during the 5-year period).

Figure 1.2. Age-specific Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Children and Adolescents from 1996 to 2000[31; a]



[a] y = years.

Figure 1.3. Gender-specific Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Children and Adolescents from 1996 to 2000[31]



Summary

Pharmacoepidemiological studies have demonstrated an increased use of psychotropic medications in children and adolescents during the early to mid-1990s. Much of this increase is attributable to psychostimulants and antidepressants, for which evidence from randomized, controlled clinical trials supports the short- and long-term safety and efficacy in youths.[21] These studies have also shown that children and adolescents older than the age of ten, males, and Caucasian youths are among the highest users of psychotropic medications.

Epidemiological data on medication utilization are necessary to fully understand the extent of psychotropic medication use in children and adolescents, but future studies are needed to assess the appropriateness of use and effectiveness of these agents. Furthermore, epidemiological studies need to be conducted periodically as newer psychotropic medications are introduced to the market and additional safety and efficacy data become available. Such is the case for antipsychotic use in children and adolescents. To date, only one pharmacoepidemiological study has exclusively examined current trends of antipsychotic use in youths since the introduction of newer atypical antipsychotics.[31] Despite the paucity of safety and efficacy data supporting atypical antipsychotic use in this population, dramatic increases in the use of these agents has been demonstrated from 1996 to 2000.

Antipsychotics for the Treatment of Psychiatric and Behavioral Problems in Children and Adolescents

As many as half of child and adolescent psychiatric inpatients and one-third of outpatients are prescribed antipsychotics.[32] Antipsychotics can be used to treat a wide spectrum of psychiatric and behavioral disorders in children and adolescents, including schizophrenia, bipolar disorder, Tourette's syndrome, and disruptive behavioral disorders (Table 1.9, page 41). However, aggression is the most common symptom for which antipsychotics are prescribed.[33] Typical antipsychotics, specifically chlorpromazine and thioridazine, are approved by the Food and Drug Administration (FDA) for the treatment of severe behavioral problems in children and adolescents. No FDA-approved indications exist for

Table 1.9. Uses for Antipsychotics in Children and Adolescents[33]

Common Uses in Child Psychiatry	Common Uses in Pediatric Medicine
Psychoses	Sedation; paradoxical response to benzodiazepines
Schizophrenia	Drug-induced psychosis
Brief psychotic disorder	Delirium
Schizoaffective disorder	Chorea
Psychotic disorder not otherwise specified	Organic personality disorder
Mood disorders	Agitation
Treatment-resistant bipolar disorder	Self-injurious behavior
Bipolar disorder with psychotic features	Anorexia nervosa
Major depression with psychotic features	**Potential Uses in Child Psychiatry**
Movement disorders	Disruptive behavior disorders
Tic disorders or Tourette's syndrome	Conduct disorder
Stereotypic movement disorder	Severe or treatment-resistant attention-deficit hyperactivity disorder
Autism and pervasive developmental disorders	Schizoid or schizotypal personality traits
Intermittent explosive disorder	Borderline personality traits
	Severe stuttering

atypical antipsychotics in the treatment of psychiatric and behavioral problems in youths.

Evidence from randomized, controlled trials supporting the use of atypical antipsychotics in children and adolescents is growing. Most available data are for risperidone in the treatment of aggression across different, specific psychiatric diagnoses. Other child and adolescent psychiatric and behavioral disorders for which atypical antipsychotics have been evaluated in randomized controlled trials include schizophrenia, bipolar disorder, pervasive developmental disorders, and Tourette's syndrome (Table 1.10, pages 42-44).

Table 1.10. Randomized, Controlled Clinical Trials of Atypical Antipsychotics in Children and Adolescents

Drug[a]	Study Design and Length[b]	N	Patient Population[c]	Primary Efficacy Measure[d]	Results[e]	Reported Side Effects	Reference Number
CLZ	R, DB, P with HLDL; 6 weeks	21	SCZ	BPRS, BHRS	BPRS: CLZ > HLDL (p=0.04); BHRS: CLZ > HLDL (p=0.02)	Drowsiness, salivation, tachycardia	34
OLZ	R, OL, P with HLDL; 6 weeks	12	PDD	CGI	CGI: OLZ = HLDL (p=NS)	Sedation, weight gain	35
QUET	R, DB, PC as adjunctive treatment (+DVP); 6 weeks	30	BP	YMRS	YMRS: DVP + QUET > DVP + PBO (p=0.03)	Sedation, nausea, headache, gastrointestinal irritation	36
RIS	R, DB, PC; 10 weeks	20	CD	RAAPP	RAAPP: RIS > PBO (p=0.008)	Increased appetite, sedation, insomnia, restlessness, irritability, enuresis, nausea/emesis	37
RIS	R, DB, PC; 4 weeks	13	SA-IQ, BEHAV	ABC, CGI, VAS	ABC: RIS > PBO ($p<0.05$ for irritation and hyperactivity); CGI: RIS > PBO ($p<0.05$); VAS: RIS > PBO ($p<0.001$)	Somnolence, increased appetite, weight gain	38
RIS	R, DB, PC; 6 weeks	38	CD, ODD, ADHD, SA-IQ, AGGR	CGI-S	CGI-S: RIS > PBO ($p<0.05$)	Tiredness, sialorrhea, nausea, weight gain	39
RIS	R, DB, PC; 6 weeks	118	CD, ODD, DBD, SA-IQ	Conduct problem subscale of NCBRF	NCBRF: RIS > PBO ($p\leq0.01$)	Somnolence, headache, vomiting, dyspepsia, weight increase, elevated serum prolactin, increased appetite, rhinitis	40

Note: See page 44 for abbreviation descriptions.

Table 1.10. Randomized, Controlled Clinical Trials of Atypical Antipsychotics in Children and Adolescents (Cont.)

Drug[a]	Study Design and Length[b]	N	Patient Population[c]	Primary Efficacy Measure[d]	Results[e]	Reported Side Effects	Reference Number
RIS	R, DB, PC; 7 weeks	110	CD, ODD, DBD, SA-IQ	Conduct problem subscale of NCBRF	NCBRF: RIS > PBO ($p<0.001$)	Somnolence, appetite increase, dyspepsia, abnormal crying, headaches, urinary incontinence, hyperprolactinemia, weight increase	41
RIS	R, DB, PC; 8 weeks	101	AD	Irritability subscale on ABC, CGI-I	ABC: RIS > PBO ($p<0.001$); CGI-I: RIS > PBO ($p<0.001$)	Increased appetite, fatigue, drowsiness, dizziness, drooling	42
RIS	R, DB, P with CLND; 8 weeks	21	TS	YGTSS	YGTSS: RIS = CLND (p=NS)	Sedation	43
RIS	R, DB, PC; 8 weeks	26	TS	YGTSS	YGTSS: RIS > PBO ($p=0.002$)	Increased appetite, fatigue, sedation, social phobia, weight gain	44
RIS	R, DB, PC, CO; 22 weeks	20	MR, BEHAV	ABC-Community	ABC: RIS > PBO 1 ($p<0.0001$ for both sequences); RIS > PBO 2 ($p<0.0001$ for low-high dose sequence)	Increased appetite, weight gain, sedation	45
ZIP	R, DB, PC; 56 days	28	TS or CTD	YGTSS, CGI-TS	YGTSS: ZIP > PBO ($p=0.016$); CGI-TS: ZIP = PBO (p=NS)	Sedation, akathisia	46

Note: See page 44 for abbreviation descriptions.

Table 1.10. Randomized, Controlled Clinical Trials of Atypical Antipsychotics in Children and Adolescents (Cont.)

[a] CLZ = clozapine; OLZ = olanzapine; QUET = quetiapine; RIS = risperidone; ZIP = ziprasidone.

[b] CLND = clonidine; CO = crossover; DB = double-blind; DVP = divalproex; HLDL = haloperidol; OL = open label; P = parallel groups; PC = placebo-controlled; R = randomized.

[c] AD = autistic disorder; ADHD = attention-deficit/hyperactivity disorder; AGGR = aggression; BEHAV = behavioral problems; BP = bipolar disorder; CD = conduct disorder; CTD = chronic tic disorder; DBD = disruptive behavioral disorders; MR = mental retardation; ODD = oppositional defiant disorder; PDD = pervasive developmental disorders; SA-IQ = subaverage intelligence; SCZ = schizophrenia; TS = Tourette's syndrome.

[d] ABC = Aberrant Behavior Checklist; BHRS = Bunney-Hamburg Psychosis Rating Scale; BPRS = Brief Psychiatric Rating Scale; CGI = Clinical Global Impressions Scale; CGI-I = Clinical Global Impressions Scale – Improvement; CGI-TS = Clinical Global Impressions Scale – Tourette's Syndrome; CGI-S = Clinical Global Impressions Scale – Severity; NCBRF = Nisonger Child Behavior Rating Form; RAAPP = Rating of Aggression Against People and/or Property Scale; VAS = Visual Analogue Scale; YGTSS = Yale Global Tic Severity Scale; YMRS = Young Mania Rating Scale.

[e] NS = not significant; PBO = placebo.

Unanswered Questions Regarding the Use of Antipsychotics in Children and Adolescents

The use of antipsychotic medications in children and adolescents has seen a dramatic increase over the past decade. From 1991 to 1996, prevalence rates for antipsychotic use in a mid-Atlantic Medicaid state nearly doubled.[24] During the latter part of the decade and after the introduction of newer atypical antipsychotics to market, prevalence rates of overall antipsychotic use and newer atypical antipsychotic use increased by 160% and 494%, respectively, in children and adolescents enrolled in the Texas Medicaid system.[31] Additionally, antipsychotics are commonly used for children and adolescents in the inpatient

setting. In a study by Pappadopulos and colleagues, atypical antipsychotics accounted for 27.8 percent, and typical antipsychotics accounted for ten percent of psychotropic medication prescriptions at discharge from New York child and adolescent public inpatient facilities.[47]

Several possible explanations exist for the increase in the use of atypical antipsychotics in children and adolescents. First, growing evidence supports the efficacy of atypical antipsychotics in the treatment of aggression, for which these agents are most commonly prescribed.[33] Second, a shift may be occurring in who is actually prescribing antipsychotics. Studies have demonstrated that antipsychotics are commonly prescribed by physicians other than child and adolescent psychiatrists.[21,32,48] Goodwin and colleagues found that pediatricians and general practitioners may prescribe antipsychotic medications to children and adolescents more frequently than psychiatrists.[49] Plausible explanations regarding this shift to "primary care mental health" include a shortage of child and adolescent psychiatrists in the U.S. and the emphasis on managed care. Currently, approximately 6,300 child and adolescent psychiatrists practice in the U.S. The U.S. Bureau of Health Professions predicts a 30 percent increase in the number of practicing child and adolescent psychiatrists to 8,312. However, these numbers fall well short of the estimated 30,000 child and adolescent psychiatrists needed to meet the increased prevalence of mental disorders and managed care staffing models.[50] Furthermore, the growing emphasis on managed care in Medicaid systems may encourage parents to seek initial mental health care with primary care physicians.[51] In an epidemiological study of child and adolescent

psychosocial problems in primary care, community-based pediatricians and family practitioners reported that 18.7 percent of the children they treated in 1996 had mental health problems, compared to 6.8 percent in 1979. Significant increases over the 17-year period were seen in children and adolescents with attention-deficit hyperactivity disorder (7.8%) and behavioral/conduct problems (6.5%).[19] Given the growing prevalence of childhood mental disorders and problems with continuity of care between primary and specialty mental health care providers, primary care physicians may have limited options other than to treat these disorders themselves. Other factors, including reluctance of families to seek psychiatric help, stigma associated with psychiatric disorders, and systemic barriers to access, may contribute to the treatment of pediatric psychiatric and behavioral disorders by primary care providers, and perhaps to increased medication use.[52]

Given the increased prevalence of antipsychotic use in children and concerns expressed regarding increased use of all psychotropic medications in children, it is important to critically evaluate the arguments for and against the use of antipsychotics in children and adolescents. Furthermore, discussion about unanswered questions regarding antipsychotic use in youths and recommendations for future studies is warranted.

Arguments Supporting the Use of Antipsychotics in Children and Adolescents

Favorable side effect profiles of atypical antipsychotics

Atypical antipsychotics were developed as a result of typical antipsychotics having unfavorable side effect profiles, especially the occurrence of extrapyramidal symptoms (EPS) and tardive dyskinesia (TD), and lacking efficacy for some patients, particularly those with negative symptoms.[53] Over the past 12 years, six atypical antipsychotics, which include clozapine, risperidone, olanzapine, quetiapine, ziprasidone, and aripiprazole, have been introduced to the market.

The presence of EPS during the course of treatment in children and adolescents can be problematic and debilitating to the patient. Emergence of such symptoms can lead to decreased medication adherence, decreased patient self-esteem, and poor patient outcomes.[54] Prevention and management of EPS may be extremely important in youths as they may be more susceptible to the development of EPS, especially dystonic reactions.[55] Atypical antipsychotics are associated with a decreased propensity to cause EPS compared to typical antipsychotics.[53]

Hyperprolactinemia is another side effect seen less during treatment with atypical antipsychotics, with the exception of risperidone, compared to typical antipsychotics. Increased prolactin levels in females can result in breast enlargement, galactorrhea, and dysmenorrhea; in males, hyperprolactinemia can lead to gynecomastia and sexual dysfunction.[56] Although hyperprolactinemia is believed to account for less than ten percent of drug discontinuations, this is

poorly studied, and more research is necessary to examine the course and impact of this side effect.[54]

Efficacy of atypical antipsychotics for aggressive behaviors

Much of the efficacy data for atypical antipsychotics have come from randomized, controlled trials in the adult population. Evidence suggests that these agents not only improve the collection of symptoms associated with schizophrenia and other psychotic disorders, but also improve patient outcomes, such as relapse, rehospitalization, and quality of life.[53,57-60] For children and adolescents, evidence from controlled clinical trials supporting the efficacy of atypical antipsychotics is growing, especially for the treatment of disruptive behavioral disorders and aggression. Of the atypical antipsychotics, the most data suggesting efficacy for aggressive behaviors are available for risperidone.

In a ten-week, randomized, double-blind, placebo-controlled study, 20 youths, aged six to 14 years, with conduct disorder (CD), aggressive behavior, and average intellectual functioning were randomized to receive either risperidone or placebo. As measured by the Rating of Aggression Against People and/or Property Scale (RAAPP), low-dose risperidone (mean dose = 0.028 mg/kg per day) was more efficacious than placebo in reducing aggression during the last four weeks of the study.[37]

In children and adolescents with subaverage intellectual functioning, risperidone has been shown to be efficacious in reducing aggressive behaviors. In a four-week randomized controlled trial of 13 children and adolescents (6 to 14 years old) with behavioral problems and borderline intellectual functioning,

risperidone (mean dose = 1.2 mg/day) was superior to placebo in reducing scores on the Aberrant Behavior Checklist (ABC), Clinical Global Impressions (CGI) scale, and the Visual Analogue Scale (VAS).[38] In another small sample of 38 hospitalized adolescents (mean age = 14.0 years) with severe aggression and subaverage levels of intelligence, Buitelaar and colleagues demonstrated that treatment with risperidone (mean dose = 2.9 mg/day) was associated with significant improvements on the CGI-Severity scale (CGI-S), modified Overt Aggression Scale (OAS-M), and the ABC.[39]

Aman and colleagues conducted a six-week, randomized, double-blind, placebo-controlled study of risperidone in 118 children and adolescents, aged five to 12 years, with disruptive behavior disorders and subaverage intelligence.[40] Patients receiving risperidone (mean dose = 1.16 mg/day) had significantly greater improvements on the conduct problem subscale of the Nisonger Child Behavior Rating Form (NCBRF) compared to those receiving placebo. Additionally, the risperidone group showed improvements on other behavioral measures, including subscales of the ABC and Behavior Problems Inventory (BPI), and the VAS. Similarly, Snyder and colleagues demonstrated risperidone's efficacy for the treatment of disruptive behaviors in 110 children (aged 5 to 12 years) with subaverage intelligence.[41] In a six-week, randomized, double-blind, placebo-controlled trial, risperidone (mean dose = 0.98 mg/day) was superior to placebo in reducing scores on the conduct subscale of the NCBRF, as well as the ABC, BPI, CGI-Improvement (CGI-I), and VAS.

In an eight-week, randomized, double-blind, controlled trial, 101 children, between the ages of five and 17 years, with autistic disorder and behavioral problems were assigned to receive risperidone or placebo.[42] Treatment with risperidone (mean dose = 1.8 mg/day) resulted in significant improvements in behavioral disturbances as indicated by scores on the ABC irritability subscale and CGI-I, compared to placebo.

Several details regarding the evidence suggesting efficacy for aggression need further emphasis. First, consistent measures were used across studies to evaluate aggressive behavior. The ABC, CGI, and NCBRF are widely-used instruments, that have been shown to be reliable and valid.[61-64] Second, the treatment effects associated with risperidone were fairly large compared to placebo, suggesting specific pharmacological benefit with this agent. These effects were also consistently seen in children of varying ages, from five to 17 years old. Third, the onset of efficacy of risperidone was rapid, with significant separation from placebo occurring during the first week and sustaining throughout the study duration. Finally, risperidone administration was well-tolerated. Risperidone was comparable to placebo with regard to extrapyramidal symptoms. Elevated prolactin levels were seen with low-dose risperidone, but no clinical sequelae were reported.[40,41] The availability of such evidence is important since the prevalence of aggressive behavior is increasing across the spectrum of childhood disorders, and aggression may account for most of the antipsychotic prescribing in children and adolescents.[33,65]

Because of the lower frequency of side effects when dosed appropriately, atypical antipsychotics may be preferred by clinicians for use in children and adolescents when antipsychotic treatment is considered appropriate. In addition, ample evidence in adults supports the use for several psychiatric conditions, such as schizophrenia and bipolar disorder. It is under the assumption that these benefits will also be seen in children and adolescents that clinicians prescribe atypical antipsychotics for childhood psychotic disorders. Perhaps more importantly, since aggression and nonpsychotic disorders account for a large percentage of antipsychotic prescribing in children, evidence supporting the efficacy of these agents for these conditions is encouraging.

Arguments Against the Use of Antipsychotics in Children and Adolescents

Lack of indications in children and adolescents

Typical antipsychotics are indicated for the treatment of severe behavioral problems (chlorpromazine and thioridazine) and for the treatment of tics and vocal utterances of Tourette's syndrome (haloperidol and pimozide). Currently, the FDA has not approved indications for atypical antipsychotics in the treatment of psychiatric or behavioral problems in children and adolescents. Although evidence exists to support the efficacy and safety of risperidone for aggressive behavior in children, it is unclear whether this is sufficient to receive an indication for a specific disorder. The evidence supporting atypical antipsychotic use for aggression also lacks consistency in the patient populations studied. With the exception of studies conducted by Aman and colleagues and Snyder and colleagues, data supporting the efficacy of risperidone for aggression originate

from controlled trials evaluating different patient populations.[37-42] While it may be argued that the generalizability of the results may increase due to heterogeneity of patient populations, it is difficult to evaluate the reproducibility of these studies for specific populations. Additionally, most data available supporting risperidone use for aggression originate from patients of subaverage intelligence.[40-42] It is unclear how these findings would translate to patients of normal intelligence or those seen in routine clinical practice. Other possibilities explaining why no pediatric indications exist for atypical antipsychotics may be the lack of financial initiative for drug manufacturers, philosophical concerns from regulatory agencies regarding the use of antipsychotics in children, and political pressure from groups opposed to the use of medication intervention for the treatment of psychiatric and behavioral problems.

Potential adverse and long-term effects of atypical antipsychotics

Although low in incidence, serious side effects, such as EPS, tardive dyskinesia, and neuroleptic malignant syndrome, have been reported with atypical antipsychotic use.[66-68] Other side effects of concern associated with these agents include weight gain, hyperglycemia, new-onset diabetes, hyperlipidemia, cardiovascular abnormalities, and hyperprolactinemia.[69] The development of metabolic and cardiovascular side effects may increase the risk of morbidity and mortality in this population. Weight gain may be especially problematic in children and adolescents as they may be subject to problems with self-esteem, social functioning, and medication adherence. Obese children are also at high risk of developing impaired glucose tolerance or type 2 diabetes.[70] Given that the

overall incidence of type 2 diabetes is increasing in children and adolescents, particularly among minorities, treatment with some atypical antipsychotics may precipitate or exacerbate abnormal glucose levels and associated clinical sequelae.[71,72] Among the atypical antipsychotics, risperidone is most frequently associated with hyperprolactinemia, particularly at higher doses.[68,73] In short-term studies of risperidone for the treatment of aggressive behaviors, hyperprolactinemia was seen with low doses, but no adverse events related to prolactin levels were reported.[39-41] In a 48-week open-label trial, administration of low-dose risperidone in children and adolescents also resulted in asymptomatic increases in prolactin levels.[74]

Long-term implications of the use of atypical antipsychotics in children and adolescents have yet to be thoroughly determined. Although associated with cognitive benefits in adults with schizophrenia, the cognitive effects of these agents in children and adolescents have not been reported in the literature.[75] A six-week trial comparing risperidone and placebo in 118 children and adolescents with disruptive behavior disorders evaluated memory using the Modified Verbal Learning Test – Children's Version (MVLT – CV), and attention and vigilance using the Continuous Performance Test (CPT).[76] Both the risperidone and placebo groups showed significant improvements in memory from baseline to endpoint, with no significant differences between groups. No significant within- or between-group differences were reported in CPT scores, suggesting risperidone treatment did not affect cognitive performance. Similarly, data regarding atypical antipsychotic effects on growth and development have yet to be published. A

study by Dunbar and colleagues analyzed pooled data from five multicenter trials of risperidone in children and adolescents with disruptive behavior disorders to retrospectively examine the effects on growth and sexual maturation over a 12-month period.[77] Results indicated that patients receiving risperidone had a mean increase of 1.2 centimeters (cm) greater than the reference population, but this deviation from expected growth was normally distributed. Sexual maturation occurred more rapidly in patients receiving risperidone than in the reference population, as described by a mean of 0.12 Tanner Stages. Additional data are necessary to fully elucidate the effects of risperidone on cognition and growth in children and adolescents across diagnoses.

Pharmacological versus nonpharmacological treatments

One of the most important issues is the question of whether pharmacological intervention is the best modality for treatment of behavioral problems. Since antipsychotics are frequently used for nonpsychotic disorders, such as aggression, closer scrutiny of this issue is necessary. Nonpharmacological treatments, such as behavioral therapy and psychoeducation, may provide alternative treatment modalities.[78] Substantial evidence supports psychotherapeutic approaches for the treatment of aggression, particularly in children and adolescents with developmental disorders.[79,80] Parent management training (PMT), problem-solving skills training (PSST), and multisystemic therapy (MST) are psychosocial treatments shown to be efficacious for aggressive youth, with parent management training being the most widely evaluated.[81] Studies have addressed the efficacy and effectiveness of parent training in young

children, demonstrating medium to large effect sizes. The effectiveness of parent training in children and adolescents between the ages of nine and 18 years has yet to be fully determined, although several models for younger children exist.[82-84]

Kazdin and colleagues evaluated the relative effects of PMT, PSST, and a combination of both treatments in a randomized controlled trial of 97 children, between the ages of seven and 13 years, who were referred to an outpatient child conduct clinic.[85] PMT consisted of 25 weekly sessions, while PSST consisted of 16 sessions. All three groups demonstrated improvement, with the combination group having the largest percentage of patients who were normalized on the CBCL by post-treatment. At one-year follow-up, the combination group showed continued improvement in child behavior and parent stress, and the PSST group further improved in child behavior. Although the combination treatment resulted in improved short-term and long-term child behavior, effect sizes related to CBCL total scores were modest when compared to the other treatments (combination versus PSST = 0.45 and combination versus PMT = 0.39).

In a 24-week randomized controlled trial of 92 children, aged four to seven years, with oppositional defiant disorder (ODD) or CD, Webster-Stratton and Hammond examined the effects of adding child training (CT) to parent training (PT).[83] Children were randomized to receive CT, PT, CT + PT, or control. At post-treatment, 80.8% of the PT group and 70.0% of the CT + PT group were normalized according to parent-rated CBCL scores. Thirty-seven percent of the CT group and 27.3% of the controls were considered normal.

Effect sizes for CBCL total scores were largest for PT when compared to controls, followed by CT + PT and CT (1.27, 1.25, and 0.49, respectively).

To determine the effectiveness in the typical service setting, Taylor and colleagues conducted a randomized controlled trial comparing Webster-Stratton's Parents and Children Series (PACS) with eclectic typical treatment in 110 families of three to eight year-old children with conduct problems.[86] PACS consisted of group therapy, and eclectic treatment was comprised of individual/family therapy. Compared to wait-list (WL) controls, PACS and eclectic treatment showed greater improvement for total problems as measured by the Eyberg Child Behavior Inventory (ECBI), CBCL, and Parent Daily Report (PDR). Medium effect sizes were reported for ECBI scores (PACS versus WL = 0.57, eclectic versus WL = 0.43, and PACS versus eclectic = 0.49).

In published studies, effect sizes are often quite large with pharmacological treatment, while those related to behavioral management for aggression have typically been modest. In addition, a few long-term follow-up studies of up to four years have been conducted on aggressive delinquent youth who have received an intensive home-based therapy (MST).[87,88] However, no evidence is available to suggest whether pharmacological treatment or nonpharmacological treatment is superior with this population. Furthermore, it is unclear whether and when children may benefit most from the combination of both interventions. Head-to-head comparisons, using the same inclusion/exclusion criteria and standardized measures across both types of interventions, are vital in defining the role of both pharmacological and

nonpharmacological interventions. Evidence supporting the long-term efficacy and safety of atypical antipsychotics in children and adolescents is also necessary. Existing studies need to be replicated to see whether the beneficial effects of atypical antipsychotic treatment hold across patient populations and service settings. Although atypical antipsychotics may be superior to typical antipsychotics in some ways, these agents still have the potential to cause harmful side effects when used inappropriately. More data are needed on side effects that may negatively impact the outcomes of children and adolescents receiving antipsychotic treatments.

Unanswered Questions and Directions for the Future

Treatment guidelines for childhood and adolescent disorders

Consensus recommendations such as those by Pappadapulos and colleagues are useful in providing clinicians with guidance regarding the use of antipsychotics to treat aggression in youth.[89] However, the recommendations are limited by the amount of available data to support evidence-based recommendations. Therefore, treatment guidelines in this area should be viewed cautiously by clinicians. While atypical antipsychotics may play a role in the treatment of childhood and adolescent psychiatric disorders, more information is necessary before one can make definitive conclusions about these agents as a class. However, as seen with risperidone, the growing body of evidence may allow for specific evidence-based recommendations regarding the use of this particular agent for the treatment of aggression.

Disorder-targeted versus symptom-targeted treatment

A question exists regarding whether disorder-targeted pharmacological treatment or symptom-targeted pharmacological treatment is more appropriate in children and adolescents. Arguments for disorder-targeted treatment over symptom-targeted treatment include greater evidence of efficacy based upon diagnosis and possibly less potential for polypharmacy. The use of polypharmacy in children and adolescents is of concern because it leads to greater risk of drug-drug interactions, a higher probability of adverse events, a potential increase in treatment nonadherence, and increased cost. On the other hand, disorder-targeted treatment requires an accurate diagnosis, which can be extremely difficult in children. For example, much debate exists regarding the diagnoses of attention-deficit hyperactivity disorder (ADHD) and bipolar disorder, as significant overlap in symptoms occurs with these disorders, and questions exist regarding the most appropriate diagnostic criteria for bipolar disorder in prepubescent children.[90] Symptom-targeted treatment may allow for short-term administration of medications until symptom resolution, as may be the case for aggression. However, this method of treatment can result in polypharmacy, and place the child or adolescent at risk for adverse events. Additionally, improvement in symptoms may be viewed as a justification for long term treatment, and the evidence to support a rationale for this decision is frequently limited.

Given the merits of basing treatment on a particular diagnosis, the field of psychopharmacology may be shifting toward disorder-targeted treatment. However, this may not be case for the treatment of aggression, which is seen

across a number of child and adolescent psychiatric disorders. Studies evaluating the effects of risperidone on aggressive behaviors have utilized diverse patient populations, including those with a diagnosis of disruptive behavior disorders, subaverage intelligence, or autistic disorder. In addition, studies of behavioral treatments have targeted children with aggressive symptoms, regardless of diagnosis. Since aggressive behaviors are so widespread across diagnoses, it is possible that pharmacological and nonpharmacological treatment for these children will always focus on symptom resolution.

To put this in perspective, fever can be examined as an analogy. Fever results from multiple etiologies, infectious and inflammatory processes are examples. Regardless of the cause, antipyretics typically have efficacy in lowering body temperature. However, antipyretics do not address the underlying condition creating the hyperthermia. If antipyretics are used without addressing the underlying etiology, then the underlying disease process may progress. However, when used in combination with interventions to address the underlying disorder, antipyretics are extremely useful pharmacological agents as they reduce symptoms and make the patient more comfortable. When applying this analogy to the treatment of aggression, atypical antipsychotics can be useful in patient management as they decrease symptoms and assist in minimizing the possibility that the patient will harm self or others. However, it is critical that the underlying disorder be identified, treated, and attempts made to improve the individual's adaptive functioning over the long-term. Unlike many other areas of medicine, the pathophysiolgic etiology of most mental disorders is unknown. From the

perspective of discrete biological targets, the current approach to pharmacological treatment by diagnosis may or may not be more accurate than using treatment by target symptoms such as aggression. Thus, from a biological perspective, it is unclear whether symptom focused or syndromal based treatment approaches are more appropriate.

'Real-world' effectiveness of atypical antipsychotics in children and adolescents

The gap between scientific evidence and clinical practice seems to be widening. Not only is it difficult to implement evidence-based practices in routine clinical care, little is actually known about how well atypical antipsychotics work in the "real-world" setting. Although randomized, controlled trials are considered the gold standard in establishing treatment efficacy, future research should aim at providing evidence of treatment effectiveness. Randomized, controlled trials offer strong evidence of efficacy, but the results are generated under conditions in which the external validity may be compromised. Effectiveness trials are subject to a number of threats to internal validity since patients under study are more likely to be heterogeneous, and there is less control over extraneous variables such as treatment setting, frequency of visits, medication adherence, and evaluation of treatment effects. Albeit, effectiveness trials may provide more complete answers to the question of how well an agent works or does not work in the "real-world" setting.

Mediators and moderators of treatment effects

Closer examination of moderators of treatment effects would provide a better ability to optimize treatment for a child or adolescent, and hopefully

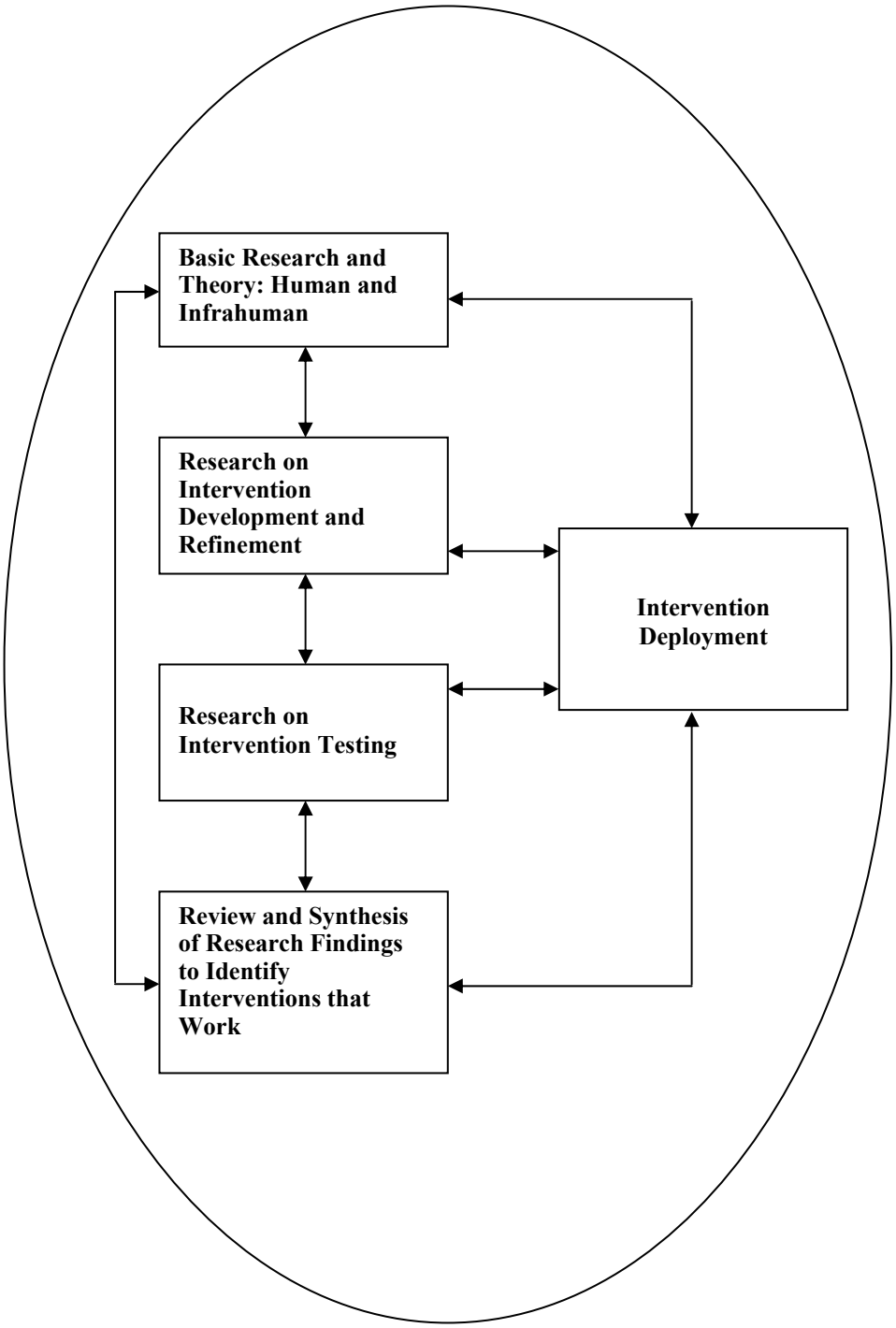
improve patient outcomes. Patient, clinician, or setting characteristics may provide plausible explanations for treatment response or nonresponse. For example, in the NIMH Multimodal Treatment of Children with ADHD (the MTA Study), only subjects with comorbid anxiety disorder experienced greater improvements with behavioral treatment plus methylphenidate compared with methylphenidate alone.[91] More recently in a study evaluating the effects of fluvoxamine in children and adolescents with anxiety disorders, lower baseline depression scores were associated with greater improvement while subjects with social phobia were less likely to improve.[92] Closer examination of mediators of treatment effects will provide a better ability to make treatments more efficient and effective. Treatment adherence (or nonadherence) is one of many factors that may account for treatment response (or nonresponse), as it did in both of the above trials.[91,92] Other factors which may determine the effectiveness of atypical antipsychotics outside of the ideal research setting include family acceptance, concern of stigmatization, provider and/or organizational choice, dosage optimization, and frequency of clinic visits.

The development and deployment of effective interventions

A conceptual model developed by the Workgroup on Child and Adolescent Mental Health Intervention Development and Deployment describes the required processes for the development and deployment of effective interventions for children and adolescents (Figure 1.4, page 63).[93] The first step in the model occurs at the basic sciences level. Evidence-based theories regarding etiology and pathophysiology of child and adolescent psychiatric and behavioral

problems need to be established and tested, so that clinicians have a better basis for what they are actually treating. Based upon these studies, biological targets for drug action are identified, and compounds are subsequently developed that modify these biological processes.[94] Medications developed in such a manner would then be studied for their efficacy in the treatment of child and adolescent psychiatric and behavioral disorders. Identification of factors influencing treatment effects is necessary during this step to better tailor treatment strategies according to a child's personal, familial, and environmental/societal characteristics. Third, evidence-based treatment strategies need to be evaluated in the clinical setting for their effectiveness. For example, effectiveness studies examining pharmacotherapy versus different psychosocial treatments versus multimodal approaches need to be studied in different types of aggression. These strategies are refined and prepared prior to testing at this stage. Interventions that are shown to be effective are then implemented using multidisciplinary approaches that have been shown to be effective in implementing and diffusing evidence-based practices into routine care. While it is important to disseminate proven interventions to the clinics, schools, and other places where youths and their parents can access them, it is also imperative that "real-world" data from these interventions be provided back to the organizations and systems of care involved in the development and testing.[95-97]

Figure 1.4. A Model for Intervention Development and Deployment[93,95]



Currently, biological targets based upon pathophysiological evidence do not exist to support the use of atypical antipsychotics in the treatment of aggression, or for that matter, in the treatment of any mental disorder. As additional research evidence evolves regarding brain function and the pathophysiology of mental disorders, future treatments should be developed based upon biological molecular targets.[94] In other respects, the remainder of these principles can and should be applied to the development and acceptance of treatment modalities in psychiatry, including the use of atypical antipsychotics for the management of aggression in children.

Summary

Concern over the growing use of atypical antipsychotics in children and adolescents exists for a number of reasons. Although both basic and clinical research supporting the rationale, efficacy, and safety of these agents in the management of aggressive behaviors is limited, the use of atypical antipsychotics in children and adolescents is growing. In many respects, this may be a reflection of the need and demand for effective treatments in these complex disorders. Clinicians choosing to prescribe atypical antipsychotics should do so after considering the issues at hand and carefully evaluating the patient and his or her surroundings. In general, antipsychotics should only be used in combination with behavioral and other psychosocial interventions that have proven benefit, and attempts should be made to limit duration of antipsychotic treatment.

Specific Aims and Related Hypotheses

Examination of current use of antipsychotics in children and adolescents serves as a foundation upon which future studies can be built. As newer psychotropic medications are introduced to the market with relatively little or no data in children and adolescents, it is imperative to determine to what extent these agents are being used in this population. Without database studies such as this study, the degree of use and effects of psychotropic medications on patient health care outcomes remains unclear. The possession of efficacy and safety data usually precedes the clinical use of psychotropic medications in the adult population. Such standards should also be applicable to psychotropic medication use in children and adolescents. The knowledge and insight to be gained from this study may hopefully stimulate additional clinical research evaluating the efficacy and safety of antipsychotics in children and adolescents.

Specific Aims

The ultimate goal of this research project was to evaluate the trends in antipsychotic use in children and adolescents (1996 to 2001). The research project was intended to evaluate the overall prevalence of antipsychotic use, including subclasses (typical and atypical antipsychotics), documented use of antipsychotics, sources of antipsychotic prescribing, and relationships of antipsychotic use on health care service utilization. To increase the generalizability of the study, data were collected from a total of four health systems: three geographically diverse Medicaid systems (California, Ohio, and Texas) and one managed care health care plan operating nationwide as a health

maintenance organization (HMO) and preferred provider organization (PPO). The inclusion of three different Medicaid populations provided state-level perspectives of the trends in use of antipsychotics in children and adolescents, as studies have demonstrated geographic variations in the prescribing of antipsychotics.[32,98] The inclusion of a private managed care organization provided valuable information regarding antipsychotic use in children and adolescents enrolled in these types of health care systems.

The research was primarily based upon the recent attention given to the use of psychotropic medications in children and adolescents. Specifically, the increased prevalence of antipsychotic use in children and adolescents has been attributed to the introduction of atypical antipsychotics.[31] Atypical antipsychotics have demonstrated efficacy in a number of pediatric psychiatric disorders, including aggression.[37-42]

The research study was conducted in three distinct phases and examined/evaluated:

- Phase I: Trends in the prevalence of antipsychotic use in children and adolescents;
- Phase II: Prescribing practices for antipsychotic agents;
- Phase III: Relationships of antipsychotic use with patient health care service utilization.

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents

To date, only one study has examined the trends in antipsychotic use in children and adolescents since the introduction of atypical antipsychotics.[31] Although the study demonstrated an overall increase in the use of antipsychotics since the introduction of atypical agents, the generalizability of the results is limited because the sample population consisted only of those children and adolescents enrolled in the Texas Medicaid system. It is unknown whether these prevalence rates are predictive of other regions of the U.S. Several studies have demonstrated geographic variation in antipsychotic prescribing in adults.[32,98] It is also unknown whether these prevalence rates are similar in other types of health care systems, namely private managed care organizations.

Phase I evaluated data from four health care systems (Medicaid: California [West], Ohio [Midwest], and Texas [South]; Managed Care: Nationwide) to determine the prevalence of antipsychotic use in children and adolescents. Total antipsychotic, typical antipsychotic, and atypical antipsychotic prevalence rates were determined. The extent to which geography influences prescribing of antipsychotics in children and adolescents and whether or not the differences (if present) are significant also were evaluated using data from the Medicaid programs. Differences in antipsychotic prevalence rates between public versus private health insurance programs were examined. In addition, daily dose of antipsychotic therapy, rates of antipsychotic switching and concomitant psychotropic medication therapy in this population were examined. Annual cost

of all antipsychotic prescriptions, as well as antipsychotic subclass and specific atypical antipsychotic, were examined for each of the four health care systems.

Phase II: Prescribing practices for antipsychotic agents

Given the expected increase in antipsychotic use in children and adolescents, it is critical to examine these two parameters (provider and diagnosis) when evaluating pharmacoepidemiological trends of antipsychotic medications. A trend for increased prescribing of psychotropic medications in youths by clinicians other than child and adolescent psychiatrists has been suggested.[49] This shift may be attributed to a lack of child and adolescent psychiatrists, pressure by managed care to preferentially utilize primary care providers, and family reluctance to seek mental health care.[50-52] Behavioral problems, such as aggression, are more likely to be treated with antipsychotics.[33] This use may account for much of the increase in prevalence, as studies have shown that antipsychotics are commonly prescribed for nonpsychotic disorders in children and adolescents.[47,49]

Phase II evaluated data from the Texas Medicaid and Texas Department of Mental Health and Mental Retardation (TDMHMR) systems to examine prescribing practices related to antipsychotic use in children and adolescents. Provider information, focusing upon the specialty of physician (neurology [including child neurology], pediatrics, primary care [including family practice and general practice], psychiatry [including child and adolescent psychiatry], or other) were collected. Diagnostic data from 1998 to 2001 were collected from the

TDMHMR Client Assignment and Registration System (CARE) database to determine the documented diagnoses (anxiety, bipolar, depressive, disruptive, psychotic, substance abuse, developmental, and other) for which antipsychotics were being prescribed.

Phase III: Relationships of antipsychotic use with patient health care service utilization

A study of mental health expenditures for children in 1998 suggest that psychotropic medications account for nine percent of the total were for psychotropic medications.[26] More specifically related to antipsychotic use in youths, expenditures in the Texas Medicaid system totaled $13,730,220 in 2000.[31] This represented a 473 percent increase from the $2,278,134 spent on antipsychotics in 1996. Atypical antipsychotics are clearly associated with high medication acquisition costs. The clinical and economic evaluation of the effects of atypical antipsychotic therapy becomes imperative to determine whether the higher acquisition costs compared to typical antipsychotics are offset by added benefits to the patient.

Since atypical antipsychotics are used to treat a wide variety of pediatric psychiatric and behavioral problems, the impact of these agents on other components of health care needed to be explored. Phase III evaluated data from the TDMHMR system to examine how the following service utilization parameters were related to antipsychotic use from 1998 to 2001: number and total days of inpatient psychiatric hospitalizations, and enrollment and duration of

different types of outpatient mental health services. TDMHMR CARE service utilization data included enrollment in the following types of outpatient mental health services: Assessment Services (TC08), Counseling and Psychotherapy (TC13); Crisis Intervention (In-Home [TC01], Inpatient [TC07], Therapeutic Foster Care [TC09], Other Residential Services [TC17], and Acute Day Treatment [TC20]); Medication-related Services (TC04); Service Coordination (TC06); Skills Training (Rehabilitative Day Treatment [TC03], Individual [TC10], Family [TC19]); and, Supportive Services (Respite [TC05], Family-Focused Services [TC23], and Flexible Community Support [TC24]). Appendix A provides descriptions of each type of outpatient mental health service. It is important to examine what types of outpatient mental health services are being delivered to mentally ill youths, as these may improve long-term adaptive functioning and patient outcomes.

In addition to evaluating overall trends of service utilization, trends in service utilization based upon age, gender, and diagnosis were examined. It is important to evaluate these parameters, as certain populations may account for a significant portion of antipsychotic use, service utilization, and associated costs. Evaluation of these parameters may indicate which populations may possibly lack access to mental health care services.

Related Hypotheses

The hypotheses for Phases I (H_1 to H_{16}) were tested for each of the four health care systems. For example, H_1 is tested for California Medi-Cal (CA), Ohio Medicaid (OH), Texas Medicaid (TX), and the Managed Care Organization

(MCO). The second set of hypotheses for Phase I relates to comparisons between the four health systems: California (CA), Ohio (OH), Texas (TX), and the Managed Care Organization (MCO). The first three hypotheses (H_{17} to H_{19}) compare prevalence rates of antipsychotic use only in the Medicaid systems. The last three hypotheses (H_{20} to H_{22}) compare prevalence rates of antipsychotic use in public versus private health insurance systems. The hypotheses for Phases II and III were tested only for Texas Medicaid (H_{23}, H_{24}) and Texas Medicaid youths receiving mental health care services within the TDMHMR system (H_{25} to H_{29}).

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (CA, OH, TX, and MCO)

H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.

Rationale: *Based upon previous pharmacoepidemiological studies examining antipsychotic use in children and adolescents, increased use of these agents will be demonstrated.*[24,31] *Much of the overall increase in overall antipsychotic use in youths will be attributable to an increased use of atypical antipsychotics, as these agents have more favorable neurological side effect profiles compared to typical antipsychotics and increasing evidence supports safety and*

efficacy for the treatment of psychiatric and behavioral disorders in children and adolescents.[33,53]

H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.

Rationale: *The prevalence rate of atypical antipsychotic use in children and adolescents enrolled in the Texas Medicaid system increased 494 percent from 1996 to 2000.*[31] *Several possible explanations for the increased use of these agents include: (1) the body of evidence supporting safety and efficacy of atypical antipsychotics for the treatment of psychiatric and behavioral disorders in children and adolescents is growing; (2) several randomized, controlled clinical trials have demonstrated the safety and efficacy of risperidone for the treatment of aggression, which is the most common symptom for which antipsychotics are prescribed in children and adolescents; and, (3) atypical antipsychotics have more favorable side effect profiles compared to typical antipsychotics, specifically related to extrapyramidal symptoms, tardive dyskinesia, and cognitive impairment.*[33,37-42,53]

H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.

Rationale: *Typical antipsychotic use in children and adolescents in the Texas Medicaid system decreased 21 percent from 1996 to 2000.*[31] *Prevalence rates of typical antipsychotic use have declined since the introduction of newer atypical antipsychotics. As evidence builds supporting the use of atypical antipsychotics and clinicians become more familiar with specific agents, decrease in the use of typical antipsychotics is likely. Additionally, these agents are associated with unwanted side effects, such as extrapyramidal symptoms, tardive dyskinesia, and impaired cognition.*[53]

H_4: During each study year (1996 – 2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.

Rationale: *Rank order of specific atypical antipsychotic use among Texas Medicaid enrolled children and adolescents from 1996 to 2000 demonstrated that risperidone was the most used, followed by olanzapine, quetiapine, and clozapine.*[31] *Although clozapine was the first atypical antipsychotic introduced to the market in 1989, its use in youths is tempered due to the risk of agranulocytosis, frequently required hematologic monitoring, and an indication for*

treatment-resistant schizophrenia.[29,99] *Due to these factors along with the rarity of early-onset schizophrenia, the prevalence rate of clozapine use may not increase during the eight-year study period.*[100] *The frequent use of risperidone, which was introduced in 1993, may be related to the available evidence supporting its safety and efficacy in children and adolescents, specifically in aggression.*[37-42] *With increased time on the market, clinicians may have a greater degree of comfort with risperidone, particularly regarding its safety in youths. Olanzapine and quetiapine were the next atypical antipsychotics introduced to the market, in 1996 and 1997 respectively. Although few randomized controlled trials of either olanzapine or quetiapine in children and adolescents have been conducted, it is possible that the perception of "a class effect" may be an important factor driving the use of these agents, even if only one agent in a class of medications has demonstrated efficacy for certain psychiatric and behavioral symptoms. Thus, clinicians may have become more familiar and more comfortable with using olanzapine and quetiapine as well.*

H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

Rationale: *Trends of increased use of psychotropic medications, including atypical antipsychotics, have been demonstrated across all age categories. In a Mid-Atlantic Medicaid state, prevalence rates for psychotropic medication use at least doubled from 1987 to 1996 for the following age categories: 0-4 (2.3-fold increase), 5-9 (2.5), 10-14 (4.8), and 15-19 (7.2) years.[24] Children and adolescents between the ages of ten and 14 years were the highest utilizers of psychotropic medications, followed by children who were five to nine years old.[24] With regard to total antipsychotic use from 1996 to 2000, the most substantial increases were associated with children ages five to nine years (+354% [+16.2 per 1,000 enrollees]) and ten to 14 years (+173% [+30.1]).[31] Children between the ages of two and four years, as well as adolescents ages 15 to 19 years, increasingly used antipsychotics (+76% [+1.4] and +76% [+30.2], respectively).[31] All age groups showed significant increases in the prevalence of atypical antipsychotic use: age < two years (+172%), two to four years (+556%), five to nine years (+609%), ten to 14 years (+490%), and 15 to 19 years (+275%).[31]*

For further reasoning to support the hypothesis, please see rationales provided for H_1, H_2, and H_3.

H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

Rationale: *Please see rationale provided for H_5.*

H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).

Rationale: *Please see rationale provided for H_5.*

H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

Rationale: *Trends of increased use of psychotropic medications, including atypical antipsychotics, have been demonstrated across both males and females. In a Mid-Atlantic Medicaid state, prevalence rates for psychotropic medication use tripled from 1987 to 1996 for males (3.1-fold increase) and females (4.0).*[24] *Males were the*

highest utilizers of psychotropic medications.[24] With regard to total antipsychotic use, both males and females showed substantial increases in use from 1996 to 2000 (+157% [+15.7] and +152% [+8.0], respectively).[31] Both gender groups showed significant changes in the prevalence of atypical antipsychotic use: males (+578%) and females (+547%). On the other hand, prevalence rates of typical antipsychotic use for males and females decreased (-28% and -25%, respectively).[31]

For further reasoning to support the hypothesis, please see provided rationales for H_1, H_2, and H_3.

H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

Rationale: *Please see rationale provided for H_8.*

H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across gender groups: male and female.

Rationale: *Please see rationale provided for H_8.*

H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.

Rationale: *Anecdotal reports suggest that the average daily risperidone dose in adults has decreased, but no evidence exists in children and adolescents.*[101] *It is possible that the mean daily dose of risperidone in youths will decrease because of the following reasons: (1) as the daily dose increases, the occurrence of adverse effects related to risperidone therapy increases because mean dopamine D(2) receptor occupancy increases*[102]*; (2) randomized controlled trials have demonstrated risperidone's efficacy at low doses (usually less than two milligrams per day) in the treatment of aggression in children and adolescents*[37-42]*; (3) with increased time on the market, clinicians have become more comfortable with the recommended dosing strategies for risperidone.*

H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

Rationale: *The recommended olanzapine dosing range for childhood psychosis is 2.5 to 20 milligrams per day.*[33] *Although olanzapine has been marketed since 1996, a paucity of evidence exists to support dosing recommendations in youths. Only one randomized*

controlled trial has evaluated olanzapine for the treatment of autistic disorder, and in this study, the mean daily dose was 7.9 (±2.5) milligrams.[33] *Other open-label trials in childhood and adolescent disorders, such as schizophrenia and bipolar disorder, have reported mean daily doses as high as 20 milligrams.*[103-105] *In clinical practice, the average daily dose of olanzapine in adults has been increasing to as high as 40 milligrams per day.*[101] *Additionally, plasma concentrations of olanzapine may be correlated with therapeutic response.*[101] *It is difficult to predict the trend in olanzapine dosing in children and adolescents from 1996 to 2001. However, based upon adult data, it is possible that there will be an increase in the mean daily dose of olanzapine.*

The use of higher doses of olanzapine may be due to practice pressures associated with prescribing antipsychotics, such as protection of the patient, other patients, and staff. Additionally, the use of higher doses of olanzapine may be associated with the tolerability of this agent at higher doses, clinician desire to improve outcomes in the patient, and to some extent, limited treatment alternatives that are highly effective. Given these reasons, it is possible that there will be an increase in the mean daily dose of olanzapine during the study period.

H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

Rationale: *The recommended quetiapine dosing range for children with psychosis ranges from 12.5 to 750 milligrams per day.*[33] *Similar to olanzapine, only one randomized controlled trial examines quetiapine for adjunctive treatment in adolescent mania.*[36] *The mean daily quetiapine dose in this study was 432 milligrams per day. In an open-label trial of quetiapine in adolescents with psychotic disorders, the average daily doses in 15 subjects ranged from 400 to 800 milligrams.*[106] *In adults, the daily quetiapine dose has exceeded the manufacturer's recommended maximum daily dose of 800 milligrams.*[101] *Based upon adult prescribing trends of quetiapine, it is possible that there will be an increase in the mean daily dose of quetiapine in youths.*

The use of higher doses of quetiapine may be due to practice pressures associated with prescribing antipsychotics, such as protection of the patient, other patients, and staff. Additionally, the use of higher doses of quetiapine may be associated with the tolerability of this agent at higher doses, clinician desire to improve outcomes in the patient, and to some extent, limited treatment alternatives that are highly effective. Given these

reasons, it is possible that the mean daily dose of quetiapine will increase during the study period.

H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.

Rationale: *In adult patients enrolled in the California Medicaid system (Medi-Cal), the likelihood of switching was lower with atypical antipsychotics than typical antipsychotics.*[107] *No such data exist in children and adolescents. Current trends of antipsychotic use show that the use of typical antipsychotics is declining, while atypical antipsychotic use is increasing.*[31] *As the number of available atypical antipsychotics grows, it is more likely that clinicians will switch from one atypical antipsychotic to another if the treatment trial is deemed a failure or response is less than optimal. Thus, the rates of antipsychotic switching will increase from 1996 to 2001 as a product of the increased availability of multiple agents.*

H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotic agents, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.

Rationale: *In the early to mid-1990s, studies examining the use of concomitant psychotropic medications reported that over 20 percent of community-treated, outpatient and over 40 percent of inpatient children and adolescents with psychiatric conditions received multiple psychotropic agents.*[108] *More recent data suggest that over 50 percent of children and adolescents with psychiatric conditions receive concomitant psychotropic medications.*[108] *Higher frequency of concomitant psychotropic medication use is strongly related to treatment by psychiatrists, and aggressive behavioral disorders.*[109-111]

Antipsychotics are commonly used for aggression across a spectrum of psychiatric disorders, including schizophrenia, externalizing disorders, and pervasive developmental disorders.[33,111] *Combination therapy with antipsychotics and one of the following agents is not uncommon for the treatment of aggression: alpha agonists, anticonvulsants, antidepressants, lithium, and psychostimulants.*[112] *The use of multiple antipsychotic is also becoming commonplace in clinical practice, despite no data*

comparing the effectiveness of combination antipsychotic therapy with antipsychotic monotherapy. Possible reasons for antipsychotic polypharmacy include: 1) the availability of more newer, atypical antipsychotics; 2) increased clinician comfort with these agents as more evidence becomes available; and, 3) clinician desire to improve patient outcomes, especially in those patients having suboptimal response to a trial of one antipsychotic. However, multiple antipsychotic agents can potentially lead to increased adverse events and medication costs.

H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.

Rationale: *In a study of children and adolescents enrolled in the Texas Medicaid system and receiving an antipsychotic, total reimbursement costs increased by 473 percent from $2,278,134 in 1996 to $13,730,220 in 2000.*[31] *The increase in expenditures was related to the increase in total payments for atypical antipsychotics (+$11,171,862 during the 5-year period). It is expected to see the same trends in antipsychotic prescription costs for each of the four health care systems, as the use of the more expensive, atypical antipsychotics increases over time.*

H_{17}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of total antipsychotic use, followed by Ohio and California.

Rationale: *To date, no study has compared prevalence rates of antipsychotic use from the states involved in this study. However, studies have shown geographic variation in antipsychotic prescribing. Using data from NAMCS, Hermann and colleagues reported geographic variations, as nonfederal physicians in the Northeast (0.9% of visits) and South (0.8%) were more inclined to prescribe antipsychotics than physicians in the Midwest (0.7%) and West (0.5%).*[98] *A similar trend was seen in a study examining the prescribing practices of child and adolescent outpatient psychiatrists in New York and Ohio.*[32] *Thirty-seven percent of New York patients who were medicated received antipsychotic therapy, compared to 18 percent of those patients in Ohio.*

H_{18}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of atypical antipsychotic use, followed by Ohio and California.

Rationale: *Please see rationale provided for H_{17}.*

H_{19}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of typical antipsychotic use, followed by Ohio and California.

Rationale: *Please see rationale provided for H_{17}.*

H_{20}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of total antipsychotic use compared to the Managed Care Organization.

Rationale: *In the study by Zito and colleagues, the prevalence of antipsychotic use in the mid-Atlantic and midwestern Medicaid states were*

higher than the prevalence rate of the northwestern group-model health maintenance organization (8.0, 5.4, and 1.0 per 1,000 enrollees, respectively).[24] *It is possible to see a similar result in this study, despite the use of different Medicaid and private insurance systems.*

H_{21}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of atypical antipsychotic use compared to the Managed Care Organization.

Rationale: *Please see rationale provided for H_{20}.*

H_{22}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of typical antipsychotic use compared to the Managed Care Organization.

Rationale: *Please see rationale provided for H_{20}.*

Phase II: Prescribing practices for antipsychotic agents (TX only)

H_{23}: The number of antipsychotic prescriptions for a child or adolescent from primary care physicians (family practice physicians, general practice physicians, and pediatricians) increases from 1996 to 2001.

Rationale: *Studies have demonstrated that antipsychotics are commonly prescribed by physicians other than child and adolescent psychiatrists.*[21,32,48,49] *A shift of provider type may be occurring due to a shortage of child and adolescent psychiatrists in the U.S. and the emphasis on managed care. An estimated 30,000 child and adolescent psychiatrists are needed to meet the increased prevalence of mental disorders and managed care staffing models.*[50] *The emphasis on managed care in Medicaid systems may encourage parents to seek initial mental health care from primary care physicians.*[19,51] *Given the growing prevalence of childhood mental disorders and problems with continuity of care between primary and specialty mental health care providers, primary care physicians may have limited options other than to treat these disorders themselves. Other factors, including reluctance of families to seek psychiatric help, stigma associated with mental disorders, and systemic barriers to access, may*

contribute to the treatment of pediatric psychiatric and behavioral disorders by primary care providers, and perhaps to increased medication use.[52]

H_{24}: The number of antipsychotic prescriptions for a child or adolescent from psychiatrists, including child and adolescent psychiatrists, increases from 1996 to 2001.

Rationale: *Although the number of practicing child and adolescent psychiatrists falls short of the demand for services, the prevalence of psychiatric and behavioral disorders in youths has increased. The rise in the numbers of affected children and adolescents may require psychiatrists to manage more patients, especially those whose mental illness is severe. Increased case loads of children and adolescents with psychiatric or behavioral problems may increase the use of psychotropic medications as compared with nonpharmacological interventions. A study by Pincus and colleagues showed an increase in the number of antipsychotic drug visits to psychiatrists from 1985 to 1993-1994.*[113]

H_{25}: From 1998 to 2001, antipsychotics are most prescribed for disruptive behavioral disorders, such as oppositional defiant disorder, conduct disorder, intermittent explosive disorder, and attention-deficit hyperactivity disorders.

Rationale: *In a study examining current inpatient antipsychotic treatment practices, Pappadopulos and colleagues reported that disruptive disorders accounted for 33.3 percent of the antipsychotic prescribing, followed by depressive (24.0%), bipolar (11.8%), and psychotic (11.3%) disorders.[47] Antipsychotic prescribing rates may be related to the prevalence rates of these psychiatric conditions, as disruptive disorders are the most prevalent disorder in the pediatric population.[7,9] Furthermore, aggressive behaviors are common among children and adolescents with disruptive disorders, perhaps leading to antipsychotic treatment.*

Phase III: Relationships of antipsychotic use with patient health care service utilization (TX only)

H_{26}: The mean number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.

Rationale: *The decreased number of psychiatric hospitalizations for children and adolescents may be related to the increased use of atypical antipsychotics. Atypical antipsychotics have been shown to reduce relapse and rehospitalization rates in adults.*[57-60] *Compared to typical antipsychotics, atypical antipsychotics are associated with lower risk of rehospitalization over a one-year period.*[60,114] *Currently, no studies evaluating relapse or rehospitalization in children and adolescents are available. It is unclear whether improvements in outcomes in adults treated with atypical antipsychotics will be seen in children and adolescents.*

The number of psychiatric hospitalizations may also be affected by the presence of managed care. From 1988 to 1995, the use of psychiatric inpatient care for children and adolescents was dramatically affected by the ongoing changes in health insurance for youths. As the role of private insurance decreased and the role of Medicaid increased, a 36 percent increase in hospital

discharges and a 44 percent decrease in mean length of stay were seen during the study period.[115] *As the penetration of managed care continues to increase into state Medicaid systems, it is possible to see decreased utilization of inpatient psychiatric services to contain health care costs.*

H_{27}: The mean number of hospital days per each hospitalized child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.

Rationale: *Treatment with atypical antipsychotics, specifically risperidone and olanzapine, has been associated with significant reductions in hospital days for admitted adult and elderly patients.*[116-118] *However, no evidence exists to suggest the same is true in children and adolescents. With regard to this population, several studies have demonstrated a decrease in lengths of stay at psychiatric inpatient facilities. Pottick and colleagues reported a 44 percent decline in the mean length of stay over an eight-year period, translating to a 23 percent decrease in number of bed-days (from more than 3 million in 1988 to about 2.5 million in 1995).*[115] *In a trend analysis of four-year (1997-2000) service data of privately insured children and adolescents, the mean days of inpatient*

mental health care decreased 20 percent from 14.4 days in 1997 to 11.5 in 2000.[119]

The duration of psychiatric hospitalizations in children and adolescents may be affected by severity of illness and environmental factors. Greater severity of psychopathology and specific diagnoses, such as post-traumatic stress disorder, have been associated with longer lengths of stay. Living arrangement stability, region of hospitalization, and severity of psychosocial stressors also affect psychiatric hospitalization length of stay in children and adolescents.[120-122] *For those requiring longer periods of inpatient psychiatric care, their lengths of stay may be affected by the efforts of managed care to contain costs associated with hospitalizations.*

H_{28}: The number of children and adolescents receiving assessment services, crisis intervention, medication-based services, and service coordination increases from 1998 to 2001, while the number of children and adolescents receiving counseling and psychotherapy, skills training, and supportive mental health services decreases from 1998 to 2001.

Rationale: *National estimates of mental health care utilization for children in 1998 suggested that outpatient care accounts for more than 50*

percent of the service costs.[26] *Compared to children with other types of insurance, children with Medicaid have higher utilization rates of outpatient mental health services.*[26] *Furthermore, children with disruptive behavioral disorders are perceived by parents as having a greater need for mental health care services, and in fact, these children are associated with higher rates of service utilization.*[123,124] *It is possible, however, that most outpatient mental health care visits in Texas Medicaid may be based upon pharmacological services, rather than psychosocial services. This shift towards medication-based outpatient treatment modalities may result from attempts by managed care organizations to contain mental health care costs. Thus, as antipsychotics are more commonly used for children and adolescents with disruptive disorders and/or aggression, it is likely that an increase in the use of outpatient mental health care due to medication-based treatments will be observed.*

H_{29}: The mean duration of enrollment in outpatient services for assessment services, crisis intervention, medication-based services, and service coordination increases among children and adolescents receiving an antipsychotic from 1998 to 2001. The mean duration of enrollment in outpatient services for counseling and psychotherapy, skills training, and supportive mental health services decreases among children and adolescents receiving an antipsychotic from 1998 to 2001.

Rationale: *In the NIMH MECA Study, 8.1 percent of the subjects received school-based mental health services, which was equivalent to the percent of subjects receiving services from a community-based, mental health specialist.*[125] *Psychotherapy, including behavioral management interventions, has been shown to be effective for childhood disorders, including disruptive behaviors.*[81] *Among privately insured children and adolescents with psychiatric or behavioral disorders, the use of psychotherapy increased from 3.3 visits in 1997 to 4.0 visits in 2000.*[119] *However, it is difficult to assume that these findings by Martin and Leslie would translate to the public insurance system. With the presence of managed care in Medicaid systems, it is possible that pharmacological services may serve as a substitute for nonpharmacological interventions to save health care dollars. Given the frequent use of antipsychotics for*

disruptive disorders among Medicaid youths, it is possible that the role of school-based and behavioral management interventions may decrease as medication-based outpatient treatment services become the majority of the types of outpatient services provided.

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CHAPTER TWO

Methods

CHAPTER OVERVIEW

Chapter Two reports the methods used to evaluate trends of antipsychotic use in children and adolescents from 1996 to 2001. The methods and relevant statistical analyses are detailed according to the phases: (1) trends in antipsychotic use in children and adolescents; (2) prescribing practices for antipsychotic agents; and, (3) relationships of antipsychotic use to service utilization.

Descriptions of the Medicaid and managed care populations are provided, with an emphasis on children and adolescents enrolled in the systems. Sources from which data were collected are discussed, as well as the types of data collected from the databases. A complete description of the statistical analyses for each phase follows. Finally, the advantages and disadvantages of database research, particularly with regard to Medicaid databases, are discussed.

The Use of Human Subjects and Related Issues

Inclusion criteria required patients to be less than 20 years of age, enrolled in one of three Medicaid systems (California, Ohio, or Texas) or a private managed care organization, and have been prescribed an antipsychotic medication. There were no exclusion criteria with regard to diagnoses, gender, ethnicity, or other concurrent medications.

The use of "human subjects" was necessary to conduct the current study. As this research did not involve direct human subject contact, a waiver of informed consent was approved by the Institutional Review Boards at The University of Texas at Austin (UT IRB) and TDMHMR (TDMHMR IRB). The research represented no more than minimal risk to the subjects, the waiver did not affect the rights and welfare of the subjects, and the research could not have practicably been carried out without the waiver. Potential loss of confidentiality was the only known potential risk associated with this research, and safeguards were taken to minimize this potential risk.

The only identified potential risk was breech of confidentiality. No potential physical, psychological, social, legal, or other risks existed for the subjects. Data containing patient identifiers were stored on The University of Texas at Austin (UT) Center for Pharmacoeconomics server to ensure data security. All patient identifiers included within the collected data were removed after the Medicaid pharmacy and service utilization data were merged. Dummy patient codes were assigned in place of patient identifiers. Dummy codes were also assigned for specific states, as well as for type of service provider. De-identified data were stored on the UT Center for Pharmacoeconomics server, which again served to provide data security and restricted access. M. Lynn Crismon, Pharm.D. and Michael Johnsrud, Ph.D. reviewed and audited the data to ensure that patient confidentiality was maintained throughout the duration of the study. The dissertation and manuscripts resulting from the research contain only

de-identified data. No additional analyses will be performed on this data unless additional approvals are obtained from the UT IRB or the TDMHMR IRB.

The protocol for this study received initial approval on August 21, 2002 from the UT IRB (Protocol #2002-07-0047). On June 11, 2003, the research study was re-approved for another year by the UT IRB. On March 31, 2004, the protocol for this study received initial approval from the TDMHMR IRB (Protocol #655-25-0401). Annual reviews and a final study report were submitted to the UT IRB and TDMHMR IRB upon completion.

The Medicaid Program

The Medicaid program is the largest single source of health insurance in the U.S., serving millions of children and adolescents under the age of 21 years.[1] Eligibility for Medicaid assistance is based upon financial and categorical eligibility requirements. First, beneficiaries of Medicaid must be low-income and meet certain resource standards, which are established by individual states. Additionally, income and resource requirements may differ for specific population groups within a state. Table 2.1 (page 122) details populations for which states are required to provide Medicaid assistance and those for which states have the option to provide insurance coverage.

For those populations which are provided insurance coverage, state Medicaid programs are required to provide coverage for a number of mandatory services, and have the option to provide additional services.[1] Furthermore, states determine the amount of coverage, such as duration and scope, within specific

service categories. Table 2.2 (page 123) provides a complete listing of the mandatory and optional services provided in state Medicaid programs.

Table 2.1. Medicaid Eligibility Criteria (Required and State Optional)[1]

Required Coverage	
Aid to Families with Dependent Children (AFDC) Eligible individuals as of July 16, 1996	Current and some former recipients of Supplemental Security Income (SSI)
Poverty-related groups (all pregnant women and children below age 6 with incomes up to 133 percent of the federal poverty level [FPL])	Foster care and adoption assistance
All children born after September 30, 1983 with incomes up to 100 percent FPL	Certain Medicare beneficiaries (Qualified Medicare Beneficiaries [QMBs] and Specified Low-Income Medicare Beneficiaries [SLMBs])
Optional Coverage	
Poverty-related groups (certain higher-income pregnant women and children)	Long-term care (individuals receiving long-term care with incomes less than 300 percent of the SSI payment level)
Medically needy (individuals categorically meeting eligibility criteria and have income and resources within "medically needy" limits determined by the state)	Working disabled (individuals who are disabled as defined by the Social Security Administration)
Recipients of state supplementary income payments	

Table 2.2. Medicaid Covered Services (Mandatory and State Optional)[1]

Mandatory Services		
Inpatient hospital services	Nurse practitioners' services	Physicians' services
Outpatient hospital services	Nursing facility (NF) services and home health services for individuals 21 years or older	Medical and surgical services of a dentist
Rural health clinic and Federally Qualified Health Center (FQHC) services	Early and periodic screening, diagnosis, and treatment (EPSDT) for individuals less than 21 years old	Nurse-midwife services
Laboratory and X-ray services	Family planning services	
Optional Services		
Podiatrists' services	Dentures	Personal care services
Optometrists' services	Prosthetic devices	Transportation services
Chiropractors' services	Eyeglasses	Case management services
Psychologists' services	Diagnostic services	Hospice care services
Medical social worker services	Screening services	Respiratory care services
Nurse anesthetists services	Preventive services	Tuberculosis-related services
Private duty nursing	Rehabilitative services	Inpatient and NF services for individuals older than 65 years in institutions for mental diseases (IMD)
Clinic services	Intermediate Care Facilities/Mentally-Retarded (ICF/MR) services	
Dental services	Inpatient psychiatric services for under age 21	
Physical therapy	Christian Science Nurses	
Occupational therapy	Christian Science Sanitoriums	
Speech, hearing and language disorders	Nursing facility (NF) services for under age 21	
Prescription drugs	Emergency hospital services	

Medicaid is the largest children's health program in the U.S., serving over 20 percent of all children and adolescents annually. In fiscal year (FY) 1996, 23.1 million children and adolescents under the age of 21 years were enrolled in state Medicaid programs, accounting for 56.6 percent of all Medicaid enrollees. Among these youths insured by Medicaid, children less than six years old comprised 43.6 percent, and children and adolescents between the ages of six and 20 years constituted 56.4 percent. Medicaid coverage in 1996 was most prominent for white, non-Hispanic youths (40.9%), followed by black, non-Hispanic (29.1%) and Hispanic (20.8%). Per recipient, Medicaid expenditures for all services averaged $1,486 during 1996. The average cost per recipient of mental health care in 1996 was $19,300; the percentage of Medicaid children and adolescents using mental health care services was less than 0.5 percent.[2]

In FY 2000, over 24 million children and adolescents less than 20 years old were enrolled in Medicaid, representing 54.6 percent of all enrollees. Similar to 1996, children under the age of six years accounted for a large portion of enrollment at 40.3 percent. Although the average Medicaid expenditures for all services increased to $1,766 per recipient, the average cost per recipient of mental health care decreased slightly to $18,193. Among enrolled youths, 0.3 percent used mental health care services in 2000.[2]

Children and Adolescents Enrolled in the California Medi-Cal Program

In California, children and adolescents comprise a significant portion of all Medi-Cal enrollees each year. In FY 1996, 3,682,510 youths were enrolled under Medi-Cal, representing 55.6 percent of all enrollees. Children and

adolescents between the ages of six and 20 years make up 60.3 percent, and those under the age of six years constitute 39.7 percent. With regard to ethnicity, most enrollees were Hispanic (50.7%), followed by white, non-Hispanic (24.4%) and black, non-Hispanic (13.5%). Medi-Cal expenditures for all services averaged $622 per enrollee under 21 years of age, while the average mental health care expenditures per user of these types of services were $48,324. Less than 0.5 percent of the Medi-Cal youth enrollees used mental health care services.[2]

In FY 2000, over 3.8 million children and adolescents were enrolled in Medi-Cal, which was a 48 percent increase over FY 1996 enrollment. Despite an increase in total enrollment of youths, this population represented 47.7 percent of all Medi-Cal enrollees. Children and adolescents between six and 20 years old accounted for 67.5 percent of all enrollees less than 21 years of age. An increase in average Medi-Cal expenditures per recipient from FY 1996 ($622) to FY 2000 ($1,329) was seen. Less than 0.05 percent of youths used mental health services, and the average expenditures for these services per user was $14,289.[2]

Children and Adolescents Enrolled in the Ohio Medicaid Program

Enrollment of children and adolescents in the Ohio Medicaid program accounts for a significant portion of total enrollment. In FY 1996, 877,582 youths enrolled in Ohio Medicaid, representing 56.9 percent of all enrollees. Fifty-six percent of enrollees under 21 years old were between the ages of six and 20 years, and 44.2 percent were under the age of six. Most Ohio Medicaid children and adolescents were white, non-Hispanic (59.8%), followed by black, non-Hispanic (35.5%) and Hispanic (2.9%). The average Ohio Medicaid expenditures for all

services per recipient in 1996 were $1,315. Ohio Medicaid spent an average of $5,719 on mental health care services per user. Less than 0.5 percent of youths enrolled in Ohio Medicaid used mental health services.[2]

Enrollment numbers of children and adolescents in FY 2000 saw a decrease, as 822,277 youths were enrolled in Ohio Medicaid. Children and adolescents between six and 20 years of age were the majority (62.8%). The average expenditures for all services per recipient increased to $1,818, and the expenditures per user of mental health care increased to $5,180. Like FY 1996, a small percentage (0.1%) of Ohio Medicaid enrolled youths used these types of services.[2]

Children and Adolescents Enrolled in the Texas Medicaid Program

In FY 1996, more than 1.8 million children and adolescents under the age of 21 years were enrolled in Texas Medicaid. This group accounted for the majority of all enrollees (64.3%). Children younger than six years were most prominent (51.7%), followed by youths who were six to 20 years old (48.3%). The ethnic stratification was similar to California, as Hispanics represented 53.4 percent, white non-Hispanic 23.3 percent, and black, non-Hispanic 21.1 percent. The average Texas Medicaid expenditures for all services were $1,215 per recipient in FY 1996. No data were reported with regard to expenditures and percentage of users of mental health care services.[2]

Over 1.7 million youths were enrolled in FY 2000, and represented 63.1 percent of all Texas Medicaid enrollees. Children and adolescents between six and 20 years old comprised 53.9 percent of enrollees under the age of 21 years.

As was seen in California and Ohio, there was an increase in expenditures for all services per recipient from FY 1996 ($1,215) to FY 2000 ($1,694). Approximately 0.3 percent of Texas Medicaid youths used mental health care, and the average expenditures per user were $6,255.[2]

The Private Managed Care Organization

The private managed care organization is a large, publicly traded health benefits company with over 6.5 million members from 18 states and Puerto Rico. The private managed care organization provides health insurance coverage and related services through administrative services products, preferred provider organizations, consumer-directed plans, health maintenance organizations, government-sponsored plans, plans for U.S. military dependents and trainees, and individuals.

In the commercial group health maintenance organization (HMO) plans, pre-paid health care services are provided to members either by: 1) primary care and specialty physicians employed by the HMO at facilities owned and operated by the private managed care organization; or, 2) a network of independent primary care and specialty physicians and other health care providers who are contracted by the private managed care organization to provide health care services. Access to other health care providers is regulated by the primary care physician, who is typically a family practitioner, internist, pediatrician, or obstetrician/gynecologist. Examples of other health care providers in the HMO plans include ambulatory surgical centers, dentists, diagnostic centers, durable

medical equipment suppliers, home health agencies, hospitals, mental health and substance abuse centers, nursing homes, optometrists, pharmacies, and urgent care centers.

In the commercial group preferred provider organizations (PPO), a member is encouraged to obtain health care services from preferred health providers. These providers are contracted by the private managed care organization to provide services at favorable rates. Unlike the HMO plans, the member has the ability to choose a physician or other health care provider without having to get approval from a primary care physician or "gatekeeper".

Approximately 72 percent of the members of the private managed care organization belong to the commercial HMO or PPO plans. The remaining members belong to Medicare plans (17%) and specialty and administrative services (7%).

No data were accessible to characterize the child and adolescent population enrolled in this private managed care organization.

Study Design

This study retrospectively evaluated prescription and service utilization claims records for children and adolescents less than 20 years of age with at least one prescription claim for an antipsychotic from 1996 to 2001. In Phase I of the study, enrollee and pharmacy data from three Medicaid states (California, Ohio, and Texas) and one private managed care organization were used to determine the prevalence of antipsychotic use in youths. Texas Medicaid pharmacy data and

TDMHMR CARE service utilization data were used during Phase II to identify provider specialties and diagnoses, respectively, associated with antipsychotic prescribing. In Phase III, relationships between antipsychotic use and the utilization of mental health services were evaluated using TDMHMR CARE service utilization data.

Inclusion/Exclusion Criteria

All children and adolescents under the age of 20 years with at least one prescription claim for an antipsychotic from 1996 to 2001 were eligible for this study. Subjects receiving typical and/or atypical antipsychotics were considered eligible (Table 2.3, page 130). Antipsychotics of all dosage forms (oral, liquid, short-acting injectable, and depot formulations) were included in the data set. No limits on the duration of antipsychotic treatment or daily dose of antipsychotic medication existed. It must be noted, however, that no data were collected for aripiprazole (Abilify™) and ziprasidone (Geodon®), as these agents were introduced to the market after the designated study period.

Subjects with any diagnosis were included, as well as subjects with any number of concomitant psychotropic medications. Childhood and adolescent psychiatric and behavioral diagnoses for which antipsychotics are commonly used are provided in Chapter One (Table 1.9, page 41). Concomitant psychotropic medications allowed in this study are listed in Table 2.4 (pages 131-133). Any child or adolescent without a Medicaid prescription claim for an antipsychotic were not eligible for this study. No exclusion criteria based upon race/ethnicity, gender, or socioeconomic status existed for this study.

Table 2.3. Typical and Atypical Antipsychotic Medications

Typical Antipsychotics	Atypical Antipsychotics
Chlorpromazine (generic, Thorazine®)	Aripiprazole (Abilify™)
Fluphenazine (generic, Permitil®, Prolixin®, decanoate)	Clozapine (generic, Clozaril®)
Haloperidol (generic, Haldol®, decanoate)	Olanzapine (Zyprexa®)
Loxapine (generic, Loxitane®)	Quetiapine (Seroquel®)
Mesoridazine (Serentil®)	Risperidone (Risperdal®)
Molindone (Moban®)	Ziprasidone (Geodon®)
Perphenazine (generic, Trilafon®)	
Pimozide (Orap®)	
Thioridazine (generic, Mellaril®)	
Thiothixene (generic, Navane®)	
Trifluoperazine (generic, Stelazine®)	

Note: No data will be collected for aripiprazole (Abilify™) and ziprasidone (Geodon®).

Table 2.4. Concomitant Psychotropic Medications

Antidepressants	Alpha-Agonists
Amitriptyline (generic, Elavil®, Endep®)	Clonidine (generic, Catapres®)
Amoxapine (generic, Asendin®)	Guanabenz (generic)
Bupropion (generic, Wellbutrin®, Wellbutrin® SR)	Guanfacine (generic, Tenex®)
Citalopram (Celexa™)	**Anti-Parkinsonians**
Clomipramine (generic, Anafranil®)	Amantadine (generic, Symmetrel®)
Doxepin (generic, Sinequan®)	Benztropine (generic, Cogentin®)
Desipramine (generic, Norpramin®)	Biperiden (Akineton®)
Fluoxetine (Prozac®, Prozac Weekly®, Sarafem®)	Trihexylphenidyl (generic, Artane®)
Fluvoxamine (generic, Luvox®)	**Anxiolytics/Hypnotics, Non-Benzodiazepines**
Imipramine (generic, Tofranil®)	Amobarbital/secobarbital (Tuinal®)
Maprotiline (generic, Ludiomil®)	Buspirone (generic, BuSpar®)
Mirtazapine (Remeron®, Remeron® Sol-Tab)	Butabarbital (generic, Butisol Sodium®)
Nefazodone (Serzone®)	Chloral hydrate (generic)
Nortriptyline (generic, Aventyl® HCl, Pamelor®)	Diphenhydramine (generic, Benadryl®)
Paroxetine (Paxil®, Paxil® CR™)	Hydroxyzine (generic, Atarax®, Vistaril®)
Phenelzine (Nardil®)	Meprobamate (generic, Equanil®, Miltown®)
Protriptyline (generic, Vivactil®)	Pentobarbital (generic, Nembutal®)
Sertraline (Zoloft®)	Secobarbital (generic, Seconal®)
Tranylcypromine (Parnate®)	Zaleplon (Sonata®)
Trazodone (generic, Desyrel®)	Zolpidem (Ambien®)
Trimipramine (Surmontil®)	
Venlafaxine (Effexor®, Effexor® XR)	

Table 2.4. Concomitant Psychotropic Medications (Cont.)

Benzodiazepines	Psychostimulants
Alprazolam (generic, Xanax®)	Amphetamine/dextroamphetamine (generic, Adderall®, Adderall™ XR)
Chlordiazepoxide (generic, Librium®)	Dexmethylphenidate (Focalin™)
Clonazepam (generic, Klonopin®)	Dextroamphetamine (generic, Dexedrine®)
Clorazepate (generic, Tranxene SD®, Tranxene® T-Tab)	Methylphenidate (generic, Concerta™, Metadate® CD, Metadate™ ER, Methylin™, Methylin™ ER, Ritalin®, Ritalin® LA, Ritalin SR®)
Diazepam (generic, Dizac®, Valium®)	Pemoline (generic, Cylert®)
Estazolam (generic, ProSom®)	**Substance Abuse**
Flurazepam (generic, Dalmane®)	Buprenorphine (Subutex®)
Lorazepam (generic, Ativan®)	Buprenorphine/naloxone (Suboxone®)
Midazolam (generic, Versed®)	Bupropion (Zyban®)
Oxazepam (generic, Serax®)	Disulfiram (generic, Antabuse®)
Prazepam (generic, Centrax®)	Mecamyline (Inversine®)
Temazepam (generic, Restoril®)	Methadone (generic, Dolophine®)
Triazolam (generic, Halcion®)	Naltrexone (generic, ReVia®)
Mania/Bipolar	Nicotine transdermal (generic, Nicotrol® Patch, NicoDerm® CQ)
Carbamazepine (generic, Carbatrol®, Tegretol®, Tegretol® XR)	
Divalproex sodium (Depakote®, Depakote® ER, Depakote® Sprinkle®)	
Gabapentin (Neurontin®)	
Lamotrigene (Lamictal®)	
Lithium (generic, Eskalith®, Eskalith®-CR, Lithobid®, Lithonate®)	
Oxcarbazepine (Trileptal®)	
Topiramate (Topamax®)	
Valproic acid (generic, Depakene®)	

Table 2.4. Concomitant Psychotropic Medications (Cont.)

Other Psychotropics	
Amitriptyline/chlordiazepoxide (generic, Limbitrol®, Limbitrol® DS)	Phenytoin (generic, Dilantin®)
Amitriptyline/perphenazine (generic, Etrafon®, Triavil®)	Pindolol (generic, Visken®)
Ethosuxamide (generic, Zarontin®)	Propranolol (generic, Inderal®)
Felbamate (Felbatol®)	Tiagabine (Gabatril®)
Levetiracetam (Keppra®)	Zonisamide (Zonegran®)
Metoprolol (generic, Lopressor®)	

Medicaid Data Sources: Enrollee, Pharmacy, and Service Utilization Databases

Medicaid Enrollee Databases

In Texas, Medicaid enrollee data (1996 to 2001) were collected with the assistance of the Research and Forecasting Department of the Texas HHSC. Using their comprehensive databases, total enrollment of children and adolescents, less than 20 years of age, was defined as the December enrollment for each study year. This assumed a balance between patient additions and withdrawals in enrollment in the Texas Medicaid system. Enrollee data for the California Medicaid system were collected from RAND California, and enrollee data for the Ohio Medicaid system were licensed from Constella Health Strategies. Enrollee data were collected in the following enrollment categories: total, male, female, and age-specific (<2, 2-4, 5-9, 10-14, and 15-19 years) (Table 2.5, page 134). The age strata are based upon the U.S. census categories.[3]

Table 2.5. Enrollment Categories for Medicaid Children and Adolescents[a]

	TOTAL	Male	Female	<2 y	2-4 y	5-9 y	10-14 y	15-19 y
1996								
1997								
1998								
1999								
2000								
2001								

[a] y = years.

Infants below the age of one year were captured using zero years as the initial age. Patient ages provided on prescription claims records were confirmed using those provided on service utilization records to ensure age-related data integrity. Data were categorized on a state basis, as differences in the eligibility criteria of individual state Medicaid systems limit the ability to pool state data into a national sample.

Medicaid Pharmacy Databases

Medicaid pharmacy databases provided prescription claims records for individuals enrolled in each state system. Prescription claims records were organized according to date, age, gender, and specific antipsychotic prescribed. Antipsychotic subclasses included both typical and atypical antipsychotics, and all dosage forms, including short-acting injectables and decanoates, were included in the data set (Table 2.3, page 130). Other pertinent information collected from the Medicaid pharmacy databases included daily dose of antipsychotic therapy, rates of antipsychotic switching, concomitant psychotropic medications (Table 2.4,

pages 131-133), reimbursement cost for each prescription claim, prescriber identification number, and prescriber specialty. Pharmacy data for the California and Texas Medicaid systems were collected from academic institutions licensed to use these data (The University of Southern California [Jeff McCombs, Ph.D.] and The University of Texas at Austin [Michael T. Johnsrud, Ph.D.]) with permission of the respective state Medicaid agencies. Pharmacy data for the Ohio Medicaid system were licensed from Constella Health Strategies.

TDMHMR CARE Service Utilization Databases

The CARE database consists of limited client-specific data for all persons receiving services from TDMHMR. Over the last eight years, approximately 18,000 children and adolescents per year received public mental health services. Youths are from lower income families, more males, and primarily between the ages of six and 18 years. Forty percent of children and adolescents receiving public mental health services are Caucasian, followed by Hispanic (35%) and African-American (20%). A percentage of Texas Medicaid youths with psychiatric or behavioral problems receive mental health services through the TDMHMR system, and therefore, are tracked by CARE.

CARE collects demographic and diagnostic information, and records of treatment services, including inpatient psychiatric hospitalizations at state facilities and outpatient mental health services. CARE service utilization data include enrollment in different types of outpatient mental health services: Assessment Services (TC08), Counseling and Psychotherapy (TC13); Crisis Intervention (In-Home [TC01], Inpatient [TC07], Therapeutic Foster Care

[TC09], Other Residential Services [TC17], and Acute Day Treatment [TC20]); Medication-related Services (TC04); Service Coordination (TC06); Skills Training (Rehabilitative Day Treatment [TC03], Individual [TC10], Family [TC19]); and, Supportive Services (Respite [TC05], Family-Focused Services [TC23], and Flexible Community Support [TC24]). The TDMHMR CARE service utilization database was obtained through Alan Shafer, Ph.D., and served as the data source for Phase II (diagnostic) and III analyses.

Private Managed Care Organization Data Sources: Enrollee and Pharmacy Databases

Enrollee and pharmacy data for the private managed care organization were licensed from Constella Health Strategies. Similar to Medicaid enrollment data, the month of December was used to determine enrollment and these counts served as a proxy for the entire calendar year. Enrollee data were collected in the following enrollment categories: total, male, female, and age-specific (<2, 2-4, 5-9, 10-14, and 15-19 years) (Table 2.5, page 134).

Prescription claims records were organized according to date, age, gender, and specific antipsychotic prescribed. Antipsychotic subclasses included both typical and atypical antipsychotics, and all dosage forms, including short-acting injectables and decanoates, were included in the data set (Table 2.3, page 130). Other pertinent information collected from the private managed care organization pharmacy database included daily dose of antipsychotic therapy, rates of

antipsychotic switching, concomitant psychotropic medications (Table 2.4, pages 131-133), and allowable charges for the antipsychotic prescription.

Study Measures

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (1996 to 2001)

The study measures evaluated in Phase I of this research were similar to those evaluated in a previous pharmacoepidemiological studies of psychotropic medication use in children and adolescents.[3-5] All analyses were conducted for each health system (three Medicaid states and one private managed care organization).

Prevalence is defined as the number of children and adolescents with at least one prescription claim for an antipsychotic agent, regardless of subclass, per 1,000 enrolled children and adolescents under the age of 20 years. Trends in prevalence were assessed over a seven-year period (1996 to 2001) using annual descriptive analyses. In addition to total prevalence, rates for typical and atypical antipsychotic use were calculated. Prevalence rates of specific atypical antipsychotic (clozapine, olanzapine, quetiapine, and risperidone) use were calculated. Age-specific prevalence was determined using the age strata described previously (<2, 2-4, 5-9, 10-14, and 15-19 years of age). Gender-specific prevalence rates were determined using male and female stratifications.

Some children and adolescents may have received more than one antipsychotic during the same calendar year. In determining the prevalence rate

for total antipsychotic use during a given year, these youths contributed a single case to the numerator. If a child or adolescent received a typical and an atypical antipsychotic during the same calendar year, he or she contributed a single case to both numerators of the prevalence rates for typical and atypical antipsychotics. If a youth received two different typical antipsychotics during the same calendar year, he or she contributed a single case to the numerator for the determination of prevalence of typical antipsychotic use. If a youth received two different atypical antipsychotics during the same calendar year, he or she contributed a single case to the numerator for the determination of prevalence of atypical antipsychotic use. However, for youths who received multiple atypical antipsychotics, a single case was added to all numerators of the prevalence rates for specific atypical antipsychotics.

Daily dose of antipsychotic prescribed was calculated for age-specific groups (<2, 2-4, 5-9, 10-14, and 15-19 years of age) using pharmacy data. To determine daily dose for each prescription record, the quantity dispensed was multiplied by the drug strength, and this product was divided by the days supply field. Due to potential errors in the 'days supply' field, 5 percent of the dosing range (2.5% on each end) was recoded as 'system-missing'. The missing values were replaced with the mean daily dose of that particular individual. Table 2.6 (page 139) provides specific atypical antipsychotic dosing ranges which included 95 percent of the total sample. Average daily doses were calculated for specific atypical antipsychotics and examined for appropriateness based upon established efficacy dosing ranges.

Table 2.6. Age-Specific Dosing Ranges (95%) of Atypical Antipsychotics[a,b]

Program	Age Group (y)	Olanzapine	Quetiapine	Risperidone
CA	<2	2.50 – 40.00	25.00 – 606.06	0.25 – 8.00
	2-4	2.50 – 30.30	25.00 – 800.00	0.25 – 7.50
	5-9	2.50 – 20.00	25.00 – 642.86	0.25 – 6.00
	10-14	2.50 – 20.67	25.00 – 900.00	0.50 – 7.00
	15-19	2.50 – 30.00	25.00 – 900.00	0.50 – 9.00
OH	<2	0.83 – 20.00	5.83 – 300.00	0.12 – 6.00
	2-4	1.25 – 15.00	11.67 – 400.00	0.25 – 4.00
	5-9	1.25 – 15.00	20.83 – 400.00	0.25 – 4.00
	10-14	0.83 – 20.00	13.33 – 600.00	0.25 – 6.00
	15-19	0.67 – 20.00	11.67 – 666.67	0.17 – 6.13
TX	<2	1.25 – 15.00	6.25 – 400.00	0.25 – 5.00
	2-4	1.25 – 15.00	25.00 – 400.00	0.25 – 5.00
	5-9	2.50 – 20.00	25.00 – 500.00	0.25 – 6.00
	10-14	2.50 – 25.00	25.00 – 600.00	0.50 – 6.00
	15-19	2.50 – 30.00	25.00 – 800.00	0.50 – 8.00
MCO	<2	2.50 – 25.00	50.00 – 600.00	0.50 – 8.00
	2-4	1.25 – 20.00	25.00 – 800.00	0.25 – 6.00
	5-9	2.50 – 20.00	25.00 – 600.00	0.25 – 4.50
	10-14	2.50 – 20.00	25.00 – 800.00	0.50 – 6.00
	15-19	2.50 – 20.00	25.00 – 800.00	0.50 – 8.00

[a]All doses reported in milligrams per day.
[b]Abbreviations: CA=California Medi-Cal; MCO=Managed Care Organization; OH=Ohio Medicaid; TX=Texas Medicaid; y=years.

Rates of switching antipsychotic therapy were evaluated as markers of poor outcome. A switch in antipsychotic treatment occurred when the patient received one prescription for a certain antipsychotic, then received a prescription for different antipsychotic within 30 days of the end of the treatment period of the previous prescription. The presence of any further prescriptions for the first antipsychotic did not constitute a switch in antipsychotic therapy. The treatment period for each prescription was defined as the dispensing date plus the days supply of the prescription. The percent of patients who switched antipsychotics, the number of switches per patient, and types of antipsychotics switches were determined for each calendar year.

Concomitant psychotropic medication use was examined and included alpha agonists, anticonvulsant/ mood stabilizers, antidepressants, benzodiazepines, psychostimulants, and others (i.e., sedative-hypnotics, etc.). Other psychotropic medications were considered concomitant if their administration overlaps with the antipsychotic treatment period. Prevalence rates of multiple antipsychotic use among children and adolescents receiving an antipsychotic were also examined. Antipsychotic polypharmacy was defined as a child or adolescent being treated with two different antipsychotics concurrently for a period of 30 days or more.

Expenditures for antipsychotic prescriptions (total and antipsychotic subclass) for children and adolescents were calculated and annual trends in cost were assessed. Consumer price indices for medical care services from 1996 to 2001 were obtained from the U.S. Bureau of Labor Statistics. Costs associated with antipsychotic prescriptions were adjusted to 2001 prices to account for increases in medical care inflation (Table 2.7, page 140).

Table 2.7. Cost-adjustments based upon Medical Care Services Consumer Price Indicies[7]

Year	Medical Care Services CPI	Percent adjustment to 2001 prices
1996	232.4	20.0%
1997	239.1	16.6%
1998	246.8	13.0%
1999	255.1	9.3%
2000	266.0	4.8%
2001	278.8	-

Table 2.8 (pages 141-142) summarizes the study measures, database sources, and corresponding data fields used to complete Phase I analyses.

Table 2.8. Study Measures and Corresponding Data for Phase I Analyses

Study Measure	Database Source(s)	Specific Data Field(s)	Comments
Prevalence of total, atypical, and typical antipsychotic use	Enrollee (Medicaid, Managed Care)	Total number of enrolled children and adolescents	*Specific atypical antipsychotic use also evaluated (clozapine, olanzapine, quetiapine, and risperidone)*
	Pharmacy (Medicaid, Managed Care)	Total number of children and adolescents with a prescription claim for any antipsychotic	
Age-specific prevalence of total, atypical, and typical antipsychotic use	Enrollee (Medicaid, Managed Care)	Total number of enrolled children and adolescents	*Age categories: <2 y, 2-4 y, 5-9 y, 10-14 y, and 15-19 y*
	Pharmacy (Medicaid, Managed Care)	Total number of children and adolescents with a prescription claim for any antipsychotic within designated age categories	
Gender-specific prevalence of total, atypical, and typical antipsychotic use	Enrollee (Medicaid, Managed Care)	Total number of enrolled children and adolescents	*Gender categories: male and female*
	Pharmacy (Medicaid, Managed Care)	Total number of children and adolescents with a prescription claim for any antipsychotic within designated gender categories	

Table 2.8. Study Measures and Corresponding Data for Phase I Analyses (Cont.)

Study Measure	Database Source(s)	Specific Data Field(s)	Comments
Daily antipsychotic dose within age-specific groups	Pharmacy (Medicaid, Managed Care)	Drug strength, quantity, and days supply	*Age categories: <2 y, 2-4 y, 5-9 y, 10-14 y, and 15-19 y; daily doses calculated for specific atypical antipsychotic*
Antipsychotic switch rates	Pharmacy (Medicaid, Managed Care)	Antipsychotic prescription claims records for an individual, prescription end date, and days supply	*Presented as the number of children and adolescents switching during each study year*
Any concomitant psychotropic medication use	Pharmacy (Medicaid, Managed Care)	Prescription claims records for other psychotropic medications	*Concomitant psychotropic medication use also calculated for specific medication classes (alpha-agonists, anticonvulsants/mood stabilizers, antidepressants, benzodiazepines, and others)*
Total prevalence of antipsychotic polypharmacy	Pharmacy (Medicaid, Managed Care)	Total number of children and adolescents with a prescription claim for any antipsychotic	*Defined as a child or adolescent being treated with two different antipsychotics concurrently for a period of 30 days or more*
	Pharmacy (Medicaid, Managed Care)	Total number of children and adolescents with prescription claims for two different antipsychotics	
Cost for prescriptions for any, atypical, and typical antipsychotics	Pharmacy (Medicaid, Managed Care)	Prescription reimbursement	

Phase II: Prescribing practices for antipsychotic agents

Diagnostic and provider specialty information were analyzed in Phase II of this study using Texas Medicaid pharmacy and TDMHMR CARE service utilization data. Diagnoses were classified according to the following categories, modified from those proposed by Pappadopulos and colleagues:

- Anxiety disorders (adjustment, anxiety disorder not otherwise specified [NOS], generalized anxiety, obsessive-compulsive, panic, post-traumatic stress, separation anxiety, and social phobia);
- Bipolar disorders (bipolar I, bipolar II, bipolar with psychosis, and cyclothymic disorder);
- Depressive disorders (dysthymia, major depressive, major depressive with psychosis, and mood disorder NOS);
- Disruptive disorders (attention-deficit hyperactivity [all types], conduct, intermittent explosive, and oppositional defiant;
- Psychotic disorders (psychotic disorder NOS, schizoaffective, and schizophrenia, schizophreniform);
- Substance abuse disorders (alcohol, cannabis, and polysubstance);
- Developmental disorders (mental retardation and pervasive developmental disorders);
- Other psychiatric disorders (disorders not specific to childhood); and,
- Other childhood psychiatric disorders (communicative disorders, encopresis, enuresis, learning disorders).[6]

Children and adolescents diagnosed with more than one disorder falling in the same category were assigned one diagnosis.[6] Youths with multiple diagnoses were assigned one diagnosis for each distinct category. The principal diagnosis assigned with TDMHMR CARE service utilization was used for the purpose of diagnostic classification for subanalyses of service utilization. It was also possible that a child or adolescent receiving an antipsychotic may not have an associated psychiatric or behavioral diagnosis, and these youths were categorized as "no psychiatric or behavioral diagnosis."

Physician specialty was classified using the following categories:

- Neurology (including child neurology);
- Primary Care (including family practice, general practice, and pediatrics);
- Psychiatry (including child and adolescent psychiatry);
- Other; or,
- Unspecified.

Provider specialty was collected from the Texas Medicaid pharmacy data. Each claim provides a field indicating a state-assigned provider identification number. Using the Texas Medicaid Drug Vendor Program's prescriber directories, the specialty of prescribing physician was determined. Once the specialty of prescriber was identified, a dummy code was assigned based upon the above specialties.

Annual analyses of diagnosis were conducted only for Texas Medicaid youths receiving mental health services in the TDMHMR system. Annual

analyses of provider type examined all Texas Medicaid youths receiving an antipsychotic. Additional analyses in Phase II evaluated diagnostic and provider information according to age strata.

Table 2.9 (page 145) summarizes the study measures, database sources, and corresponding data fields used to complete Phase II analyses.

Table 2.9. Study Measures and Corresponding Data for Phase II Analyses

Study Measure	Database Source(s)	Specific Data Field(s)	Comments
Provider specialty classification associated with any, atypical, and typical antipsychotic prescriptions	Texas Medicaid pharmacy	Provider identification number	*Provider specialty data also evaluated for age-specific and gender-specific groups*
	Lists of state assigned provider identification numbers	Provider identification number and specialty of provider	
Diagnosis classification for use of any, atypical, and typical antipsychotic	TDMHMR CARE service utilization	Diagnosis and date of service records	*Diagnostic data also evaluated for age-specific and gender-specific groups*

Phase III: Relationships of antipsychotic use with patient health care service utilization

The purpose of Phase III was to examine how the following service utilization parameters were related to antipsychotic use from 1998 to 2001: number and total days of inpatient psychiatric hospitalizations, and enrollment and duration of different types of outpatient mental health services. TDMHMR CARE service utilization data included enrollment in the following types of outpatient mental health services: Assessment Services (TC08), Counseling and

Psychotherapy (TC13); Crisis Intervention (In-Home [TC01], Inpatient [TC07], Therapeutic Foster Care [TC09], Other Residential Services [TC17], and Acute Day Treatment [TC20]); Medication-related Services (TC04); Service Coordination (TC06); Skills Training (Rehabilitative Day Treatment [TC03], Individual [TC10], Family [TC19]); and, Supportive Services (Respite [TC05], Family-Focused Services [TC23], and Flexible Community Support [TC24]). It is important to examine what types of outpatient mental health services are being delivered to mentally ill youths, as these may improve long-term adaptive functioning and patient outcomes.

In addition to evaluating overall trends of service utilization, trends in service utilization based upon age, gender, and diagnosis were examined. It is important to evaluate these parameters, as certain populations may account for a significant portion of antipsychotic use, service utilization, and associated costs. Evaluation of these parameters may indicate which populations may possibly lack access to mental health care services.

Table 2.10 (pages 147-148) summarizes the study measures, database sources, and corresponding data fields used to complete Phase III analyses.

Table 2.10. Study Measures and Corresponding Data for Phase III Analyses

Study Measure	Database Source(s)	Specific Data Field(s)	Comments
Number of inpatient psychiatric hospitalizations per patient	TDMHMR CARE service utilization	Total number of service utilization claims records for inpatient psychiatric hospitalizations for an individual	*All analyses of inpatient psychiatric hospitalizations will also be evaluated according to demographic variables (age and gender) and diagnoses.*
Number of inpatient hospital days per patient hospitalized	TDMHMR CARE service utilization	Admission and discharge dates for inpatient psychiatric hospitalizations for an individual hospitalized	
Number of youths receiving specific types of outpatient mental health services	TDMHMR CARE service utilization	Total number of children and adolescents receiving specific types of outpatient mental services	*All analyses of outpatient mental health services will also be evaluated according to demographic variables (age and gender) and diagnoses.*

Table 2.10. Study Measures and Corresponding Data for Phase III Analyses (Cont.)

Study Measure	Database Source(s)	Specific Data Field(s)	Comments
Duration of enrollment in specific types of outpatient mental health services	TDMHMR CARE service utilization	Service utilization dates associated with outpatient mental health services	*Assessment Services (TC08), Counseling and Psychotherapy (TC13); Crisis Intervention (In-Home [TC01], Inpatient [TC07], Therapeutic Foster Care [TC09], Other Residential Services [TC17], and Acute Day Treatment [TC20]); Medication-related Services (TC04); Service Coordination (TC06); Skills Training (Rehabilitative Day Treatment [TC03], Individual [TC10], Family [TC19]); and, Supportive Services (Respite [TC05], Family-Focused Services [TC23], and Flexible Community Support [TC24]).*

Statistical Analyses

Appropriate statistical procedures were used to test the stated hypotheses. All statistical measures are two-tailed, and due to the large sample, significance defined at an alpha level of 0.01. For hypotheses that were tested using analysis of variance (ANOVA), post hoc analyses were conducted to further investigate the significant difference detected in the ANOVA. The Scheffe test was used

when sample sizes were unequal, but group variances were equal. The Games-Howell test was used when both sample sizes and group variances were unequal.[8]

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (1996 to 2001)

Prevalence rates of antipsychotic use were reported as X per 1,000 enrollees and applied to total, age-specific, gender-specific, and drug-specific prevalence rates. The Pearson chi-square test was used to compare annual prevalence rates of antipsychotic use (H_1 through H_3, and H_5 through H_{10}). Logistic regression analyses were used to determine odds ratios of each prevalence rate of antipsychotic use (i.e., the odds that a child or adolescent were to receive an antipsychotic with each additional study year). Rank order was used to compare the specific atypical antipsychotic prevalence rates annually (H_4). Comparisons of annual prevalence rates of antipsychotic use between Medicaid states were examined using the Pearson chi-square (H_{17} through H_{19}). Comparisons of annual prevalence rates of antipsychotic use between Medicaid states and the Managed Care Organization were examined using the Pearson chi-square (H_{20} through H_{22}).

Descriptive statistics (mean±standard deviation [SD], median, 95% confidence intervals [CI]) were used to report average daily dose of specific atypical antipsychotic treatment. ANOVA was used to evaluate the year effect on mean daily dose of atypical antipsychotics prescribed in age-specific groups (H_{11} through H_{13}). The prevalence of antipsychotic switching was reported as the percentage of children and adolescents having at least one switch in medications. The Pearson chi-square test was used to compare prevalence of antipsychotic

switching across the calendar years under study. Logistic regression analyses were used to determine odds ratios of antipsychotic switching (i.e., the odds that a child or adolescent were to switch antipsychotic medications with each additional study year) (H_{14}). Percentages of the types of antipsychotic switched occurring each year were reported, and the mean number of switches per patient during a calendar year was evaluated. The prevalence of concomitant psychotropic medication use was reported as the percentage of children and adolescents having at least one concomitant psychotropic medication during antipsychotic treatment. The Pearson chi-square test was used to compare prevalence of concomitant psychotropic medication use across the calendar years under study. Logistic regression analyses were used to determine odds ratios of antipsychotic switching (i.e., the odds that a child or adolescent were to receive a psychotropic medication during antipsychotic treatment with each additional study year) (H_{15}). Percentages of medication class of concomitant psychotropic medications used each year were reported.

Cost of antipsychotic prescriptions in Phase I (H_{16}) was evaluated for any trend over the seven-year period. No state comparisons were performed on prescription costs, as states differ in Medicaid prescription reimbursement formulas (Table 2.11, page 151).

Table 2.11. Medicaid Prescription Reimbursement Formulas (June 2003)[9]

State	Ingredient Cost	Dispensing Fee	Co-Pay
California	Average Wholesale Price (AWP) – 5%	$4.05	$1.00
Ohio	Wholesaler Acquistion Cost (WAC) + 9% or AWP – 12.8%	$3.70	None
Texas	(AWP – 15% or WAC + 12% [lowest]) / 1.02	$5.27	N/A

Phase II: Prescribing practices for antipsychotic agents

Diagnostic and provider specialty information were presented as percentages. The Pearson chi-square test was utilized to compare annual rates of prescribing from different providers (H_{23} and H_{24}), as well as the diagnoses for which an antipsychotic was prescribed (H_{25}). Rank order was used to determine for which diagnoses antipsychotics were most prescribed from 1998 to 2001.

Phase III: Relationships of antipsychotic use with patient health care service utilization

Descriptive statistics (mean±SD, median, and 95% CI) were used to report data on patient health care service utilization. The ANOVA model was used to evaluate the year effect on interval measures of inpatient and outpatient mental health service utilization: mean number of inpatient psychiatric hospitalizations, mean number of hospital days, and mean duration of enrollment in outpatient mental health services (H_{26}, H_{27}, H_{29}). The Kruskal-Wallis test was also used to evaluate the year effect on interval measures of inpatient and outpatient mental health service utilization due to non-normal distributions. To evaluate trends in categorical outpatient mental health service utilization data (frequencies of

patients receiving different types of outpatient mental health services), the Pearson chi-square test was utilized (H_{28}).

Hypotheses Testing and Associated Statistical Methods

Table 2.12 (pages 152-158) provides a summary of the hypotheses tested, the study measure used for each hypothesis, and the appropriate statistical methods used to test the hypotheses.

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods

Hypothesis	Study Measure	Statistical Method
Phase I: Epidemiology (CA, OH, TX, and MCO)		
H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.	Prevalence of total antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.	Prevalence of atypical antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.	Prevalence of typical antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_4: During each study year (1996-2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.	Prevalence of specific atypical antipsychotic use	Rank order
H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increase across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).	Age-specific prevalence of total antipsychotic use	Pearson Chi-square (χ^2); Logistic regression

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods (Cont.)

Hypothesis	Study Measure	Statistical Method
Phase I: Epidemiology (Cont.; CA, OH, TX, and MCO)		
H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increase across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).	Age-specific prevalence of atypical antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decrease across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).	Age-specific prevalence of typical antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increase across gender groups: male and female.	Gender-specific prevalence of total antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increase across gender groups: male and female.	Gender-specific prevalence of atypical antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decrease across gender groups: male and female.	Gender-specific prevalence of typical antipsychotic use	Pearson Chi-square (χ^2); Logistic regression
H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.	Daily dose of risperidone	ANOVA (year effect)
H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.	Daily dose of olanzapine	ANOVA (year effect)
H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.	Daily dose of quetiapine	ANOVA (year effect)

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods (Cont.)

Hypothesis	Study Measure	Statistical Method
Phase I: Epidemiology (Cont.; CA, OH, TX, and MCO)		
H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.	Antipsychotic switch rates	Pearson Chi-square (χ^2); Logistic regression
H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotics, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.	Any concomitant psychotropic medication use	Pearson Chi-square (χ^2); Logistic regression
H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.	Cost for prescriptions for any, atypical, and typical antipsychotics	Rank order
H_{17}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of total antipsychotic use, followed by Ohio and California.	Prevalence of total antipsychotic use	Pearson Chi-square (χ^2), Rank order
H_{18}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of atypical antipsychotic use, followed by Ohio and California.	Prevalence of atypical antipsychotic use	Pearson Chi-square (χ^2), Rank order

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods (Cont.)

Hypothesis	Study Measure	Statistical Method
Phase I: Epidemiology (Cont.; CA, OH, TX, and MCO)		
H_{19}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of typical antipsychotic use, followed by Ohio and California.	Prevalence of typical antipsychotic use	Pearson Chi-square (χ^2), Rank order
H_{20}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of total antipsychotic use compared to the Managed Care Organization.	Prevalence of total antipsychotic use	Pearson Chi-square (χ^2), Rank order
H_{21}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of atypical antipsychotic use compared to the Managed Care Organization.	Prevalence of atypical antipsychotic use	Pearson Chi-square (χ^2), Rank order

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods (Cont.)

Hypothesis	Study Measure	Statistical Method
Phase I: Epidemiology (Cont.; CA, OH, TX, and MCO)		
H_{22}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of typical antipsychotic use compared to the Managed Care Organization.	Prevalence of typical antipsychotic use	Pearson Chi-square (χ^2), Rank order
Phase II: Prescribing Practices (TX only)		
H_{23}: The number of prescriptions for an antipsychotic for a child or adolescent from primary care physicians (family practice physicians, general practice physicians, and pediatricians) increases from 1996 to 2001.	Provider type classification associated with any antipsychotic prescription	Pearson Chi-square (χ^2)
H_{24}: The number of prescriptions for an antipsychotic for a child or adolescent from psychiatrists, including child and adolescent psychiatrists, increases from 1996 to 2001.	Provider type classification associated with any antipsychotic prescription	Pearson Chi-square (χ^2)
H_{25}: From 1998 to 2001, antipsychotics are most prescribed for disruptive behavioral disorders, such as oppositional defiant disorder, conduct disorder, intermittent explosive disorder, and attention-deficit hyperactivity disorders.	Diagnosis classification associated with any antipsychotic prescription	Rank order

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods (Cont.)

Hypothesis	Study Measure	Statistical Method
Phase III: Service utilization (TX only)		
H_{26}: The mean number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.	Number of inpatient psychiatric hospitalizations per patient	ANOVA (year effect)
H_{27}: The mean number of hospital days per each hospitalized child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.	Length of stay of inpatient psychiatric hospitalizations per patient hospitalized	ANOVA (year effect)
H_{28}: The number of children and adolescents receiving assessment services, crisis intervention, medication-based services, and service coordination increases from 1998 to 2001, while the number of children and adolescents receiving counseling and psychotherapy, skills training, and supportive mental health services decreases from 1998 to 2001.	Number of outpatient mental health visits per patient	Pearson Chi-square (χ^2)

Table 2.12. Hypotheses Tested, Associated Study Measure(s), and Statistical Methods (Cont.)

Hypothesis	Study Measure	Statistical Method
Phase III: Service utilization (TX only; Cont.)		
H_{29}: The mean duration of enrollment of outpatient services for assessment services, crisis intervention, medication-based services, and service coordination increases among children and adolescents receiving an antipsychotic from 1998 to 2001. The mean duration of enrollment of outpatient services for counseling and psychotherapy, skills training, and supportive mental health services decreases among children and adolescents receiving an antipsychotic from 1998 to 2001.	Types of outpatient mental health visits per patient	ANOVA (year effect)

Use of Healthcare Claims Data for Pharmacoepidemiological and Outcomes Research

Pharmacoepidemiological research in pediatric populations is essential to provide accurate data on real-world use of drugs, to reveal variations in prescribing practices, and to learn about the occurrence of adverse events. Randomized, controlled clinical trials are necessary to establish the efficacy of a drug, and to detect commonly occurring adverse events associated with that drug. While clinical trials are useful, the applicability of the findings may be limited in actual clinical practice due to lack of generalizability of study population, expenses related to drug treatment, and short duration of study time. Research

using healthcare claims databases is more applicable to the naturalistic practice situation, as usual community practice settings, actual patient populations, and prescribing physicians are represented. Use of healthcare claims databases for research purposes is less expensive compared to clinical trials, and allows for greater flexibility in determining the study methodology.[10] Furthermore, healthcare claims databases are very accessible sources of data for large numbers of patients, which provides greater statistical power.

Research using healthcare claims databases does have its disadvantages. First, study populations resulting from these databases are not randomized to treatment and are usually more heterogenous than those patients seen in clinical trials. As varying external interventions may occur, less precision and internal validity are associated with database research. Second, physician-defined diagnoses may be subject to imprecision. The lack of severity and chronicity classification schemes may result in significant interpatient differences.[11] Third, the establishment of causality between drug and patient outcome parameters is difficult with retrospective data. External variables, such as psychosocial interventions, may affect patient outcome variables, thus limiting the ability to infer that changes are solely due to drug treatment. Fourth, clinical research using administrative data is required to use markers of clinical outcome instead of direct measurement of symptoms or functioning. These markers may or may not be indicative of actual clinical outcomes. Finally, a phenomenon known as "confounding by indication" may occur in which poor outcomes are attributed to failed drug treatment rather than the actual course of the disease.[12]

Medicaid Databases

With over 20 million children and adolescents enrolled, Medicaid systems provide rich sources of data from which questions regarding medication use and service utilization patterns can be answered. Medicaid systems are extensive in scope, providing data for an individual in four separate files: eligibility, provider, health service utilization, and prescription claims records. Patient information, such as demographics and socioeconomic status, are included in each record. Diagnostic information is also provided as *International Classification of Disease* ICD-9 or ICD-10 codes. Service utilization claims records provide information on physician encounters, hospital admissions, diagnosis (ICD-9 or ICD-10), and associated reimbursement costs. Within the pharmacy database, Medicaid data available include drugs coded within the National Drug Code (NDC) Directory, quantity, days supply, and reimbursement for the costs.

Large data sets, such as Medicaid claims databases, can be problematic. First, the quality of the data may be questionable as the data are collected for reasons other than research. While little is known about the reliability and validity of Medicaid data, a study by Hennessy and colleagues suggested that there is some question as to the integrity of these data.[13] Other studies have shown, however, that there is adequate agreement between Medicaid claims and medical records. Walkup et al. examined the reliability of Medicaid claims for use in psychiatric diagnostic and service delivery research. Diagnostic data from the Medicaid claims files were reliable, but outpatient mental health services were sometimes not captured by the claims file.[14] Lurie and colleagues also

demonstrated high reliability (86.8%) of diagnostic data in Medicaid databases.[15] It must be noted that possible errors in the medical records may be carried into administrative databases as inaccurate information. Second, large samples inevitably produce statistically significant findings that are measurement errors or minute differences without clinical significance. Researchers need to be aware of these potential hazards when using large data sets like Medicaid.

Limitations exist regarding the extent to which results from a study of a Medicaid child and adolescent population can be generalized to the entire U.S. child and adolescent population. By definition, this sample consisted of children and adolescents of low socioeconomic status, a population which has been shown to be at risk for the development of aggressive behaviors.[16] Furthermore, Medicaid children and adolescents may include those receiving foster care or those with severe mental disorders. These factors make it extremely important to examine psychotropic pharmacotherapy in this population, the types of disorders being treated, and the other types of mental health services being delivered. With the inclusion of a private managed care organization operating nationwide, valuable information regarding antipsychotic use in children and adolescents covered by an HMO or PPO is provided. Additionally, inclusion of private managed care organization data allows for a better, overall perspective of the use of these agents in youths from 1996 to 2001.

Although it is unclear how results from the this study translate to the entire U.S. child and adolescent population, it provides information as to how much these medications are being used, who is prescribing them and for what, the types

of mental health services being delivered, and the associated costs of the medications and utilized health care services.

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CHAPTER THREE

Results

CHAPTER OVERVIEW

Chapter Three presents the study results describing the current trends of antipsychotic use in children and adolescents from 1996 to 2001. Descriptions of the demographic characteristics of children and adolescents receiving an antipsychotic during the designated study are provided according to the health system. The findings are detailed according to the phases: (1) trends in antipsychotic use in children and adolescents; (2) prescribing practices for antipsychotic agents; and, (3) relationships of antipsychotic use to service utilization. Within each section, the hypotheses and associated statistical analyses are presented.

Phase I analyses, which includes Medi-Cal (CA), Ohio Medicaid (OH), Texas Medicaid (TX), and one private managed care organization (MCO), are separated accordingly. Eligibility and prescription claims data were collected for each calendar year between 1996 and 2001, but data are reported only for 1996, 1998, and 2001 in some instances. The year 1998 was chosen because it represents the time point when multiple atypical antipsychotics were available on the market, and when the growth of antipsychotic use escalated significantly in several of the insurance programs under study. Phase II includes provider analyses from the Texas Medicaid (TX) child and adolescent population. Diagnostic (Phase II) and service utilization (Phase III) analyses examines only

Texas Medicaid youths receiving mental health services from the Texas Department of Mental Health and Mental Retardation (TDMHMR) system from 1998 to 2001.

Number of Children and Adolescents Enrolled in Three Medicaid Programs and One Managed Care Organization

Total, age-specific, and gender-specific enrollments for children and adolescents less than 20 years of age were determined using each insurance program's respective eligibility database. In 1996, the number of enrolled youths in CA was 2,895,158. Children between the ages of five and nine years comprised the largest percentage of enrollment (30.6%), and female enrollment was roughly equal to that of males. In 1998, 2,637,323 youths were enrolled in CA. Thirty-one percent of enrollees were between the ages of five and nine years, and 50 percent were females. Over 2.6 million children and adolescents were enrolled in 2001. As seen in previous years, children aged five to nine years were the largest age group (29.5%), and the female to male ratio was approximately 1.0. Table 3.1 (page 168) provides further detail regarding CA enrollee data during each calendar year from 1996 to 2001.

Table 3.1. Medi-Cal (CA) Youth Enrollment Numbers from 1996 to 2001[a]

	1996	1997	1998	1999	2000	2001
Total	2895158	2845547	2637323	2651983	2653100	2602614
Male	1455738	1432158	1329412	1337180	1338367	1314618
Female	1439418	1413388	1307911	1314803	1314733	1287994
<2 y	253180	236814	206395	201752	201290	208567
2 - 4 y	648331	612017	541209	517524	497031	476695
5 - 9 y	886016	884815	825825	823388	809585	766617
10 - 14 y	624304	625952	604147	623936	648648	653965
15 - 19 y	483327	485949	459747	485383	496546	496770

[a]Abbreviations: y= years.

Over 744,000 children and adolescents were enrolled in OH in 1996. Children aged five to nine years were the largest age group (29.1%), and the female to male ratio was approximately 1.0. In 1998, the number of enrolled youths was 687,729. Children between the ages of five and nine years comprised the largest percentage of enrollment (28.6%), and female enrollment was roughly equal to that of males. In 2001, 842,735 youths were enrolled in OH. Twenty-seven percent of enrollees were between the ages of five and nine years, and 50 percent were females. Table 3.2 (page 169) provides further detail regarding OH enrollee data during each calendar year from 1996 to 2001.

Table 3.2. Ohio Medicaid (OH) Youth Enrollment Numbers from 1996 to 2001[a]

	1996	1997	1998	1999	2000	2001
Total	744906	704100	687729	696888	724357	843735
Male	368733	348634	340797	345930	360617	422264
Female	376173	355466	346932	350958	363740	421471
<2 y	118466	113357	110542	110205	116679	128600
2 - 4 y	157779	142053	129062	126606	130848	153579
5 - 9 y	216489	205334	196906	195461	196680	223267
10 - 14 y	144026	141274	141025	148185	157857	192854
15 - 19 y	108146	102082	110194	116431	122293	145435

[a]Abbreviations: y= years.

In 1996, 1,143,025 youths were enrolled in TX. Thirty percent of enrollees were between the ages of five and nine years, and females constituted 50 percent of enrollees. Over 993,000 children and adolescents were enrolled in TX in 1998. Children aged five to nine years were the largest age group (28.6%), and the female to male ratio was approximately 1.0. In 2001, the number of enrolled youths was 1,144,806. Similar to previous years, children between the ages of five and nine years comprised the largest percentage of enrollment (25.5%), and female enrollment was roughly equal to that of males. Table 3.3 (page 170) provides further detail regarding TX enrollee data during each calendar year from 1996 to 2001.

Table 3.3. Texas Medicaid (TX) Youth Enrollment Numbers from 1996 to 2001[a]

	1996	1997	1998	1999	2000	2001
Total	1143025	1046609	993021	976291	1002341	1144806
Male	567712	520458	495489	487737	525692	576284
Female	575313	526151	497532	488554	476649	568511
<2 y	237220	218973	210515	212276	226490	244170
2 - 4 y	267800	232130	206552	197366	201444	230088
5 - 9 y	345133	313909	284085	271776	269988	292110
10 - 14 y	184152	184895	171052	165967	170722	230187
15 - 19 y	108720	96702	120817	128906	133697	148251

[a]Abbreviations: y= years.

In 1996, the number of enrolled youths in MCO was 905,310. Children between the ages of five and nine years comprised the largest percentage of enrollment (25.9%), and female enrollment was roughly equal to that of males. In 1998, 906,343 youths were enrolled. Twenty-seven percent of enrollees were between the ages of five and nine years, and female and male enrollees were equal. Compared to previous years, fewer children and adolescents were enrolled in MCO in 2001. Although the female to male ratio remained approximately 1.0, children and adolescents aged ten to 14 years became the largest age group (26.2%). Table 3.4 (page 171) provides further detail regarding MCO enrollee data during each calendar year from 1996 to 2001.

Table 3.4. Managed Care Organization (MCO) Youth Enrollment Numbers from 1996 to 2001[a]

	1996	1997	1998	1999	2000	2001
Total	905310	867935	906343	828952	695862	632439
Male	461342	442563	461205	422566	354383	322392
Female	443968	425372	445138	406386	341479	310047
<2 y	89757	82552	85134	74573	58488	56306
2 - 4 y	135139	128726	135329	122801	99920	93252
5 - 9 y	234401	225437	242563	220507	181565	161715
10 - 14 y	229477	220276	230126	213306	184018	165888
15 - 19 y	216536	210944	213191	197765	171871	155278

[a]Abbreviations: y= years.

Demographic Characteristics of Children and Adolescents Who Received an Antipsychotic from 1996 to 2001

A total of 118,930 unique children and adolescents from all four insurance programs were identified as having at least one prescription for an antipsychotic between 1996 and 2001 (CA: 48,030; OH: 26,660; TX: 35,288; and MCO: 8,952). Table 3.5 (page 175) summarizes the demographic characteristics of the youths receiving an antipsychotic from each of the four programs.

Children and Adolescents in the California Medi-Cal Program

Over the six-year period, the number of children and adolescents enrolled in CA who received at least one antipsychotic prescription increased from 13,090 in 1996 to 17,884 in 2001. The mean (± SD) age of CA youths treated with an antipsychotic also increased (1996: 12.12±5.31 years; 1998: 12.79±4.91 years; and, 2001: 13.28±4.12 years). Children and adolescents above the age of five

years represented the majority of those receiving treatment with an antipsychotic. From 1996 to 1999, the 15- to 19-year-old group constituted the largest age group receiving an antipsychotic (range: 35.6% to 40.1%). In 2000 and 2001, children and adolescents between the ages of ten and 14 years comprised the largest group (37.7% and 38.2%, respectively). Males constituted the majority of youths receiving an antipsychotic during each calendar year, and a trend towards an increased percentage of males existed (1996: 57.8%; 1998: 63.9%; and, 2001: 66.0%).

Children and Adolescents in the Ohio Medicaid Program

In 1996, a total of 3,515 children and adolescents enrolled in OH had at least one prescription for an antipsychotic. During the study period, the number of youths receiving an antipsychotic substantially increased. In 2001, 12,099 children and adolescents were identified, which represents a 244.2% increase from 1996. The mean (±SD) age of OH youths treated with an antipsychotic decreased over the six-year period (1996: 13.77±4.27 years; 1998: 13.31±4.17 years; and, 2001: 12.69±4.01 years). Similar to Medi-Cal, children and adolescents five years or older were the majority of those receiving an antipsychotic from 1996 to 2001. Adolescents aged 15 to 19 years represented the largest age group receiving an antipsychotic in 1996, 1997, and 1998 (44.8%, 42.4%, and 38.5%, respectively). The ten- to 14-year-old age group represented the highest percentage of users from 1999 to 2001 (range: 37.7% to 40.4%). During each calendar year, the majority of OH youths receiving an antipsychotic

were males. From 1996 to 2001, there was a 277.1 percent increase in the number of males receiving an antipsychotic (1996: 2,196; 1998: 3,848; and, 2001: 8,282).

Children and Adolescents in the Texas Medicaid Program

During the study period, the number of TX youths receiving an antipsychotic more than doubled from 1996 to 2001 (1996: 7,240; 1998: 10,656; and, 2001: 17,790). The mean (±SD) age of children and adolescents slightly increased from 1996 (11.63±4.28 years) to 2001 (11.79±3.99 years). In age groups at least two years old, a trend showing an increased number of youths receiving an antipsychotic existed. The ten- to 14-year-old age group constituted the largest age group during each calendar year (range: 37.4% to 41.5%), followed by five to nine-year olds (range: 32.5% to 34.2%) and 15- to 19-year olds (range: 18.1% to 20.4%). Although males comprised the majority of children and adolescents treated with an antipsychotic during each study year, there was a 159.6 percent increase in the number of females receiving an antipsychotic over the six-year period.

The percentage of TX youths receiving antipsychotic treatment and mental health care services from TDMHMR remained fairly consistent from 1998 to 2001. In 1998, 2,413 (22.6%) children and adolescents received services from TDMHMR. In 2001, 4,124 (23.2%) youths received TDMHMR services.

Children and Adolescents in the Private Managed Care Organization

The number of children and adolescents enrolled in MCO who received at least one antipsychotic prescription increased from 1,338 in 1996 to 2,861 in 2000. In 2001, the number of youths treated with an antipsychotic decreased

compared to 2000 (2,172 versus 2,861, respectively). During the six-year period, the mean (±SD) age of children and adolescents slightly decreased (1996: 11.63±4.28 years; 1998: 13.21±4.54 years; and 2001: 11.79±3.99 years). Adolescents aged 15 to 19 years represented the largest age group receiving an antipsychotic in 1996, 1997, and 1998 (47.0%, 43.6%, and 38.8%, respectively). The ten- to 14-year-old age group represented the highest percentage of users from 1999 to 2001 (range: 35.1% to 37.4%).

Hypothesis Testing: Phase I (Trends in the prevalence of antipsychotic use in children and adolescents [1996 to 2001])

Phase I evaluated data from four health care systems (Medicaid: California [West], Ohio [Midwest], and Texas [South]; Managed Care: Nationwide) to determine the prevalence of antipsychotic use in children and adolescents. Total antipsychotic, typical antipsychotic, and atypical antipsychotic prevalence rates were determined (H_1 to H_{10}). In addition, daily dose of antipsychotic therapy (H_{11} to H_{13}), rates of antipsychotic switching (H_{14}), and concomitant psychotropic medication therapy (H_{15}) in this population were examined. Annual cost of all antipsychotic prescriptions (H_{16}), as well as antipsychotic subclass and specific atypical antipsychotic, were examined for each of the four health care systems.

Appendix B provides the details of logistic regression analyses examining time trends in the prevalence of antipsychotic use. Appendix C provides details of the analyses examining the relationship between year and mean daily doses of risperidone, olanzapine, and quetiapine in age-specific groups.

Table 3.5. Summary of Demographic Characteristics of Children and Adolescents Receiving an Antipsychotic Between 1996 and 2001[a,b]

	CA			OH			TX			MCO		
	1996	**1998**	**2001**	**1996**	**1998**	**2001**	**1996**	**1998**	**2001**	**1996**	**1998**	**2001**
N	13090	13017	17884	3515	5865	12099	7240	10656	17790	1338	1725	2172
Age, y												
<2	4.2	2.7	0.2	0.4	0.4	0.3	0.9	0.7	0.6	2.2	2.3	1.2
2-4	9.0	5.6	2.0	3.1	2.7	2.8	8.3	6.5	7.0	3.8	5.1	3.7
5-9	21.3	21.7	23.7	17.9	21.7	25.8	32.9	33.0	32.5	15.2	19.6	22.7
10-14	29.9	32.2	38.2	33.8	36.7	40.4	37.4	40.6	41.5	31.8	34.1	37.4
15-19	35.6	37.9	35.9	44.8	38.5	30.8	20.4	19.2	18.4	47.0	38.8	34.9
Gender												
Female	42.2	36.1	34.0	37.5	34.4	31.5	30.5	31.2	32.1	45.0	43.4	38.3
Male	57.8	63.9	66.0	62.5	65.6	68.5	69.5	68.8	67.9	55.0	56.6	61.7

[a]Abbreviations: CA=California Medi-Cal; MCO=Managed Care Organization; OH=Ohio Medicaid; TX=Texas Medicaid; y=years.
[b]Age and gender distributions presented as percentages.

Prevalence of Antipsychotic Use in Children and Adolescents Enrolled in California Medi-Cal (1996 to 2001)

H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of total antipsychotic use increased 1.52-fold (Figure 3.1, page 177). In 1996, 4.52 youths per 1,000 enrollees had at least one prescription for an antipsychotic. The prevalence rate of total antipsychotic use decreased in 1997, but increased steadily thereafter. In 2001, an additional 2.35 youths per 1,000 enrollees received an antipsychotic compared to 1996 (prevalence [PREV] in 2001=6.87; % change=51.98%).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of total antipsychotic use (χ^2=2611.13, df=5, p<0.0001; Table 3.6, page 177). Logistic regression analysis showed a nine percent increase in the odds of receiving any antipsychotic with each additional year (odds ratio [OR]=1.0987; 95% confidence interval [CI]=1.0944 to 1.1031).

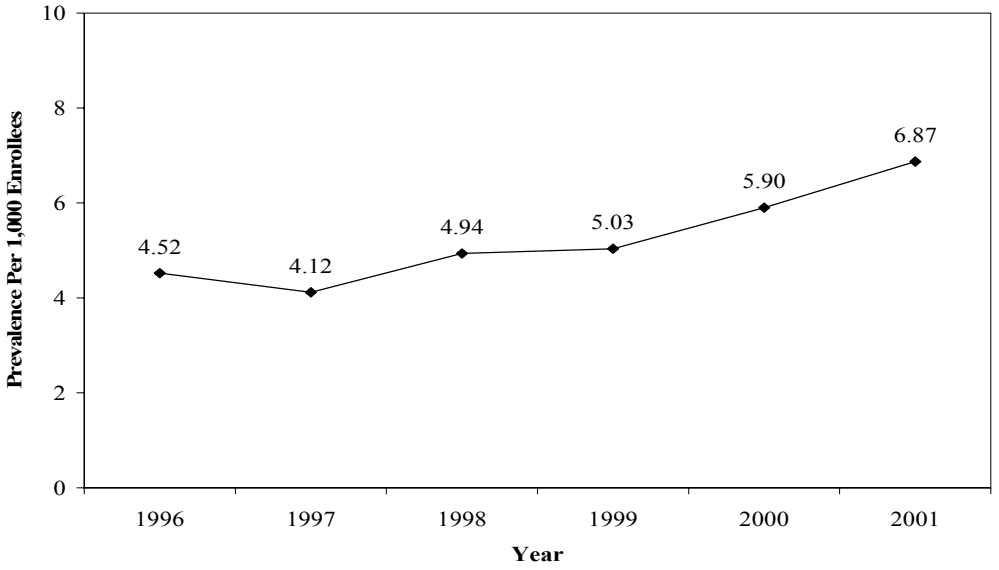
Result: H_1 accepted.

Table 3.6. Chi-Square Analysis of the Relationship Between Prevalence Rate of Total Antipsychotic Use in Medi-Cal Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	2882068	2833837	2624306	2638634	2637448	2584730
Youths who received an antipsychotic	13090	11710	13017	13349	15652	17884

[a]χ^2=2611.13, df=5, p<0.0001.
[b]OR=1.0987 (95% CI: 1.0944 – 1.1031).

Figure 3.1. Prevalence Rates of Total Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of atypical antipsychotic use increased almost 20-fold (Figure 3.2, page 179). In 1996, 0.31 youths per 1,000 enrollees had at least one prescription for an atypical antipsychotic. Over the study period, there was an increase in the use of atypical antipsychotics, with much of the growth occurring after 1997. In 2001, the prevalence rate of atypical antipsychotic use was 6.17 youths per 1,000 enrollees, which represented a 1873.0 percent increase from 1996 (+5.86 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of atypical antipsychotic use (χ^2=23448.56, df=5, p<0.0001; Table 3.7, page 179). Logistic regression analysis showed a 56 percent increase in the odds of receiving an atypical antipsychotic with each additional year (OR=1.5563; 95% CI=1.5469 to 1.5657).

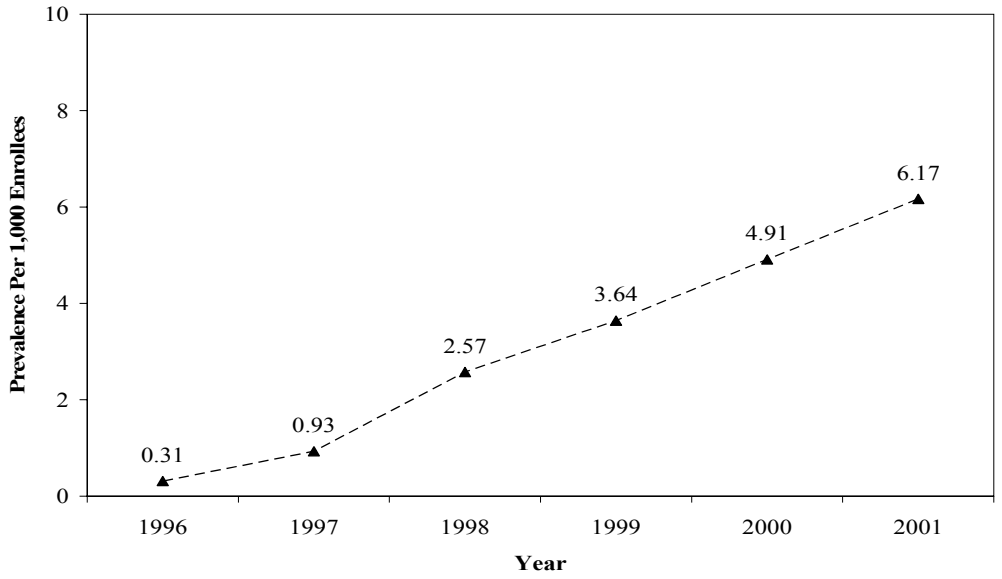
Result: H_2 accepted.

Table 3.7. Chi-Square Analysis of the Relationship Between Prevalence Rate of Atypical Antipsychotic Use in Medi-Cal Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	2894253	2842898	2630534	2642328	2640071	2586563
Youths who received an antipsychotic	905	2649	6789	9655	13029	16051

[a] χ^2=23448.56, df=5, p<0.0001.
[b] OR=1.5563 (95% CI: 1.5469 – 1.5657).

Figure 3.2. Prevalence Rates of Atypical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.

From 1996 to 2001, the use of typical antipsychotics in youths enrolled in CA decreased by 71.4 percent (prevalence ratio [PR]=0.29; Figure 3.3, page 181). In 1996, 4.38 youths per 1,000 enrollees had at least one prescription for a typical antipsychotic. Over the study period, the prevalence rate of typical antipsychotic use steadily decreased. In 2001, 3.13 fewer youths per 1,000 enrollees received a typical antipsychotic (PREV=1.25 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of typical antipsychotic use (χ^2=7441.30, df=5, p<0.0001; Table 3.8, page 181). Logistic regression analysis showed a 22 percent decrease in the odds of receiving a typical antipsychotic with each additional year (OR=0.7797; 95% CI=0.7752 to 0.7842).

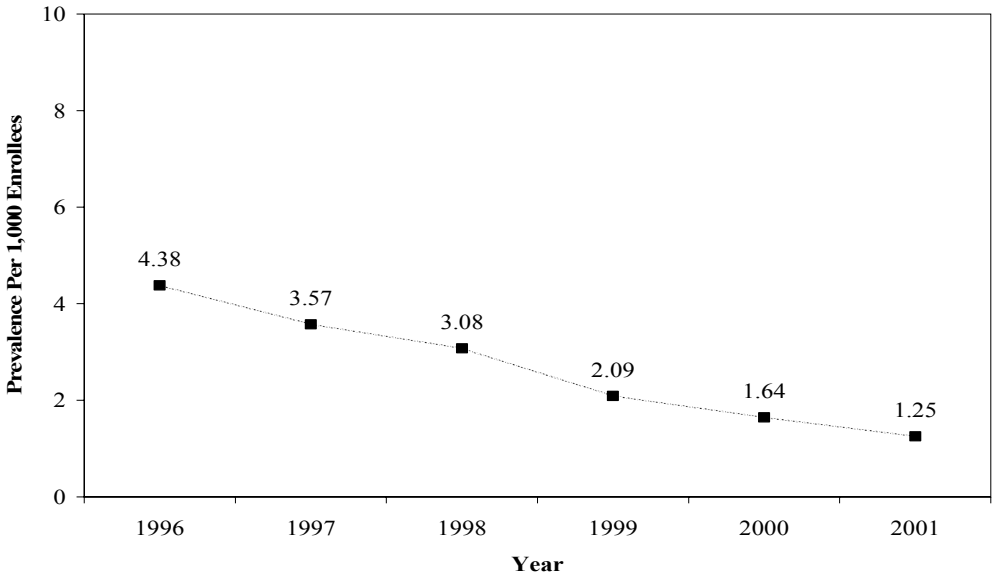
Result: H_3 accepted.

Table 3.8. Chi-Square Analysis of the Relationship Between Prevalence Rate of Typical Antipsychotic Use in Medi-Cal Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	2882473	2835379	2629210	2646439	2648737	2599351
Youths who received an antipsychotic	12685	10168	8113	5544	4363	3263

[a]χ^2=7441.30, df=5, p<0.0001.
[b]OR=0.7797 (95% CI: 0.7752 – 0.7842).

Figure 3.3. Prevalence Rates of Typical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_4: During each study year (1996 – 2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.

Rank order of prevalence rates of specific atypical antipsychotic demonstrated that risperidone was the most commonly used agent in children and adolescents enrolled in CA over the six-year period (Table 3.9, page 182). In 1996, the prevalence rate of clozapine use was slightly higher than that of olanzapine. In 1997, the prevalence rate of clozapine use was higher than that of quetiapine. From 1998 to 2001, the prevalence rate of risperidone use was highest, followed by olanzapine, quetiapine, and clozapine. In 2001, risperidone use was approximately double the use of olanzapine (PREV: 4.18 versus 1.84), and quadruple that of quetiapine (PREV: 4.18 versus 1.02).

Result: H_4 accepted.

Table 3.9. Prevalence Rates of Specific Atypical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Atypical Antipsychotic	1996	1997	1998	1999	2000	2001	Prevalence Ratio (2001:1996)	Percent Change (%)
CLZ	0.02	0.02	0.03	0.04	0.04	0.04	1.77	76.89
OLZ	0.01	0.28	0.98	1.29	1.61	1.84	148.29	14728.96
QUET		0.001	0.11	0.34	0.58	1.02	965.06[c]	96405.65[d]
RIS	0.29	0.70	1.76	2.48	3.39	4.18	14.49	1349.19

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: CLZ=clozapine; OLZ=olanzapine; QUET=quetiapine; RIS=risperidone.
[c]Prevalence ratio (2001:market entry).
[d]Percent change from market entry to 2001.

H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

The overall use of antipsychotics decreased in children less than five years of age (<2 years: PR=0.09, % change=-91.2%; 2 to 4 years: PR=0.43, % change=-57.3%). A trend toward the increased use of antipsychotics was seen in the five- to nine-year olds (PR=1.78, % change=78.0%), ten- to 14-year olds (PR=1.75, % change=75.5%), and 15- to 19-year olds (PR=1.40, % change=39.9%; Table 3.10, page 184). Adolescents aged 15 to 19 years had the highest prevalence rates during each calendar year, but ten- to 14-year olds had the steepest growth (+4.90 per 1,000; Figure 3.4, page 184). Children between the ages of five and nine years had the greatest percent change in prevalence rates from 1996 to 2001.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use across all age groups ($p<0.001$; Table 3.10, page 184). Logistic regression analysis showed a 36 percent and 19 percent decrease in the odds of receiving any antipsychotic in the less than 2 years (OR=0.6422; 95% CI=0.6188 to 0.665) and two to four year age groups (OR=0.8145; 95% CI=0.7986 to 0.8307), respectively. Children and adolescents aged ten to 14 years had the highest odds of receiving any antipsychotic with each calendar year (OR=1.1393; 95% CI=1.1318 to 1.1468), followed by five- to nine-year olds (OR=1.1335; 95% CI=1.1240 to 1.1431) and 15- to 19-year olds (OR=1.0763; 95% CI=1.0696 to 1.0831).

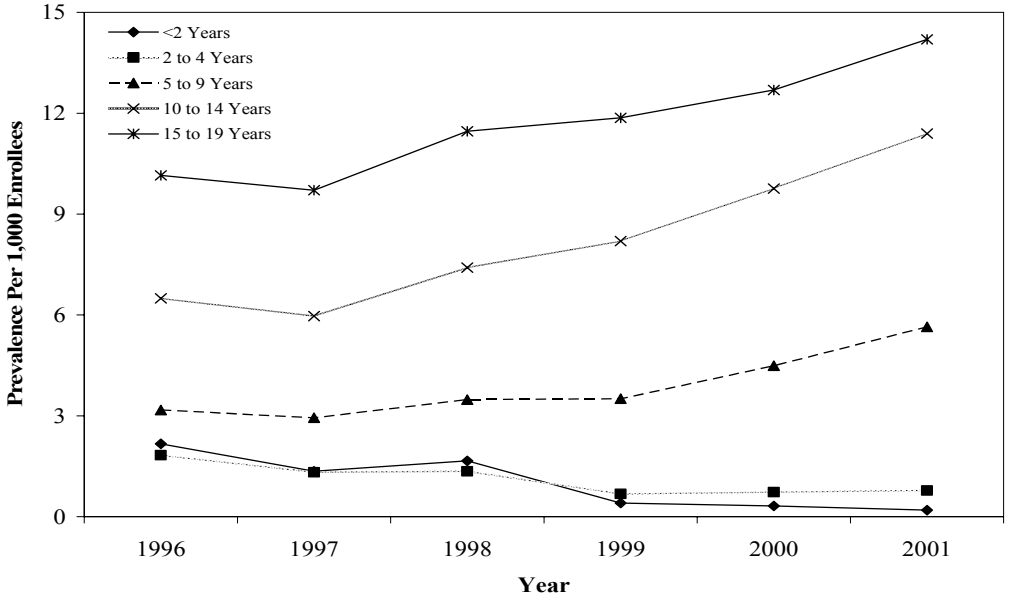
Result: H_5 rejected.

Table 3.10. Age-Specific Prevalence Rates of Total Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	2.17	1.66	0.19	0.09	-91.16	10660.66	<0.0001
2 – 4 y	1.83	1.35	0.78	0.43	-57.34	525.51	<0.001
5 – 9 y	3.17	3.49	5.65	1.78	77.97	1085.42	<0.0001
10 – 14 y	6.50	7.41	11.40	1.75	75.46	1660.56	<0.0001
15 – 19 y	10.15	11.46	14.20	1.40	39.87	580.28	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.4. Age-Specific Prevalence Rates of Total Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

The use of atypical antipsychotics increased across all age categories from 1996 to 2001 (Table 3.11, page 186; Figure 3.5, page 186). In children less than two years of age, there was a 17-fold increase in the prevalence of atypical antipsychotic use (+0.132 per 1,000; % change=1660.2%). Compared to 1996, an additional 0.61 and 5.14 youths per 1,000 enrollees received an atypical antipsychotic in the two- to four-year old (PR=40.94, % change=3993.8%) and five- to nine-year old (PR=48.99, % change=4799.2%) groups, respectively, in 2001. Prevalence rates of atypical antipsychotic use also increased 24-fold in the ten- to 14-year age group (+10.11 per 1,000), and 10-fold in the 15- to 19-year age group (+11.08 per 1,000) over the six-year period.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use across all age groups ($p<0.01$; Table 3.11, page 186). Children between the ages of five and nine years had the highest odds (OR=1.7463; 95% CI=1.7222 to 1.7706), followed by two- to four-year olds (OR=1.5860; 95% CI=1.5217 to 1.6531), ten- to 14-year olds (OR=1.5790; 95% CI=1.5636 to 1.5945), and 15- to 19-year olds (OR=1.4170; 95% CI=1.4044 to 1.4298).

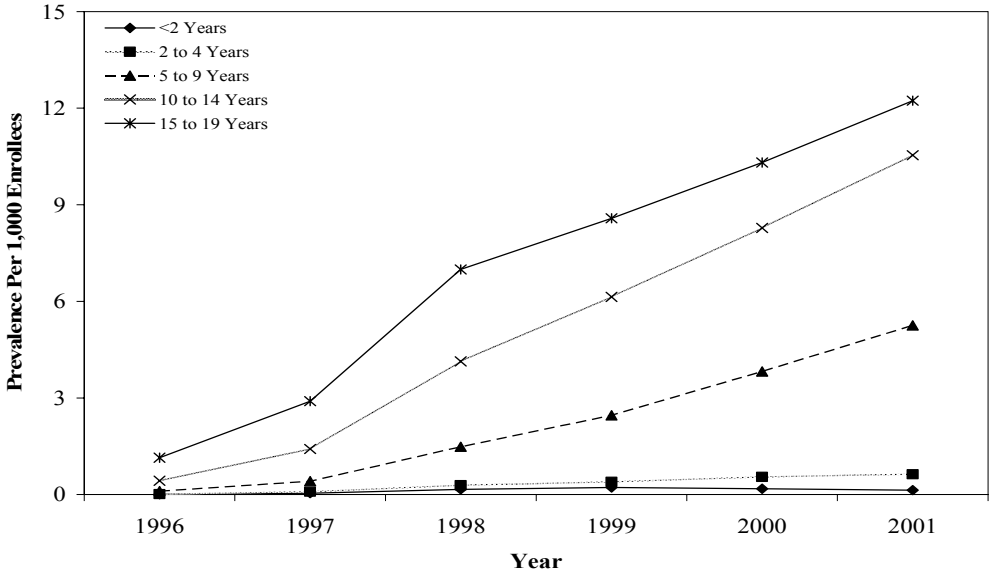
Result: H_6 accepted.

Table 3.11. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	$\chi 2$ Value	p-value
<2 y	0.008	0.16	0.14	17.60	1660.16	65.51	<0.01
2 – 4 y	0.02	0.29	0.63	40.94	3993.76	548.60	<0.001
5 – 9 y	0.11	1.48	5.25	48.99	4799.15	7601.55	<0.0001
10 – 14 y	0.43	4.14	10.54	24.56	2355.72	9472.64	<0.0001
15 – 19 y	1.15	6.99	12.23	10.67	967.25	6411.53	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.5. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).

The use of typical antipsychotics decreased across all age categories from 1996 to 2001 (Table 3.12, page 188). Although prevalence rates of typical antipsychotic use in adolescents were higher than those for children, both children and adolescents received fewer typical antipsychotics over the six-year period (Figure 3.6, page 188). Compared to 1996, there was a 90 to 97 percent decrease in the prevalence rate of typical antipsychotic use in children less than five years of age. In youths above the age of five years, the use of typical antipsychotics decreased by 62 to 80 percent.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use across all age groups ($p<0.001$; Table 3.12, page 188). Younger children had lower odds of receiving a typical antipsychotic with each calendar year compared to their older counterparts (<2 years: OR=0.5649; 95% CI=0.5408 to 0.5901). With increasing age, the odds of receiving a typical antipsychotic with each calendar year increased (2 to 4 years: OR=0.6271; 5 to 9 years: OR=0.7450; 10 to 14 years: OR=0.7707; and, 15 to 19 years: OR=0.8113).

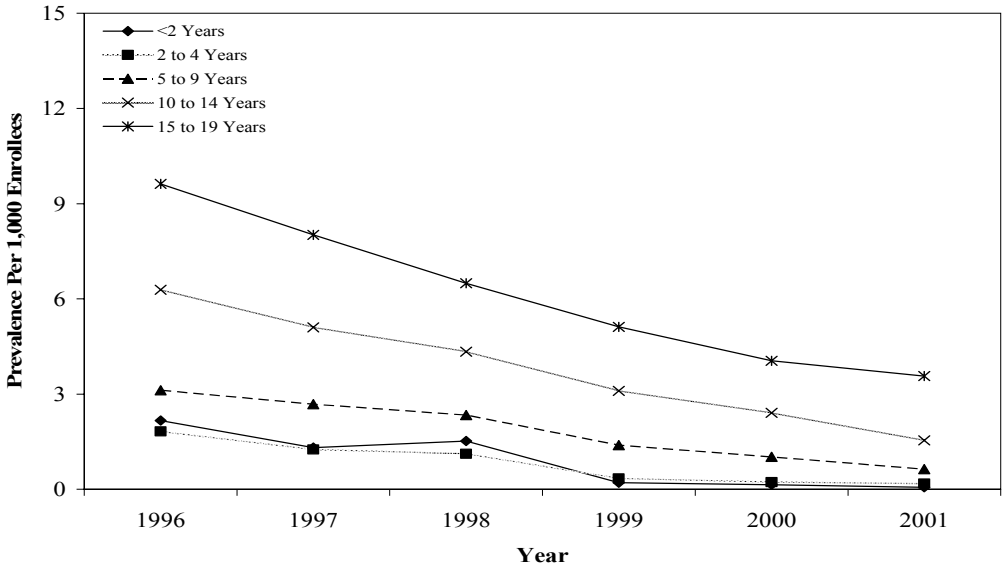
Result: H_7 accepted.

Table 3.12. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	2.16	1.52	0.06	0.03	-97.12	914.50	<0.001
2 – 4 y	1.82	1.12	0.18	0.10	-90.11	1447.40	<0.0001
5 – 9 y	3.12	2.34	0.63	0.20	-79.70	2147.74	<0.0001
10 – 14 y	6.29	4.34	1.54	0.24	-75.51	2662.88	<0.0001
15 – 19 y	9.62	6.49	3.57	0.37	-62.91	2233.50	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.6. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

The use of antipsychotics increased in both male and female groups from 1996 to 2001 (Table 3.13, page 190). Compared to 1996, an additional 3.52 males and 0.8 females per 1,000 enrollees received an antipsychotic in 2001 (Male: PR=1.71, % change=70.9%; Female: PR=1.22, % change=21.9%). During each calendar year, male prevalence rates of total antipsychotic use were higher than those of females (Figure 3.7, page 190).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use in males and females ($p<0.001$; Table 3.13, page 190). Males (OR=1.1262, 95% CI=1.1204 to 1.1320) had higher odds of receiving any antipsychotic with each calendar year compared to females (OR=1.0470, 95% CI=1.0400 to 1.0541).

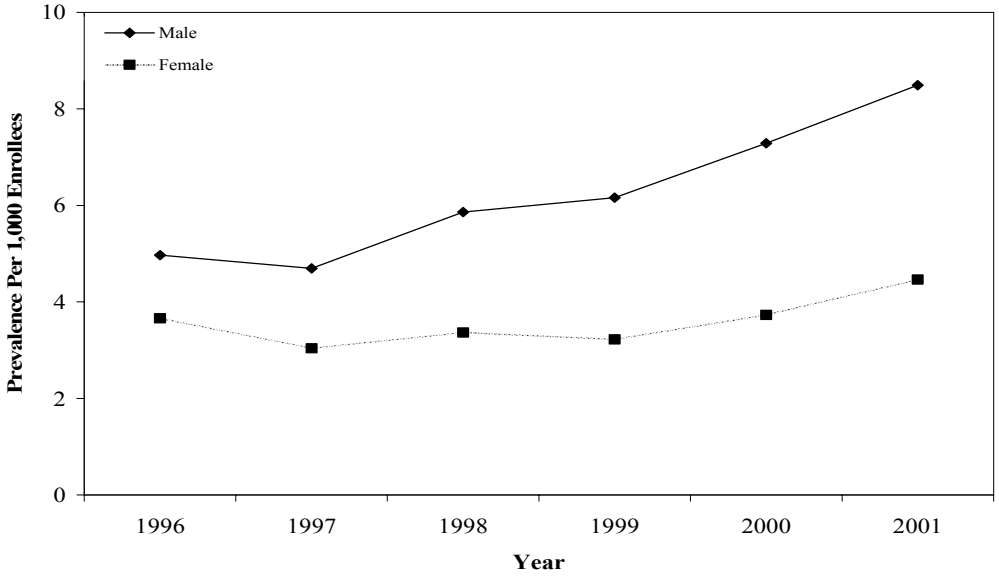
Result: H_8 accepted.

Table 3.13. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	4.97	5.86	8.49	1.71	70.93	2288.49	<0.0001
Female	3.66	3.36	4.46	1.22	21.89	473.05	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.7. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

Prevalence rates of atypical antipsychotic use increased in both male and female groups from 1996 to 2001 (Table 3.14, page 192). Compared to 1996, there was a 21-fold increase in atypical antipsychotic use in males in 2001, and a 18-fold increase in females (Male: +7.44 per 1,000, % change=2037.9%; Female: +3.57 per 1,000, % change=1714.6%). Male prevalence rates of atypical antipsychotic use were higher than those of females (Figure 3.8, page 192).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use in males and females ($p<0.0001$; Table 3.14, page 192). Males showed a 58 percent increase in the odds of receiving an atypical antipsychotic with each additional calendar year (OR=1.5782, 95% CI=1.5661 to 1.5903), and females showed a 53 percent increase (OR=1.5342, 95% CI=1.5178 to 1.5509).

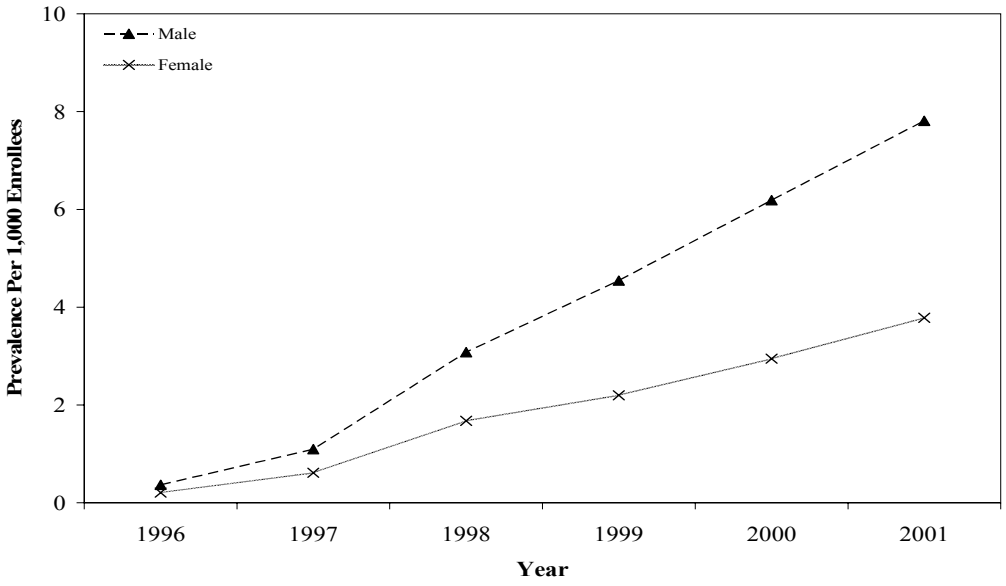
Result: H_9 accepted.

Table 3.14. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	0.37	3.08	7.81	21.38	2037.89	15468.95	<0.0001
Female	0.21	1.68	3.78	18.15	1714.55	6816.09	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.8. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across gender groups: male and female.

The use of typical antipsychotic use decreased by 72 percent in males, and 71 percent in females from 1996 to 2001 (Table 3.15, page 194). In 2001, 3.47 fewer males and 2.54 fewer females per 1,000 received a typical antipsychotic compared to 1996 (Male: PR=0.28; Female: PR=0.29). Male prevalence rates of typical antipsychotic use remained higher than those of females (Figure 3.9, page 194).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use in males and females ($p<0.0001$; Table 3.15, page 194). Males showed a 22 percent decrease in the odds of receiving a typical antipsychotic with each additional calendar year (OR=0.7842, 95% CI=0.7782 to 0.7903), and females showed a 24 percent decrease (OR=0.7645, 95% CI=0.7572 to 0.7719).

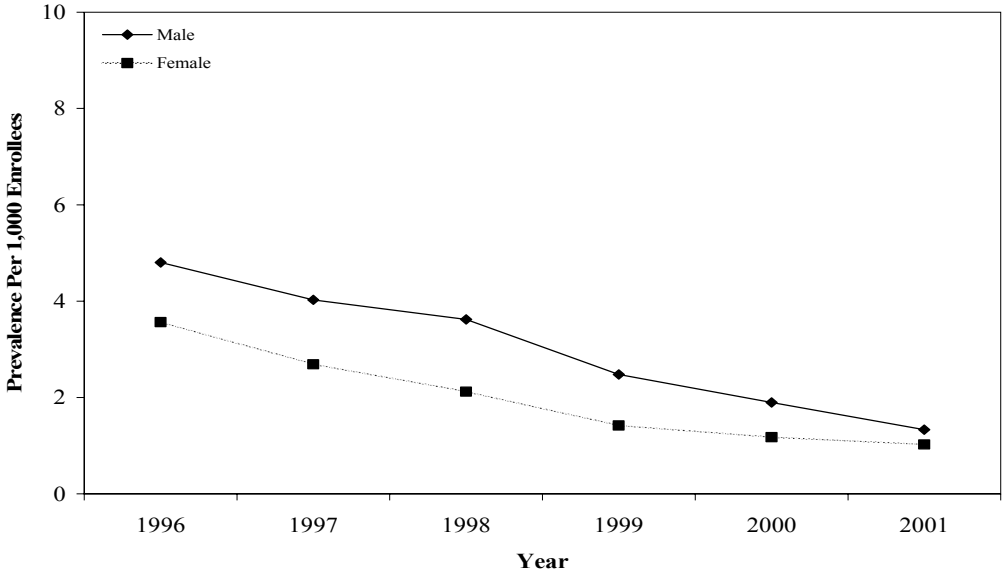
Result: H_{10} accepted.

Table 3.15. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	4.80	3.62	1.33	0.28	-72.25	4044.71	<0.0001
Female	3.56	2.12	1.02	0.29	-71.28	3330.82	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.9. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Medi-Cal Youths from 1996 to 2001



H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.

A trend toward lower mean daily doses of risperidone over the six-year period existed in all age groups. Analysis of variance (ANOVA) showed significant differences in mean risperidone doses between calendar years for age categories greater than two years of age ($p<0.001$). In children under the age of two years, no significant between-year differences existed ($p=0.044$).

In the two- to four-year age group, mean risperidone doses in 1998 and 1999 were significantly higher than those in 2001 ($p=0.007$ and $p=0.006$, respectively). Mean risperidone doses in children between the ages of five and nine years were significantly higher in 1996 compared to 1998, 1999, 2000, and 2001 ($p<0.001$). In the ten- to 14-year age group, risperidone doses in 1996 and 1997 were significantly higher than 1998 through 2001 ($p<0.001$). Mean risperidone doses in 15- to 19-year olds were significantly higher in 1996 compared to 1997 through 2001.

Result: H_{11} rejected.

H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

Mean daily doses of olanzapine increased in children less than two years of age from 1996 to 2001, while olanzapine doses decreased over time in ten- to 14-year olds. Other age groups (2 to 4, 5 to 9, and 15 to 19 years) showed no distinct trends in olanzapine dosing. ANOVA showed significant differences in mean olanzapine doses between calendar years for children and adolescents aged ten to 14 years ($p<0.001$). In the ten- to 14-year age group, mean olanzapine doses in 1997 were significantly higher than those in 2001 ($p=0.001$).

Result: H_{12} rejected.

H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

The 15- to 19-year age groups showed a trend in increased quetiapine dosing from 1998 to 2001. Other age groups showed no distinct trend in mean quetiapine dosing over the study period. ANOVA showed no significant differences in mean quetiapine doses between calendar years for children and adolescents.

Result: H_{13} rejected.

H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.

The prevalence of switches in antipsychotic treatment increased from 114.8 per 1,000 youths receiving an antipsychotic in 1996 to 194.1 per 1,000 in 2001 (Table 3.16, page 199). A peak in the prevalence of antipsychotic switches occurred in 1999. With each additional calendar year, a child or adolescent had a nine percent increase in the odds that they would experience a switch in antipsychotic treatment (OR=1.0968, 95% CI=1.0858 to 1.1080).

Among children and adolescents having at least one switch in antipsychotic treatment, the mean (±SD) number of switches per youth during a calendar year remained fairly steady over the six-year period (range: 1.30±0.59 to 1.38±0.67). No significant differences in the mean number switches per youth between calendar years existed.

Closer examination of the types of antipsychotic switches revealed a decrease in typical to typical antipsychotic switches over time (1996: 69.2%; 1998: 15.8%; 2001: 3.0%). Conversely, there was an increase in atypical to atypical antipsychotic switches (1996: 1.1%; 1998: 20.5%; 2001: 57.6%). Typical to atypical switches peaked in 1998, and atypical to typical switches peaked in 1999. Chi-square analysis demonstrated a significant relationship between calendar year and type of antipsychotic switch (χ^2=7848.66, df=15, $p<0.001$; Table 3.17, page 199).

Result: H_{14} accepted.

Table 3.16. Prevalence of Antipsychotic Switches in Medi-Cal Youths from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	13090	11710	13017	13349	15652	17884
Number of youths with at least one switch in antipsychotic treatment	1503	1929	2670	2860	3155	3472
Prevalence per 1,000 youths receiving an antipsychotic	114.8	164.7	205.1	214.2	201.6	194.1

Table 3.17. Types of Antipsychotic Switches in Medi-Cal Youths from 1996 to 2001[a]

Type of Switch		1996	1997	1998	1999	2000	2001
Typical →Typical	N	1355	1107	568	339	254	141
	%	69.2	42.8	15.8	8.6	5.9	3.0
Typical → Atypical	N	443	980	1565	1459	1467	1158
	%	22.6	37.9	43.4	37.0	34.1	24.7
Atypical → Typical	N	139	333	733	883	777	693
	%	7.1	12.9	20.3	22.4	18.1	14.8
Atypical → Atypical	N	21	168	737	1260	1806	2701
	%	1.1	6.5	20.5	32.0	42.0	57.6

[a] χ^2=7848.66, df=15, p<0.001

H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotic agents, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.

The prevalence of concomitant psychotropic medication use increased by 61 percent from 1996 to 2001 (+285.4 per 1,000 youths receiving an antipsychotic; Table 3.18, page 202). Over the six-year period, the number of youths having at least one concomitant psychotropic medication during antipsychotic treatment steadily increased (Figure 3.10, page 202). With each calendar year, a child or adolescent had a 25 percent increase in the odds of receiving a concomitant psychotropic medication during antipsychotic treatment (OR=1.2551; 95% CI=1.2448 to 1.2655).

Antidepressants (range: 27.0% to 31.0%) were the most commonly used agents during each year, followed by antimanic/bipolar agents (range: 20.2% to 23.6%; Table 3.19, page 203). The use of psychostimulants increased from 1996 to 2001, while the use of anti-parkinsonian agents decreased. Chi-square analysis demonstrated a significant relationship between calendar year and the number of youths receiving different classes of concomitant psychotropic medications (χ^2=1668.281, df=40, p<0.001).

The prevalence of antipsychotic polypharmacy increased by 91 percent from 1996 to 2001 (+34.4 per 1,000 youths receiving an antipsychotic; Table 3.20, page 204). Over the six-year period, the number of youths receiving

treatment with two different antipsychotic medications for at least 30 days steadily increased (Figure 3.11, page 204). With each calendar year, a child or adolescent had a 10 percent increase in the odds of receiving two different antipsychotic medications for a period of 30 days or more (OR=1.1049; 95% CI=1.0876 to 1.1224).

The use of two typical agents decreased over time (1996: 66.2%; 1998: 16.3%; 2001: 3.8%), while the use of two atypical agents increased (1996: 0.7%; 1998: 18.3%; 2001: 53.1%). The use of a typical and atypical agent concomitantly was fairly common during all study years (range: 33.1% to 65.4%), and peaked in 1998. Chi-square analysis demonstrated a significant relationship between calendar year and percentage of type of antipsychotic polypharmacy (χ^2=2284.515, df=10, p<0.001).

Result: H_{15} accepted.

Table 3.18. Prevalence of Concomitant Psychotropic Medication Use in Medi-Cal Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	13090	11710	13017	13349	15652	17884
Number of youths receiving any other concomitant psychotropic medication	6076	6742	8275	9218	10804	13406
Prevalence per 1,000 youths receiving an antipsychotic	464.2	575.7	635.7	690.5	690.3	749.6

Figure 3.10. Number of Medi-Cal Youths Receiving a Concomitant Psychotropic Medication While Receiving an Antipsychotic from 1996 to 2001

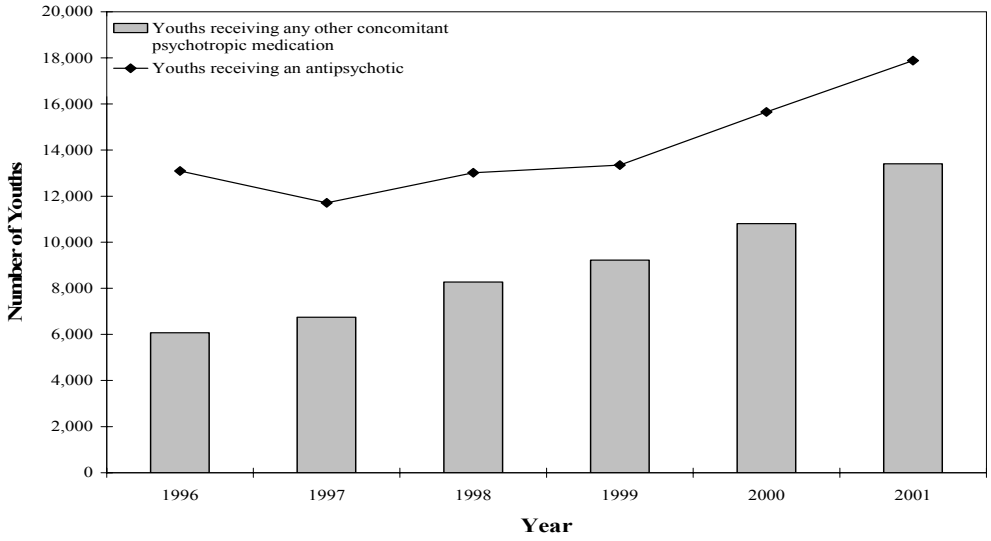


Table 3.19. Medication Class of Concomitant Psychotropic Medications with Antipsychotic Treatment in Medi-Cal Youths from 1996 to 2001[a]

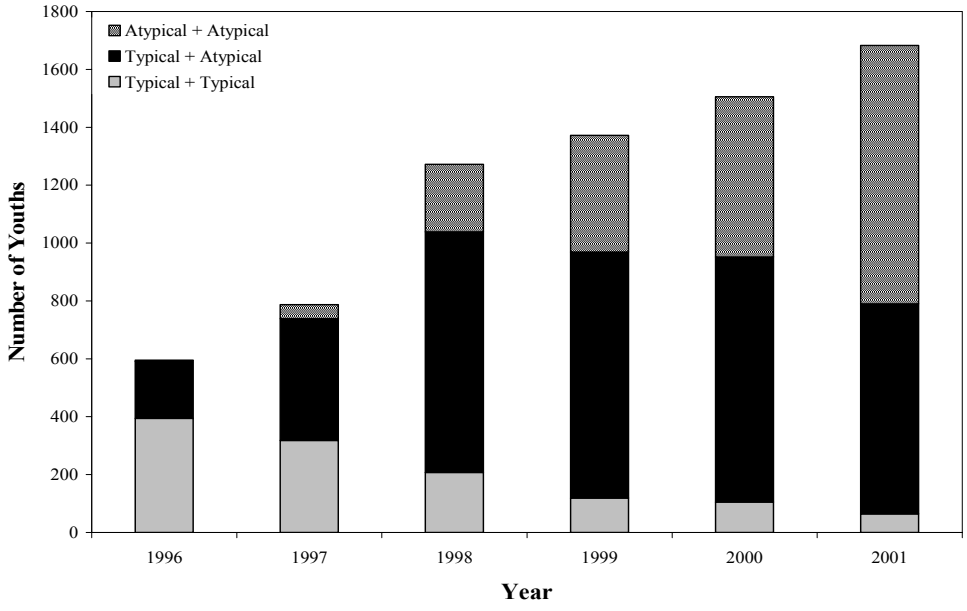
Psychotropic Class		1996	1997	1998	1999	2000	2001
Alpha-agonists	N	886	1085	1447	1667	1999	2350
	%	8.6	8.9	9.3	9.5	9.6	9.2
Antidepressants	N	2772	3524	4546	5209	6198	7919
	%	27.0	29.0	29.3	29.6	29.8	31.0
Anti-parkinsonian agents	N	1696	2054	2077	1950	1921	1943
	%	16.5	16.9	13.4	11.1	9.3	7.6
Anxiolytics/sedatives/hypnotics	N	1043	1152	1504	1681	1882	2282
	%	10.2	9.5	9.7	9.6	9.1	8.9
Benzodiazepines	N	513	541	632	686	780	1080
	%	5.0	4.4	4.1	3.9	3.8	4.2
Antimanic/bipolar agents	N	2075	2518	3418	3974	4894	5935
	%	20.2	20.7	22.0	22.6	23.6	23.2
Psychostimulants	N	953	992	1536	2069	2712	3568
	%	9.3	8.1	9.9	11.8	13.1	14.0
Substance abuse agents	N	11	12	15	14	30	57
	%	0.1	0.1	0.1	0.1	0.1	0.2
Other psychotropic agents	N	315	294	338	340	351	418
	%	3.1	2.4	2.2	1.9	1.7	1.6

$\chi 2=1668.281$, df=40, $p<0.001$

Table 3.20. Prevalence of Antipsychotic Polypharmacy in Medi-Cal Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	13090	11710	13017	13349	15652	17884
Number of youths receiving antipsychotic polypharmacy	492	661	993	1090	1167	1287
Prevalence per 1,000 youths receiving an antipsychotic	37.6	56.4	76.3	81.7	74.6	72.0

Figure 3.11. Number of Medi-Cal Youths with Antipsychotic Polypharmacy and Type of Antipsychotic Polypharmacy from 1996 to 2001

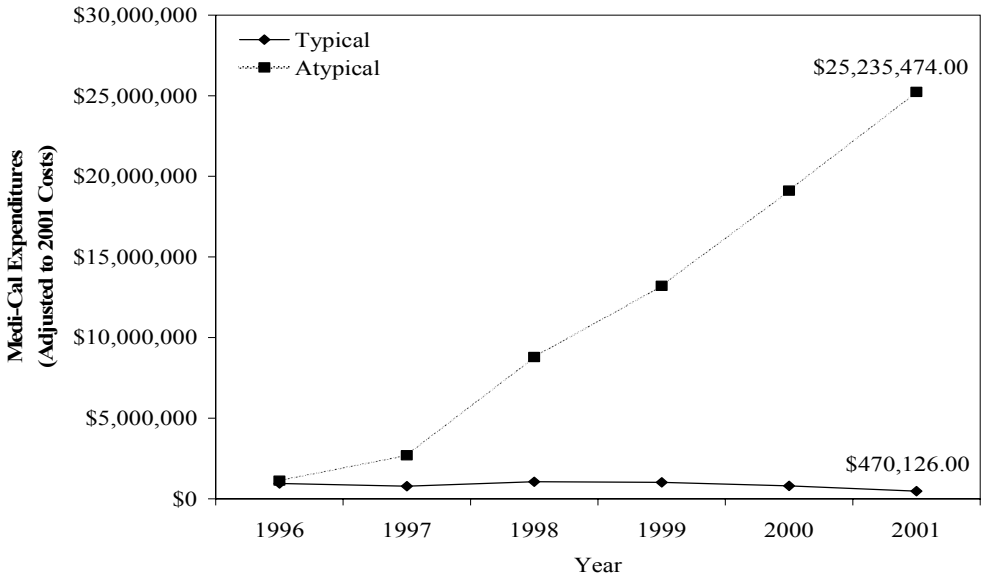


H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.

In 1996, a total of $2,072,231 was spent on antipsychotic medications for children and adolescents. Typical antipsychotics cost $948,325, and atypical antipsychotics cost $1,123,906. Over the six-year period, substantial increases in the cost of all antipsychotics occurred, primarily due to the cost associated with the increased use of atypical antipsychotics (Figure 3.12, page 206). In 2001, a total of $25,705,600 was spent on antipsychotic medications, and 98 percent of this total was associated with atypical antipsychotics ($25,235,474).

Result: H_{16} accepted.

Figure 3.12. Cost Associated with Antipsychotic Medications for Medi-Cal Youths from 1996 to 2001



Prevalence of Antipsychotic Use in Children and Adolescents Enrolled in Ohio Medicaid (1996 to 2001)

H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of total antipsychotic use increased 3-fold (Figure 3.13, page 208). In 1996, 4.72 youths per 1,000 enrollees had at least one prescription for an antipsychotic. The prevalence rate of total antipsychotic use increased steadily over the six-year period. In 2001, an additional 9.62 youths per 1,000 enrollees received an antipsychotic compared to 1996 (PREV in 2001=14.34; % change=203.89%).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of total antipsychotic use (χ^2=5683.106, df=5, $p<0.0001$; Table 3.21, page 208). Logistic regression analysis showed a 24 percent increase in the odds of receiving any antipsychotic with each additional year (OR=1.2424; 95% CI=1.2353 to 1.2496).

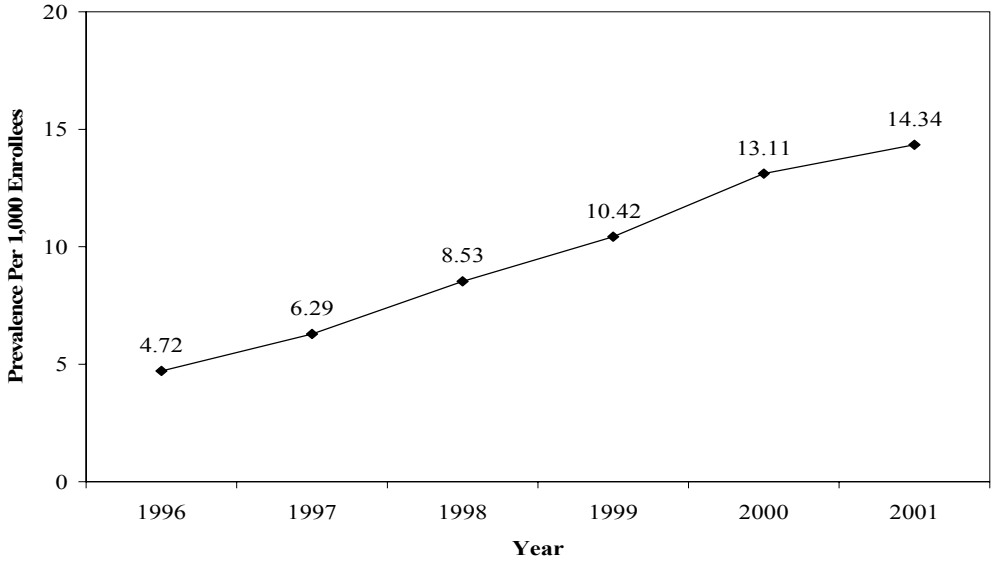
Result: H_1 accepted.

Table 3.21. Chi-Square Analysis of the Relationship Between Prevalence Rate of Total Antipsychotic Use in Ohio Medicaid Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	741391	699670	681864	689623	714861	831636
Youths who received an antipsychotic	3515	4430	5865	7265	9496	12099

[a]χ^2=5683.106, df=5, p<0.0001.
[b]OR=1.2424 (95% CI: 1.2353 – 1.2496).

Figure 3.13. Prevalence Rates of Total Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of atypical antipsychotic use increased 9-fold (Figure 3.14, page 210). In 1996, 1.43 youths per 1,000 enrollees had at least one prescription for an atypical antipsychotic. Over the study period, there was an continual increase in the use of atypical antipsychotics. In 2001, the prevalence rate of atypical antipsychotic use was 13.09 youths per 1,000 enrollees, which represented a 814.1 percent increase from 1996 (+11.66 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of atypical antipsychotic use (χ^2=10714.85, df=5, p<0.0001; Table 3.22, page 210). Logistic regression analysis showed a 43 percent increase in the odds of receiving an atypical antipsychotic with each additional year (OR=1.4335; 95% CI=1.4233 to 1.4437).

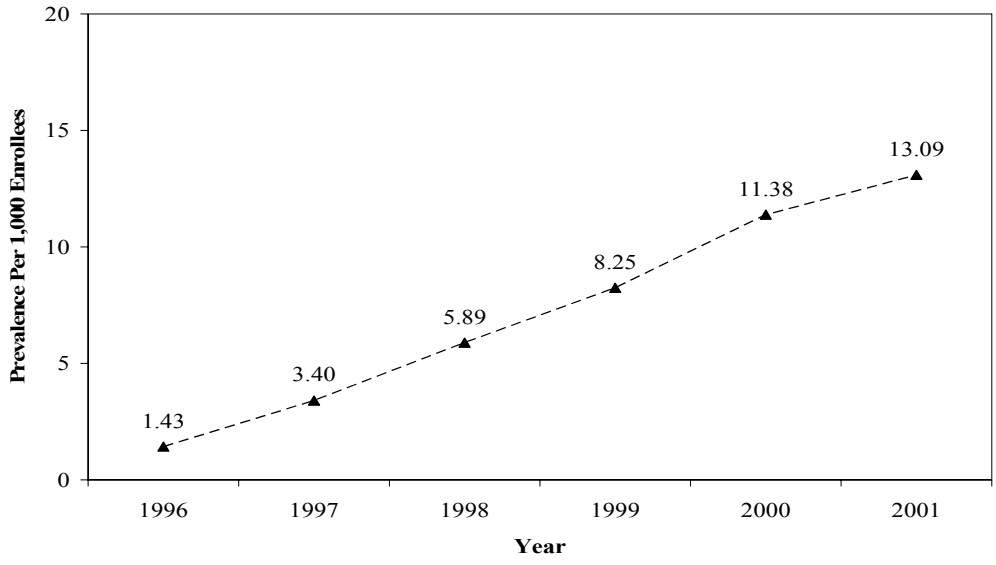
Result: H_2 accepted.

Table 3.22. Chi-Square Analysis of the Relationship Between Prevalence Rate of Atypical Antipsychotic Use in Ohio Medicaid Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	743839	701703	683675	691140	716111	832688
Youths who received an antipsychotic	1067	2397	4054	5748	8246	11047

[a]χ^2=10714.85, df=5, p<0.0001.
[b]OR=1.4335 (95% CI: 1.4233 – 1.4437).

Figure 3.14. Prevalence Rates of Atypical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.

From 1996 to 2001, the use of typical antipsychotics in youths enrolled in OH decreased by 46.9 percent (PR=0.53; Figure 3.15, page 212). In 1996, 3.69 youths per 1,000 enrollees had at least one prescription for a typical antipsychotic. Over the study period, the prevalence rate of typical antipsychotic use steadily decreased. In 2001, 1.73 fewer youths per 1,000 enrollees received a typical antipsychotic (PREV=1.96 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of typical antipsychotic use (χ^2=576.03, df=5, p<0.001; Table 3.23, page 212). Logistic regression analysis showed an 11 percent decrease in the odds of receiving a typical antipsychotic with each additional year (OR=0.8919; 95% CI=0.8832 to 0.9007).

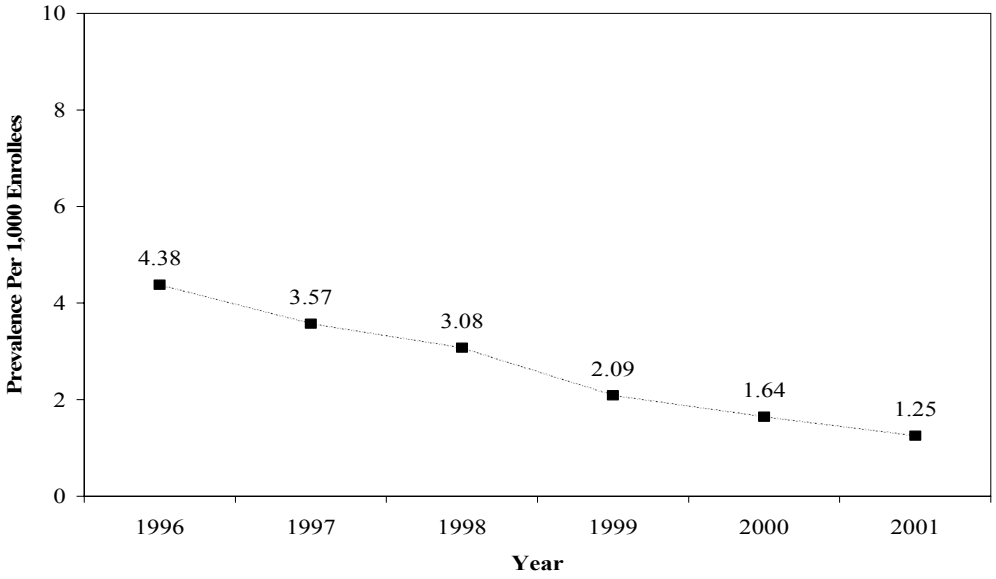
Result: H_3 accepted.

Table 3.23. Chi-Square Analysis of the Relationship Between Prevalence Rate of Typical Antipsychotic Use in Ohio Medicaid Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	742158	701583	685347	694768	722447	842081
Youths who received an antipsychotic	2748	2517	2382	2120	1910	1654

[a]χ^2=576.03, df=5, p<0.001.
[b]OR=0.8919 (95% CI: 0.8832 – 0.9007).

Figure 3.15. Prevalence Rates of Typical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_4: During each study year (1996 – 2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.

Rank order of prevalence rates of specific atypical antipsychotic demonstrated that risperidone was the most commonly used agent in children and adolescents enrolled in OH over the six-year period (Table 3.24, page 213). In 1996, the prevalence rate of clozapine use was slightly lower than that of olanzapine. In 1997, the prevalence rate of clozapine use was higher than that of quetiapine. From 1998 to 2001, the prevalence rate of risperidone use was highest, followed by olanzapine, quetiapine, and clozapine. In 2001, risperidone use was approximately double the use of olanzapine (PREV: 8.15 versus 3.68), and almost triple that of quetiapine (PREV: 8.15 versus 2.98).

Result: H_4 accepted.

Table 3.24. Prevalence Rates of Specific Atypical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Atypical Antipsychotic	1996	1997	1998	1999	2000	2001	Prevalence Ratio (2001:1996)	Percent Change (%)
CLZ	0.07	0.08	0.07	0.08	0.09	0.09	1.29	28.90
OLZ	0.10	1.01	1.74	1.93	2.85	3.68	36.54	3553.89
QUET		0.01	0.49	1.30	2.20	2.98	233.38[c]	23238.29[d]
RIS	1.32	2.60	4.25	5.93	7.81	8.15	6.20	519.63

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: CLZ=clozapine; OLZ=olanzapine; QUET=quetiapine; RIS=risperidone.
[c]Prevalence ratio (2001:market entry).
[d]Percent change from market entry to 2001.

H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

The overall use of antipsychotics decreased in children less than two years of age (PR=0.56, % change=-44.1%). A trend toward the increased use of antipsychotics was seen in the two- to four-year olds (PR=2.84, % change=183.6), five- to nine-year olds (PR=4.71, % change=370.6%), ten- to 14-year olds (PR=3.19, % change=219.36%), and 15- to 19-year olds (PR=1.93, % change=93.4%; Table 3.25, page 215). Adolescents aged 15 to 19 years had the highest prevalence rates during each calendar year, but ten- to 14-year olds had the steepest growth (+18.69 per 1,000; Figure 3.16, page 215). Children between the ages of five and nine years had the greatest percent change in prevalence rates.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use across all age groups ($p<0.01$; Table 3.25, page 215). Logistic regression analysis showed an 11 percent decrease in the odds of receiving any antipsychotic in the less than 2 years age group (OR=0.8906; 95% CI=0.8278 to 0.9582). Children and adolescents aged five to nine years had the highest odds of receiving any antipsychotic with each calendar year (OR=1.3564; 95% CI=1.3400 to 1.3729), followed by two- to four-year olds (OR=1.2510; 95% CI=1.2112 to 1.2922), ten- to 14-year olds (OR=1.2500; 95% CI=1.2386 to 1.2615), and 15- to 19-year olds (OR=1.1304; 95% CI=1.1199 to 1.1410).

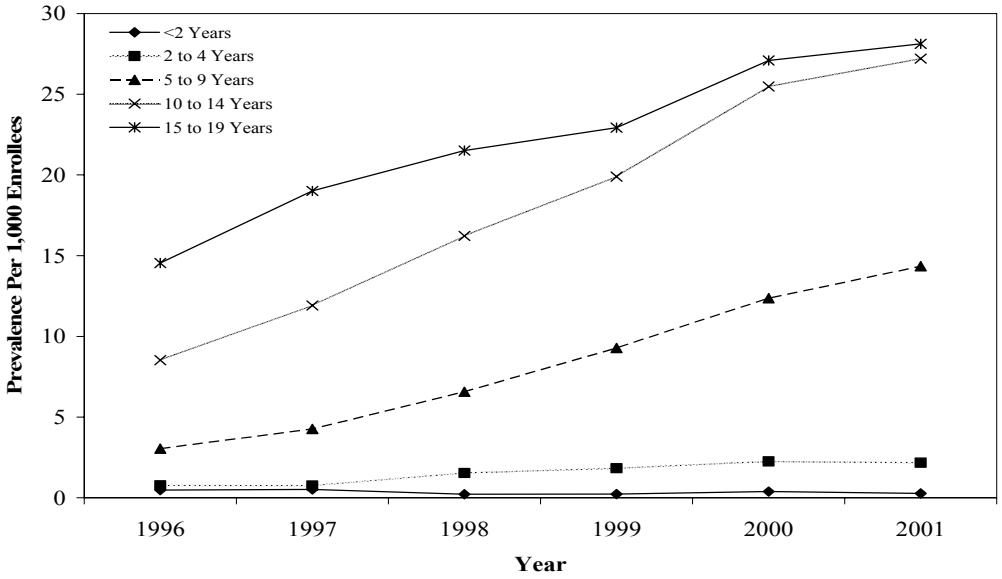
Result: H_5 accepted.

Table 3.25. Age-Specific Prevalence Rates of Total Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	0.47	0.22	0.26	0.56	-44.07	27.27	<0.01
2 – 4 y	0.77	1.53	2.17	2.84	183.58	209.27	<0.001
5 – 9 y	3.05	6.57	14.35	4.71	370.57	2604.06	<0.0001
10 – 14 y	8.52	16.22	27.21	3.19	219.36	2366.66	<0.0001
15 – 19 y	14.55	21.52	28.12	1.93	93.35	694.41	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.16. Age-Specific Prevalence Rates of Total Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

The use of atypical antipsychotics increased across all age categories greater than two years of age from 1996 to 2001 (Table 3.26, page 217; Figure 3.17, page 217). In children less than two years of age, there was a decrease in the prevalence of atypical antipsychotic use (-0.06 per 1,000; % change=31.9%). Compared to 1996, an additional 1.81 and 13.07 youths per 1,000 enrollees received an atypical antipsychotic in the two- to four-year old (PR=36.73, % change=3572.8%) and five- to nine-year old (PR=20.93, % change=1992.9%) groups, respectively, in 2001. Prevalence rates of atypical antipsychotic use also increased 9-fold in the ten- to 14-year age group (+22.80 per 1,000), and 5-fold in the 15- to 19-year age group (+19.46 per 1,000) over the six-year period.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use across all age groups ($p<0.01$; Table 3.26, page 217). Children between the ages of two and four years had the highest odds (OR=1.6594; 95% CI=1.5788 to 1.7442), followed by five- to nine-year olds (OR=1.5842; 95% CI=1.5608 to 1.6080), ten- to 14-year olds (OR=1.4183; 95% CI=1.4028 to 1.4339), and 15- to 19-year olds (OR=1.3009; 95% CI=1.2857 to 1.3162).

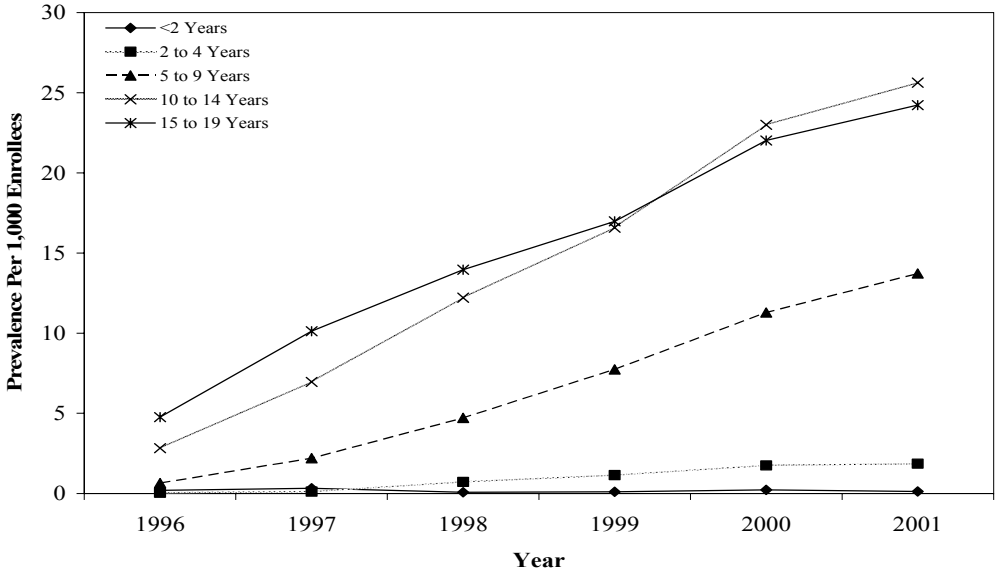
Result: H_6 accepted.

Table 3.26. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	$\chi 2$ Value	p-value
<2 y	0.19	0.08	0.13	0.68	-31.91	25.83	<0.01
2 – 4 y	0.05	0.72	1.86	36.73	3572.77	484.39	<0.001
5 – 9 y	0.66	4.72	13.73	20.93	1992.92	4211.95	<0.0001
10 – 14 y	2.83	12.21	25.63	9.07	806.82	4233.77	<0.0001
15 – 19 y	4.76	13.97	24.22	5.09	408.68	2031.99	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.17. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).

The use of typical antipsychotics decreased across all age categories from 1996 to 2001 (Table 3.27, page 219). Although prevalence rates of typical antipsychotic use in adolescents were higher than those for children, both children and adolescents received fewer typical antipsychotics over the six-year period (Figure 3.18, page 219). Compared to 1996, there was a 49 to 59 percent decrease in the prevalence rate of typical antipsychotic use in children less than five years of age. In youths above the age of five years, a 47 to 59 percent decrease in the use of typical antipsychotics.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use across all age groups ($p<0.01$; Table 3.27, page 219). Younger children had lower odds of receiving a typical antipsychotic with each calendar year compared to their older counterparts (<2 years: OR=0.8315; 95% CI=0.7583 to 0.9118). Children and adolescents above the age of two years were less likely to receive a typical antipsychotic with each calendar year (2 to 4 years: OR=0.9214; 5 to 9 years: OR=0.8630; 10 to 14 years: OR=0.8555; and, 15 to 19 years: OR=0.8778).

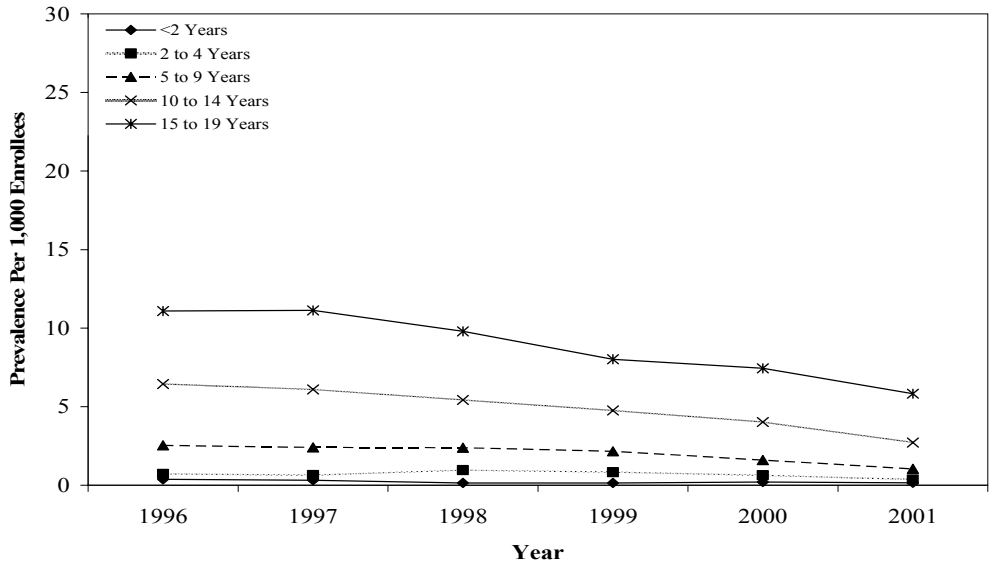
Result: H_7 accepted.

Table 3.27. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	$\chi 2$ Value	p-value
<2 y	0.38	0.14	0.16	0.41	-59.06	25.35	<0.01
2 – 4 y	0.73	0.97	0.37	0.51	-49.08	42.34	<0.01
5 – 9 y	2.55	2.39	1.04	0.41	-59.00	183.19	<0.001
10 – 14 y	6.45	5.43	2.72	0.42	-57.80	338.71	<0.001
15 – 19 y	11.09	9.79	5.83	0.53	-47.41	325.13	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.18. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

The use of antipsychotics increased in both male and female groups from 1996 to 2001 (Table 3.28, page 221). Compared to 1996, an additional 13.65 males and 5.54 females per 1,000 enrollees received an antipsychotic in 2001 (Male: PR=3.29, % change=229.3%; Female: PR=2.58, % change=158.3%). During each calendar year, male prevalence rates of total antipsychotic use were higher than those of females (Figure 3.19, page 221).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use in males and females ($p<0.0001$; Table 3.28, page 221). Males (OR=1.2613, 95% CI=1.2524 to 1.2703) had higher odds of receiving any antipsychotic with each calendar year compared to females (OR=1.2038, 95% CI=1.1920 to 1.2157).

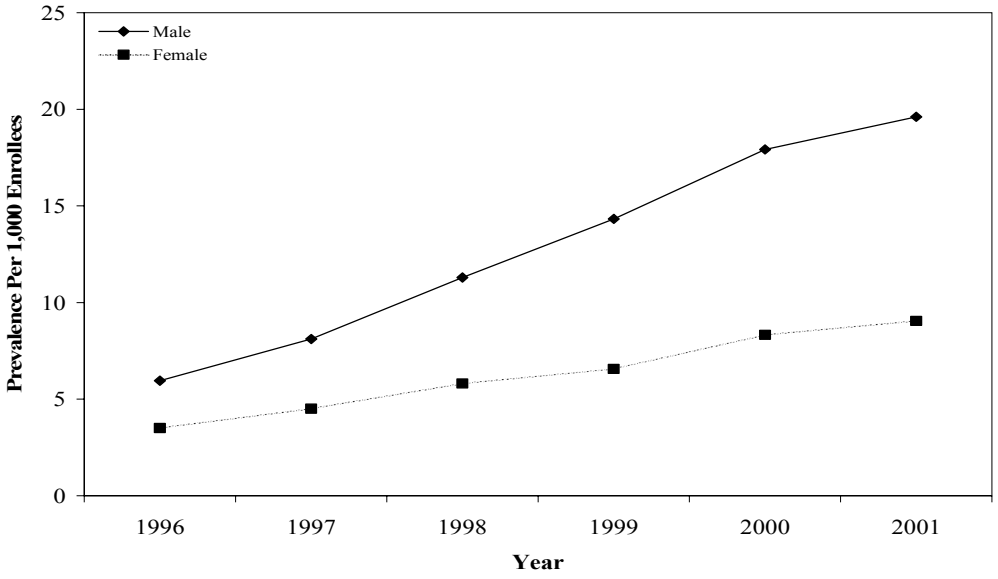
Result: H_8 accepted.

Table 3.28. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	5.96	11.29	19.61	3.29	229.33	4299.57	<0.0001
Female	3.50	5.81	9.04	2.58	158.34	1403.02	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.19. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

Prevalence rates of atypical antipsychotic use increased in both male and female groups from 1996 to 2001 (Table 3.29, page 223). Compared to 1996, there was a 10-fold increase in atypical antipsychotic use in males in 2001, and a 7-fold increase in females (Male: +16.67 per 1,000, % change=903.6%; Female: +6.63 per 1,000, % change=644.2%). Male prevalence rates of atypical antipsychotic use were higher than those of females (Figure 3.20, page 223).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use in males and females ($p<0.0001$; Table 3.29, page 223). Males showed a 45 percent increase in the odds of receiving an atypical antipsychotic with each additional calendar year (OR=1.4473, 95% CI=1.4350 to 1.4598), and females showed a 40 percent increase (OR=1.3994, 95% CI=1.3815 to 1.4175).

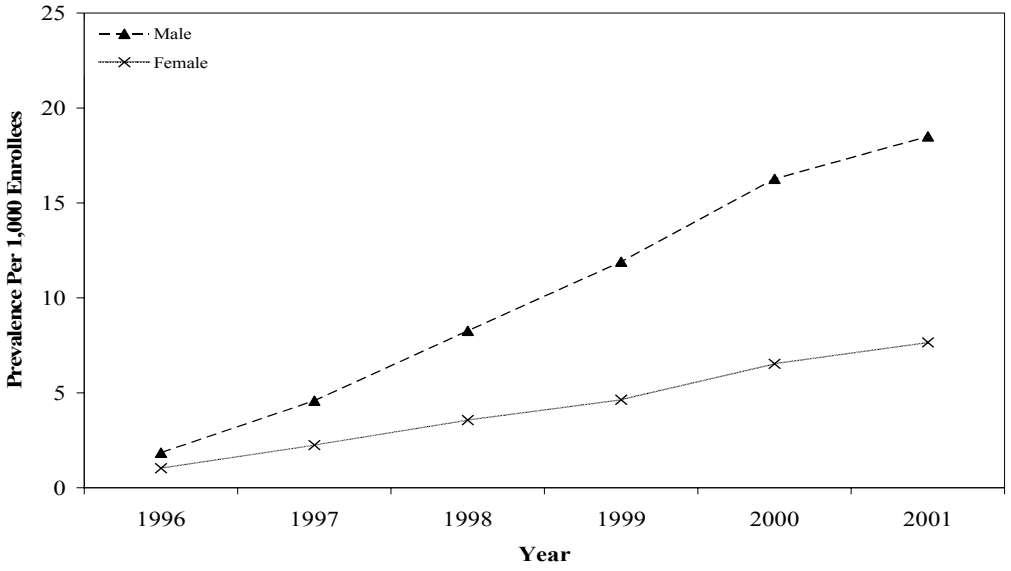
Result: H_9 accepted.

Table 3.29. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	1.84	8.26	18.51	10.04	903.57	7848.65	<0.0001
Female	1.03	3.57	7.66	7.44	644.23	2836.07	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.20. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across gender groups: male and female.

The use of typical antipsychotic use decreased by 55 percent in males, and 33 percent in females from 1996 to 2001 (Table 3.30, page 225). In 2001, 2.55 fewer males and 0.92 fewer females per 1,000 received a typical antipsychotic compared to 1996 (Male: PR=0.45; Female: PR=0.67). Male prevalence rates of typical antipsychotic use remained higher than those of females (Figure 3.21, page 225).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use in males and females ($p<0.001$; Table 3.30, page 225). Males showed a 13 percent decrease in the odds of receiving a typical antipsychotic with each additional calendar year (OR=0.8652, 95% CI=0.8541 to 0.8764), and females showed a seven percent decrease (OR=0.9305, 95% CI=0.9164 to 0.9448).

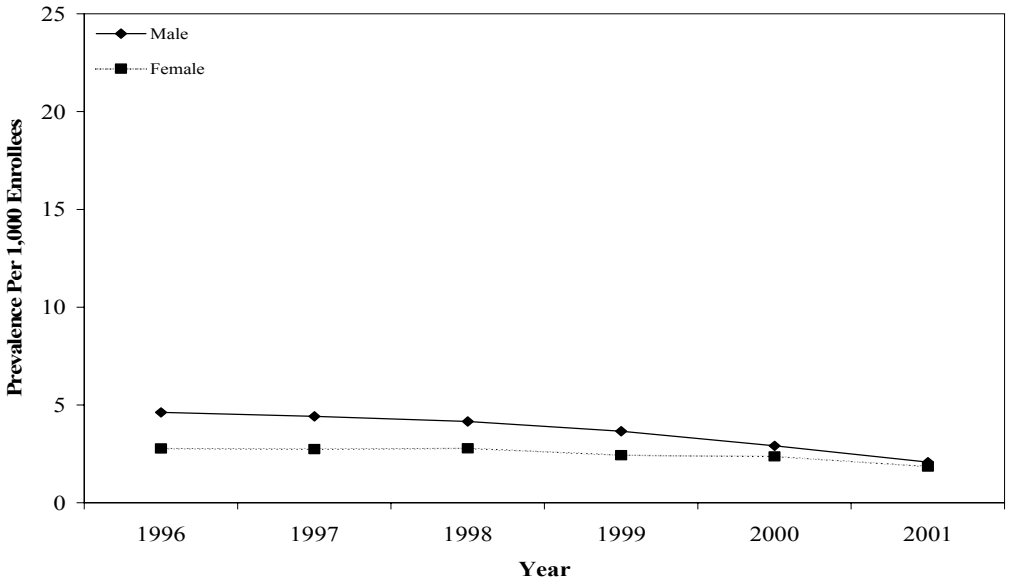
Result: H_{10} accepted.

Table 3.30. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	4.62	4.16	2.07	0.45	-55.16	527.38	<0.001
Female	2.77	2.78	1.85	0.67	-33.36	105.98	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.21. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Ohio Medicaid Youths from 1996 to 2001



H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.

ANOVA showed significant differences in mean risperidone doses between calendar years for all age categories ($p<0.01$). In the two- to four-year, ten- to 14-year, and 15- to 19-year age groups, a trend toward lower mean risperidone doses existed. In five- to nine-year-olds, there was an initial increase in the mean risperidone dose until 1998, followed by a decrease in mean daily dose. In children aged less than two years, a definitive trend in risperidone dosing did not exist over the six-year period.

In the two- to four-year age group, mean risperidone doses from 1996 to 2000 were significantly higher than those in 2001 ($p\leq0.003$). Mean risperidone doses in children between the ages of five and nine years were significantly lower in 1996 and 1997 compared to 1998 and 1999 ($p<0.001$). In the same age group, mean risperidone doses in 1997 through 2000 were significantly higher than doses in 2001 ($p<0.001$). In the ten- to 14-year age group, risperidone doses in 1996 through 2000 were significantly higher than 2001 ($p<0.001$). The same between-year differences in risperidone dosing were seen in 15- to 19-year olds (1996 through 2000 > 2001; $p<0.001$).

Result: H_{11} rejected.

H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

All age groups showed no definitive trend in olanzapine dosing from 1996 to 2001. ANOVA showed significant differences in mean olanzapine doses between calendar years for the less than two years, two- to four-year, ten to 14-year, and 15- to 19-year age groups ($p<0.001$). In the ten- to 14-year age group, mean olanzapine doses in 1998 were significantly higher than those in 1999 and 2000 ($p\leq0.001$). Olanzapine doses in 1999 and 2000 were significantly lower than those in 2001 in ten- to 14-year-olds ($p<0.001$). In the 15- to 19-year age group, mean olanzapine doses were significantly higher in 1998 and 2000, compared to 2001 ($p<0.001$ and $p=0.007$, respectively).

Result: H_{12} rejected.

H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

From 1998 to 2001, age groups greater than five years of age showed a trend of increased mean quetiapine doses. No distinct time trends in quetiapine dosing existed for the younger children. ANOVA showed significant differences in mean quetiapine doses between calendar years for all age groups, except the two- to four-year-olds ($p<0.001$).

In the five- to nine-year age group, mean quetiapine doses were significantly lower in 1998 through 2000, compared to 2001 ($p\leq0.007$). Mean quetiapine doses in ten- to 14-year-olds were significantly lower in 1998 and 1999 than those in 2000 and 2001 ($p<0.001$). Finally, mean daily doses of quetiapine in adolescents aged 15 to 19 years were significantly lower in 1998 compared to 1999, 2000, and 2001 ($p<0.001$).

Result: H_{13} rejected.

H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.

The prevalence of switches in antipsychotic treatment increased from 101.8 per 1,000 youths receiving an antipsychotic in 1996 to 167.0 per 1,000 in 2001 (Table 3.31, page 230). From 1997 to 1999, the prevalence of antipsychotic switches remained fairly steady, and increased thereafter. With each additional calendar year, a child or adolescent had a nine percent increase in the odds that they would experience a switch in antipsychotic treatment (OR=1.0918, 95% CI=1.0730 to 1.1109).

Among children and adolescents having at least one switch in antipsychotic treatment, the mean (±SD) number of switches per youth during a calendar year remained fairly steady over the six-year period (range: 1.22±0.51 to 1.29±0.58). No significant differences in the mean number switches per youth between calendar years existed.

Closer examination of the types of antipsychotic switches revealed a decrease in typical to typical antipsychotic switches over time (1996: 32.3%; 1998: 6.3%; 2001: 1.2%). Typical to atypical switches and atypical to typical switches decreased over the six-year period. There was an increase in atypical to atypical antipsychotic switches (1996: 5.5%; 1998: 36.9%; 2001: 75.8%). Chi-square analysis demonstrated a significant relationship between calendar year and type of antipsychotic switch (χ^2=1820.44, df=15, p<0.001; Table 3.32, page 230).

Result: H_{14} accepted.

Table 3.31. Prevalence of Antipsychotic Switches in Ohio Medicaid Youths from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	3515	4430	5865	7265	9496	12099
Number of youths with at least one switch in antipsychotic treatment	358	585	794	972	1362	2020
Prevalence per 1,000 youths receiving an antipsychotic	101.8	132.1	135.4	133.8	143.4	167.0

Table 3.32. Types of Antipsychotic Switches in Ohio Medicaid Youths from 1996 to 2001[a]

Type of Switch		1996	1997	1998	1999	2000	2001
Typical →Typical	N	141	102	62	54	48	30
	%	32.3	14.3	6.3	4.3	2.8	1.2
Typical → Atypical	N	166	291	348	364	410	358
	%	38.0	40.7	35.3	29.1	23.5	13.9
Atypical → Typical	N	106	158	212	253	240	237
	%	24.3	22.1	21.5	20.2	13.8	9.2
Atypical → Atypical	N	24	164	364	582	1043	1959
	%	5.5	22.9	36.9	46.4	59.9	75.8

[a] χ^2=1820.44, df=15, p<0.001

H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotic agents, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.

The prevalence of concomitant psychotropic medication use increased by 46 percent from 1996 to 2001 (+263.3 per 1,000 youths receiving an antipsychotic; Table 3.33, page 233). Over the six-year period, the number of youths having at least one concomitant psychotropic medication during antipsychotic treatment steadily increased (Figure 3.22, page 233). With each calendar year, a child or adolescent had a 29 percent increase in the odds of receiving a concomitant psychotropic medication during antipsychotic treatment (OR=1.2896; 95% CI=1.2717 to 1.3077).

Antidepressants (range: 27.2% to 30.2%) were the most commonly used agents from 1996 to 2000 (range: 27.2% to 30.2%; Table 3.34, page 234). Antimanic/bipolar agent use remained fairly constant (range: 22.0% to 24.6%), while the concomitant use of psychostimulants increased from 1996 to 2001 substantially (1996: 7.3%; 1998: 17.7%; 2001: 27.5%). Chi-square analysis demonstrated a significant relationship between calendar year and the number of youths receiving different classes of concomitant psychotropic medications (χ^2=1920.42, df=40, p<0.001).

The prevalence of antipsychotic polypharmacy was unable to be determined because of data integrity problems. Due to a large percentage of

prescription records in which the 'days supply' field equaled the 'quantity dispensed' field, a proxy of 30 days was used as 'days supply'. This recoding affected the ability to determine prevalence rates of antipsychotic polypharmacy.

Result: H_{15} accepted.

Table 3.33. Prevalence of Concomitant Psychotropic Medication Use in Ohio Medicaid Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	3515	4430	5865	7265	9496	12099
Number of youths receiving any other concomitant psychotropic medication	2020	3014	4408	5833	7810	10139
Prevalence per 1,000 youths receiving an antipsychotic	574.7	680.4	751.6	802.9	822.5	838.0

Figure 3.22. Number of Ohio Medicaid Youths Receiving a Concomitant Psychotropic Medication While Receiving an Antipsychotic from 1996 to 2001

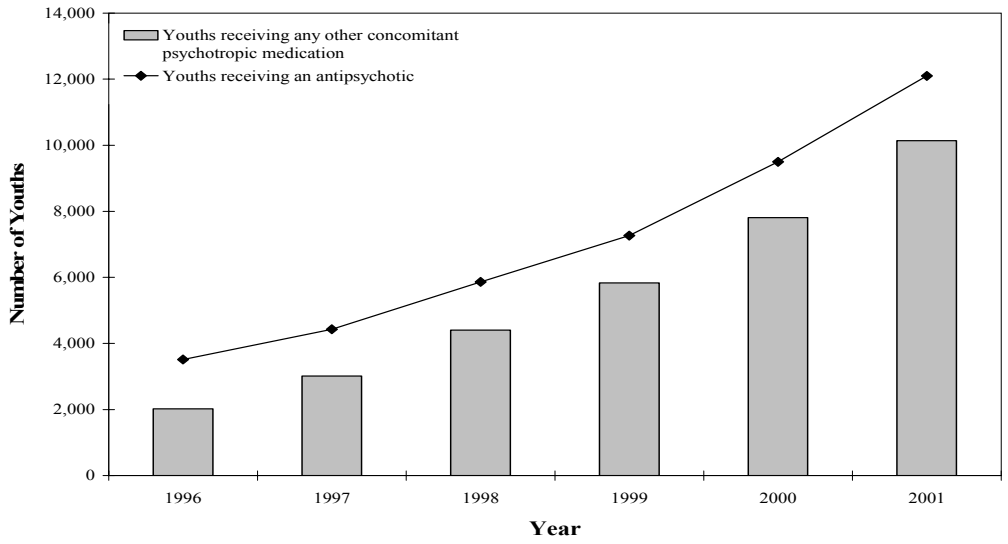


Table 3.34. Medication Class of Concomitant Psychotropic Medications with Antipsychotic Treatment in Ohio Medicaid Youths from 1996 to 2001[a]

Psychotropic Class		1996	1997	1998	1999	2000	2001
Alpha-agonists	N	361	644	970	1292	1612	1890
	%	10.7	11.8	11.4	11.1	10.3	9.6
Antidepressants	N	1013	1579	2280	3230	4264	5350
	%	30.2	28.9	26.8	27.9	27.2	27.1
Anti-parkinsonian agents	N	363	561	742	749	795	799
	%	10.8	10.3	8.7	6.5	5.1	4.0
Anxiolytics/sedatives/hypnotics	N	258	395	505	647	844	973
	%	7.7	7.2	5.9	5.6	5.4	4.9
Benzodiazepines	N	176	225	314	375	463	542
	%	5.2	4.1	3.7	3.2	3.0	2.7
Antimanic/bipolar agents	N	805	1344	1975	2551	3519	4387
	%	24.0	24.6	23.2	22.0	22.5	22.2
Psychostimulants	N	246	549	1502	2489	3864	5422
	%	7.3	10.1	17.7	21.5	24.7	27.5
Substance abuse agents	N	35	29	51	68	101	119
	%	1.0	0.5	0.6	0.6	0.6	0.6
Other psychotropic agents	N	102	130	169	187	211	265
	%	3.0	2.4	2.0	1.6	1.3	1.3

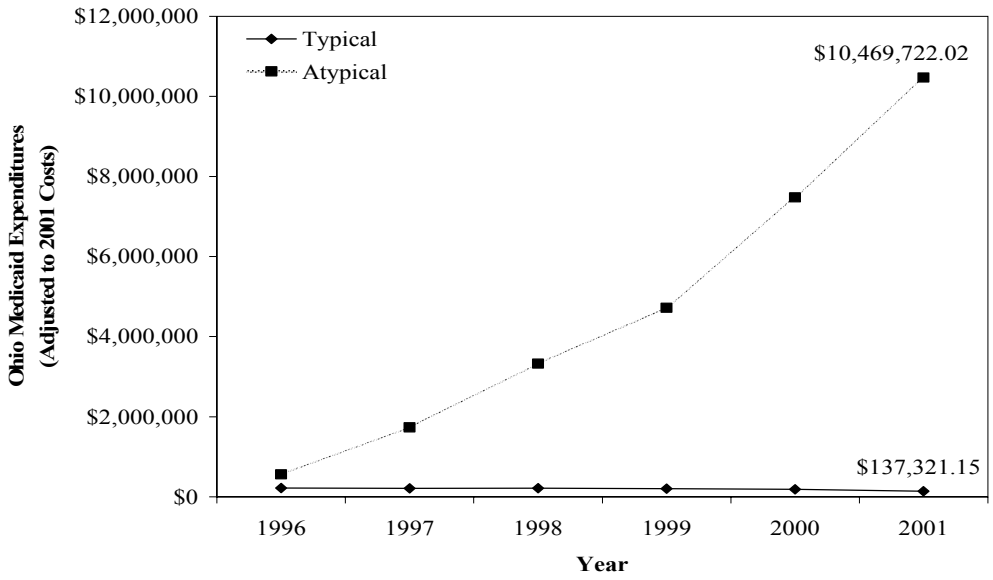
$\chi 2=1920.415$, df=40, $p<0.001$

H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.

In 1996, a total of $777,425 was spent on antipsychotic medications for children and adolescents. Typical antipsychotics cost $218,582, and atypical antipsychotics cost $558,844. Over the six-year period, substantial increases in the cost of all antipsychotics occurred, primarily due to the cost associated with the increased use of atypical antipsychotics (Figure 3.23, page 236). In 2001, a total of $10,607,043 was spent on antipsychotic medications, and 99 percent of this total was associated with atypical antipsychotics ($10,469,722).

Result: H_{16} accepted.

Figure 3.23. Cost Associated with Antipsychotic Medications for Ohio Medicaid Youths from 1996 to 2001



Prevalence of Antipsychotic Use in Children and Adolescents Enrolled in Texas Medicaid (1996 to 2001)

H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of total antipsychotic use increased 2.45-fold (Figure 3.24, page 238). In 1996, 6.33 youths per 1,000 enrollees had at least one prescription for an antipsychotic. The prevalence rate of total antipsychotic use increased steadily over the six-year period. In 2001, an additional 9.21 youths per 1,000 enrollees received an antipsychotic compared to 1996 (PREV in 2001=15.54; % change=145.34%).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of total antipsychotic use (χ^2=6424.48, df=5, p<0.0001; Table 3.35, page 238). Logistic regression analysis showed a 19 percent increase in the odds of receiving any antipsychotic with each additional year (OR=1.1883; 95% CI=1.1832 to 1.1935).

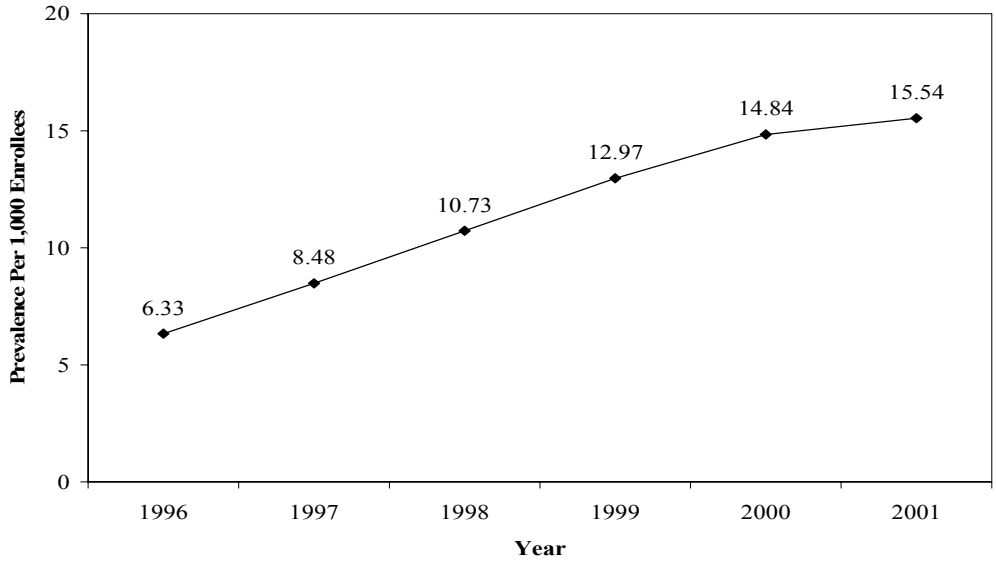
Result: H_1 accepted.

Table 3.35. Chi-Square Analysis of the Relationship Between Prevalence Rate of Total Antipsychotic Use in Texas Medicaid Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	1135785	1037734	982365	963627	987462	1127016
Youths who received an antipsychotic	7240	8875	10656	12664	14879	17790

[a]χ^2=6424.48, df=5, p<0.0001.
[b]OR=1.1883 (95% CI: 1.1832 – 1.1935).

Figure 3.24. Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of atypical antipsychotic use increased 6-fold (Figure 3.25, page 240). In 1996, 2.49 youths per 1,000 enrollees had at least one prescription for an atypical antipsychotic. Over the study period, there was an increase in the use of atypical antipsychotics. In 2001, the prevalence rate of atypical antipsychotic use was 14.88 youths per 1,000 enrollees, which represented a 498.6 percent increase from 1996 (+12.39 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of atypical antipsychotic use (χ^2=13991.22, df=5, p<0.0001; Table 3.36, page 240). Logistic regression analysis showed a 35 percent increase in the odds of receiving an atypical antipsychotic with each additional year (OR=1.3452; 95% CI=1.3384 to 1.3520).

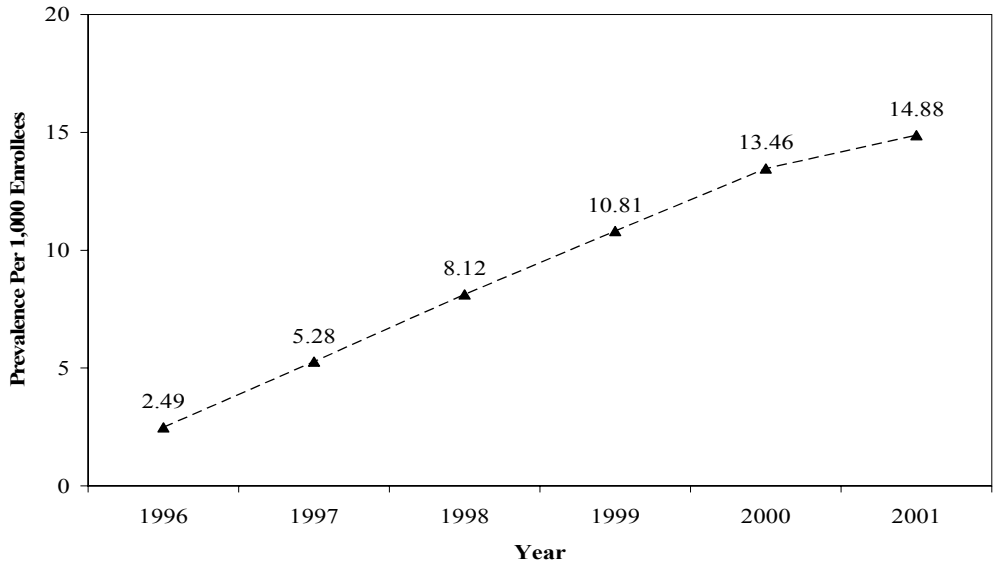
Result: H_2 accepted.

Table 3.36. Chi-Square Analysis of the Relationship Between Prevalence Rate of Atypical Antipsychotic Use in Texas Medicaid Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	1140184	1041087	984957	965733	988848	1127772
Youths who received an antipsychotic	2841	5522	8064	10558	13493	17034

[a] χ^2=13991.22, df=5, p<0.0001.
[b] OR=1.3452 (95% CI: 1.3384 – 1.3520).

Figure 3.25. Prevalence Rates of Atypical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.

From 1996 to 2001, the use of typical antipsychotics in youths enrolled in TX decreased by 66.3 percent (PR=0.34; Figure 3.26, page 242). In 1996, 4.55 youths per 1,000 enrollees had at least one prescription for a typical antipsychotic. Over the study period, the prevalence rate of typical antipsychotic use steadily decreased. In 2001, 3.02 fewer youths per 1,000 enrollees received a typical antipsychotic (PREV=1.53 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of typical antipsychotic use (χ^2=2091.31, df=5, p<0.0001; Table 3.37, page 242). Logistic regression analysis showed a 16 percent decrease in the odds of receiving a typical antipsychotic with each additional year (OR=0.8416; 95% CI=0.8351 to 0.8483).

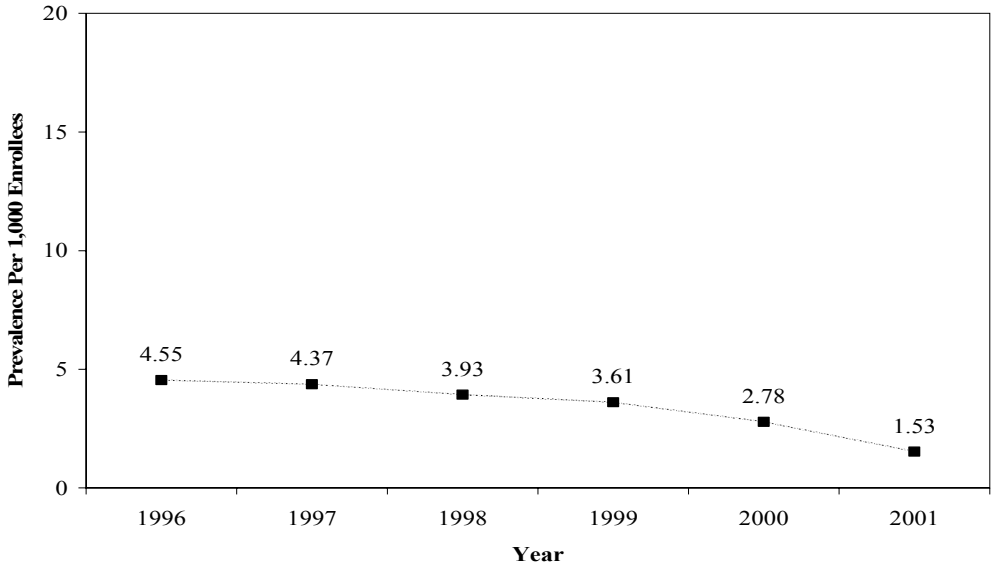
Result: H_3 accepted.

Table 3.37. Chi-Square Analysis of the Relationship Between Prevalence Rate of Typical Antipsychotic Use in Texas Medicaid Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	1137825	1042036	989114	972767	999553	1143053
Youths who received an antipsychotic	5200	4573	3907	3524	2788	1753

[a] χ^2=2091.31, df=5, p<0.0001.
[b] OR=0.8416 (95% CI: 0.8351 – 0.8483).

Figure 3.26. Prevalence Rates of Typical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_4: During each study year (1996 – 2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.

Rank order of prevalence rates of specific atypical antipsychotic demonstrated that risperidone was the most commonly used agent in children and adolescents enrolled in TX over the six-year period (Table 3.38, page 243). The prevalence rate of clozapine use was lower than that of olanzapine in 1996, and lower than that of quetiapine in 1997. From 1998 to 2001, the prevalence rate of risperidone use was highest, followed by olanzapine, quetiapine, and clozapine. In 2001, risperidone use was more than double the use of olanzapine (PREV: 10.07 versus 4.46), and more than triple that of quetiapine (PREV: 10.07 versus 2.77).

Result: H_4 accepted.

Table 3.38. Prevalence Rates of Specific Atypical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Atypical Antipsychotic	1996	1997	1998	1999	2000	2001	Prevalence Ratio (2001:1996)	Percent Change (%)
CLZ	0.04	0.04	0.04	0.05	0.05	0.05	1.14	13.82
OLZ	0.07	1.00	2.05	3.12	3.94	4.46	60.73	5972.68
QUET		0.06	0.49	1.30	1.85	2.77	47.45[c]	4644.97[d]
RIS	2.43	4.64	6.47	7.84	9.60	10.07	4.14	314.04

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: CLZ=clozapine; OLZ=olanzapine; QUET=quetiapine; RIS=risperidone.
[c]Prevalence ratio (2001:market entry).
[d]Percent change from market entry to 2001.

H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

From 1996 to 2001, the overall use of antipsychotics increased in all age groups (<2 years: PR=1.41, % change=41.4%; 2 to 4 years: PR=2.39, % change=138.6%; 5 to 9 years: PR=2.89, % change=189.1%; 10 to 14 years: PR=2.23, % change=122.5%; 15 to 19 years: PR=1.69, % change=68.9%; Table 3.39, page 245). Children and adolescents aged ten to 14 years had the highest prevalence rates from 1998 to 2001, and had the steepest growth (+19.48 per 1,000; Figure 3.27, page 245). Children between the ages of five and nine years had the greatest percent change in prevalence rates from 1996 to 2001.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use across youths older than two years ($p<0.001$; Table 3.39, page 245). Children and adolescents aged five to nine years had the highest odds of receiving any antipsychotic with each calendar year (OR=1.2344; 95% CI=1.2254 to 1.2436), followed by two- to four-year olds (OR=1.1800; 95% CI=1.1615 to 1.1989) and ten- to 14-year olds (OR=1.1743; 95% CI=1.1667 to 1.1819). Adolescents between the ages of 15 and 19 years had lower odds of receiving any antipsychotic with each additional calendar year (OR=1.0964; 95% CI=1.0862 to 1.1067).

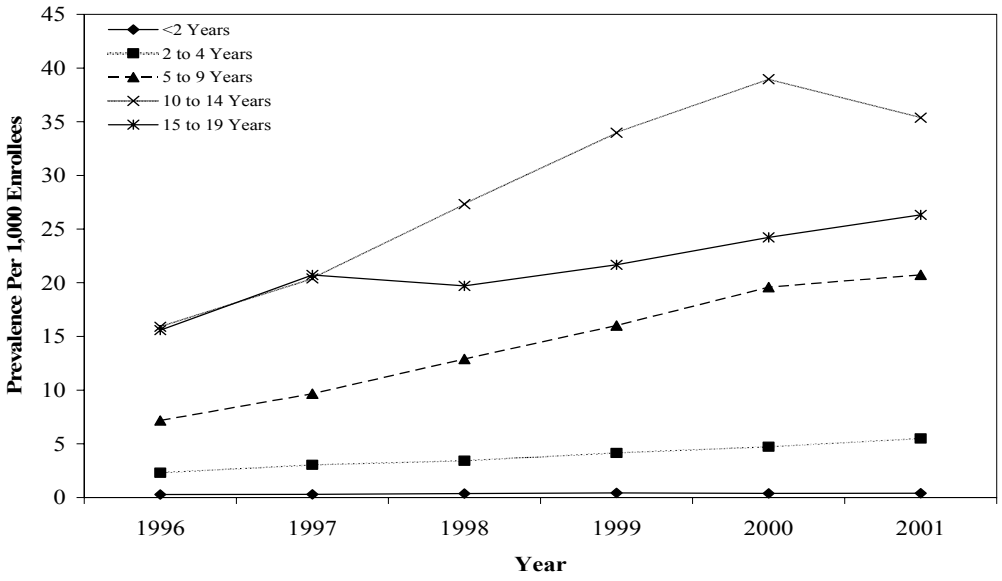
Result: H_5 accepted.

Table 3.39. Age-Specific Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	0.29	0.38	0.41	1.41	41.44	10.31	0.07
2 – 4 y	2.30	3.43	5.50	2.39	138.63	429.32	<0.001
5 – 9 y	7.17	12.90	20.74	2.89	189.08	3269.34	<0.0001
10 – 14 y	15.90	27.33	35.38	2.23	122.52	2726.24	<0.0001
15 – 19 y	15.59	19.72	26.33	1.69	68.87	407.16	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.27. Age-Specific Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

The use of atypical antipsychotics increased across all ages (Figure 3.28, page 247). In children less than two years of age, a 5.6-fold increase in the prevalence of atypical antipsychotic use existed (+0.23 per 1,000; % change=458.6%). Compared to 1996, an additional 4.69 and 17.33 youths per 1,000 enrollees received an atypical antipsychotic in the two- to four-year old (PR=9.37, % change=836.6%) and five- to nine-year old (PR=7.44, % change=643.7%) groups, respectively, in 2001. Atypical antipsychotic use increased 5-fold in the ten- to 14-year age group (+27.35 per 1,000), and 3.8-fold in the 15- to 19-year age group (+18.26 per 1,000).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use across all age groups ($p<0.01$; Table 3.40, page 247). Children between the ages of two and four years had the highest odds (OR=1.4535; 95% CI=1.4235 to 1.4841), followed by five- to nine-year olds (OR=1.4091; 95% CI=1.3968 to 1.4214), and less than two year olds (OR=1.3196; 95% CI=1.2185 to 1.4291). Ten- to 14-year olds had a 31 percent increase in the odds of receiving an atypical antipsychotic with each year (OR=1.3082; 95% CI=1.2985 to 1.3181), while 15- to 19-year olds had a 24 percent increase in odds (OR=1.2413; 95% CI=1.2276 to 1.2551).

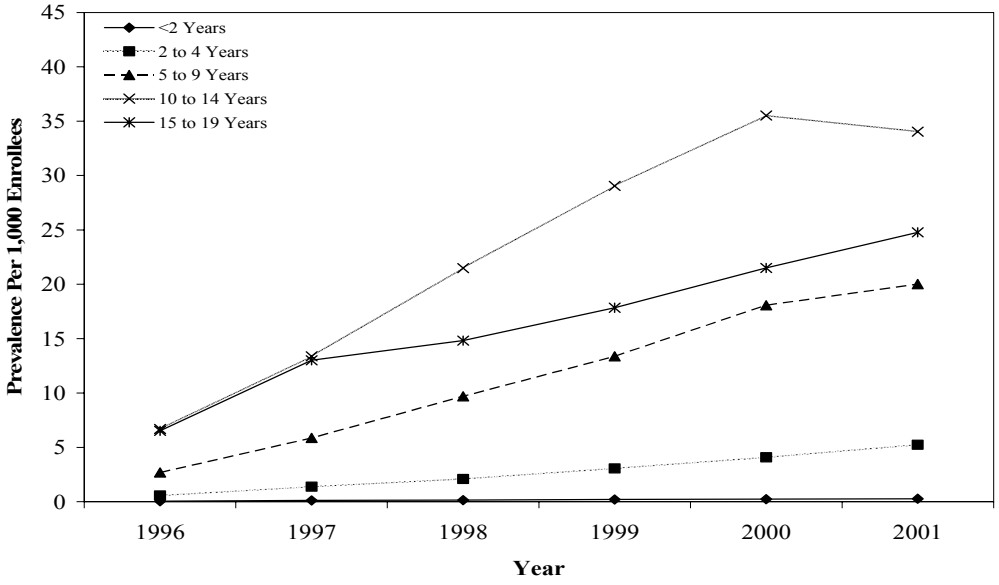
Result: H_6 accepted.

Table 3.40. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	$\chi 2$ Value	p-value
<2 y	0.05	0.15	0.28	5.59	458.63	49.06	<0.01
2 – 4 y	0.56	2.10	5.25	9.37	836.55	1365.36	<0.0001
5 – 9 y	2.69	9.70	20.02	7.44	643.76	6447.51	<0.0001
10 – 14 y	6.69	21.48	34.04	5.09	408.77	5520.13	<0.0001
15 – 19 y	6.52	14.82	24.78	3.80	280.02	1536.16	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.28. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).

The use of typical antipsychotics decreased across all age categories from 1996 to 2001 (Table 3.41, page 249). Although prevalence rates of typical antipsychotic use in adolescents were higher than those for children, both children and adolescents received fewer typical antipsychotics over the six-year period (Figure 3.29, page 249). Compared to 1996, there was a 48 to 77 percent decrease in the prevalence rate of typical antipsychotic use in children less than five years of age. In youths above the age of five years, a 67 to 70 percent decrease occurred in the use of typical antipsychotics.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use across all age groups ($p<0.01$; Table 3.41, page 249). Children below the age of two years had higher odds of receiving a typical antipsychotic with each calendar year compared to their older counterparts (<2 years: OR=0.9119; 95% CI=0.8544 to 0.9731). The odds of receiving a typical antipsychotic with each calendar year were similar for the two- to four-year and 15- to 19-year age groups (2 to 4 years: OR=0.8053; 15 to 19 years: OR=0.8045). Both the five- to nine-year and ten- to 14-year age groups showed a 17 percent decrease in odds of receiving a typical antipsychotic.

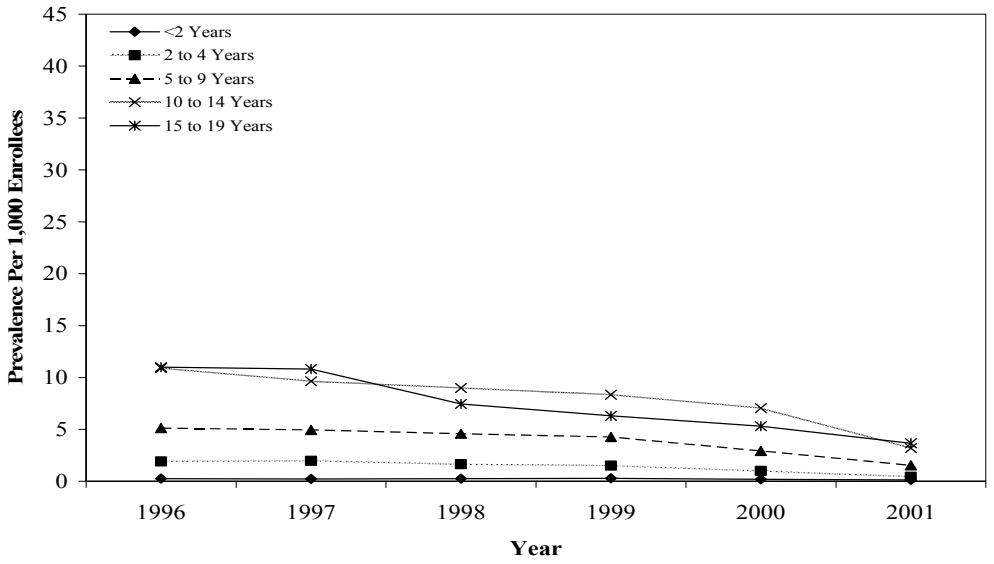
Result: H_7 accepted.

Table 3.41. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	0.26	0.26	0.14	0.52	-48.29	16.08	<0.01
2 – 4 y	1.92	1.64	0.43	0.23	-77.31	284.84	<0.001
5 – 9 y	5.12	4.58	1.54	0.30	-69.93	737.43	<0.001
10 – 14 y	10.90	8.99	3.19	0.29	-70.72	988.91	<0.001
15 – 19 y	11.00	7.46	3.67	0.33	-66.64	749.65	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.29. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

The use of antipsychotics increased in both male and female groups from 1996 to 2001 (Table 3.42, page 251). Compared to 1996, an additional 12.07 males and 6.19 females per 1,000 enrollees received an antipsychotic in 2001 (Male: PR=2.37, % change=137.2%; Female: PR=2.63, % change=162.7%). During each calendar year, male prevalence rates of total antipsychotic use were higher than those of females (Figure 3.30, page 251).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use in males and females ($p<0.0001$; Table 3.42, page 251). Females (OR=1.2057, 95% CI=1.1965 to 1.2150) had higher odds of receiving any antipsychotic with each calendar year compared to males (OR=1.1786, 95% CI=1.1725 to 1.1848).

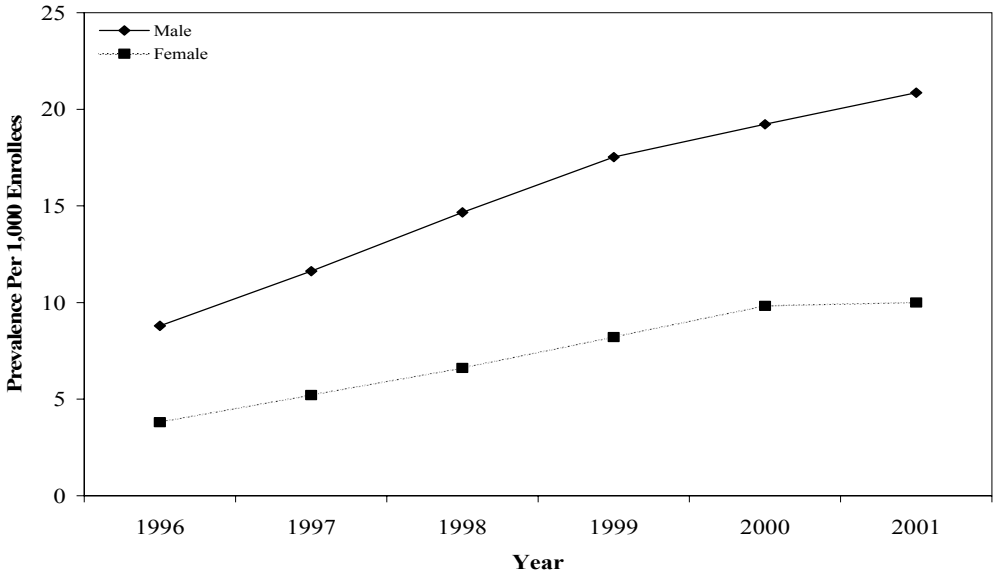
Result: H_8 accepted.

Table 3.42. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	8.79	14.66	20.86	2.37	137.24	3918.77	<0.0001
Female	3.81	6.61	10.00	2.63	162.74	2390.94	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.30. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

Prevalence rates of atypical antipsychotic use increased in both male and female groups from 1996 to 2001 (Table 3.43, page 253). Compared to 1996, there was a 5.9-fold increase in atypical antipsychotic use in males in 2001, and a 6.2-fold increase in females (Male: +16.62 per 1,000, % change=488.3%; Female: +7.99 per 1,000, % change=517.3%). Male prevalence rates of atypical antipsychotic use were higher than those of females (Figure 3.31, page 253).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use in males and females ($p<0.0001$; Table 3.43, page 253). Males showed a 34 percent increase in the odds of receiving an atypical antipsychotic with each additional calendar year (OR=1.3414, 95% CI=1.3331 to 1.3498), and females showed a 35 percent increase (OR=1.3511, 95% CI=1.3390 to 1.3633).

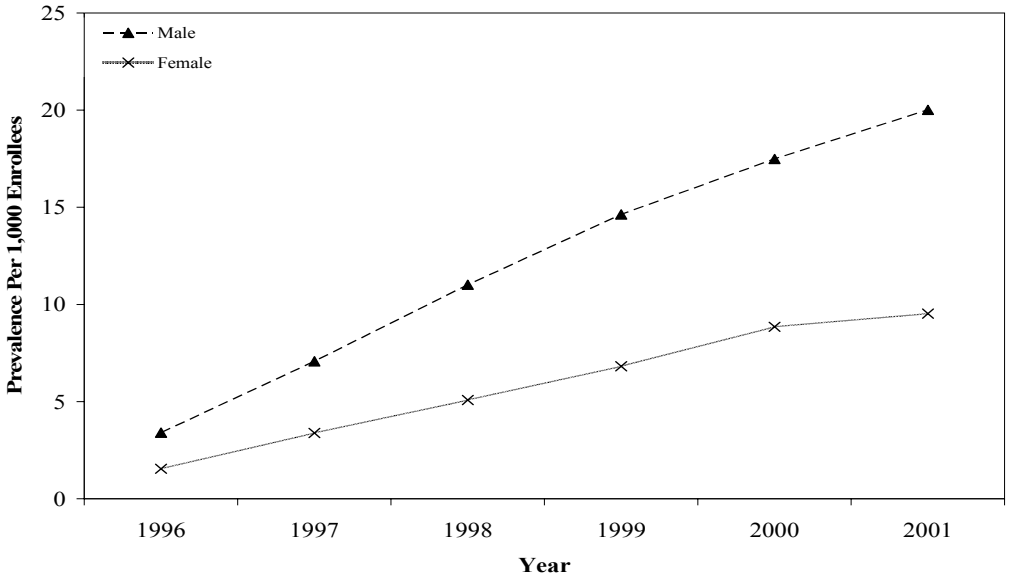
Result: H_9 accepted.

Table 3.43. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	3.40	11.01	20.02	5.88	488.27	9170.99	<0.0001
Female	1.54	5.09	9.53	6.17	517.32	4611.29	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.31. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across gender groups: male and female.

The use of typical antipsychotics decreased by 69 percent in males, and 61 percent in females from 1996 to 2001 (Table 3.44, page 255). In 2001, 4.35 fewer males and 1.65 fewer females per 1,000 received a typical antipsychotic compared to 1996 (Male: PR=0.31; Female: PR=0.39). Male prevalence rates of typical antipsychotic use remained higher than those of females (Figure 3.32, page 255).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use in males and females ($p<0.001$; Table 3.44, page 255). Males showed a 19 percent decrease in the odds of receiving a typical antipsychotic with each additional calendar year (OR=0.8256, 95% CI=0.8178 to 0.8336), and females showed a 13 percent decrease (OR=0.8715, 95% CI=0.8595 to 0.8837).

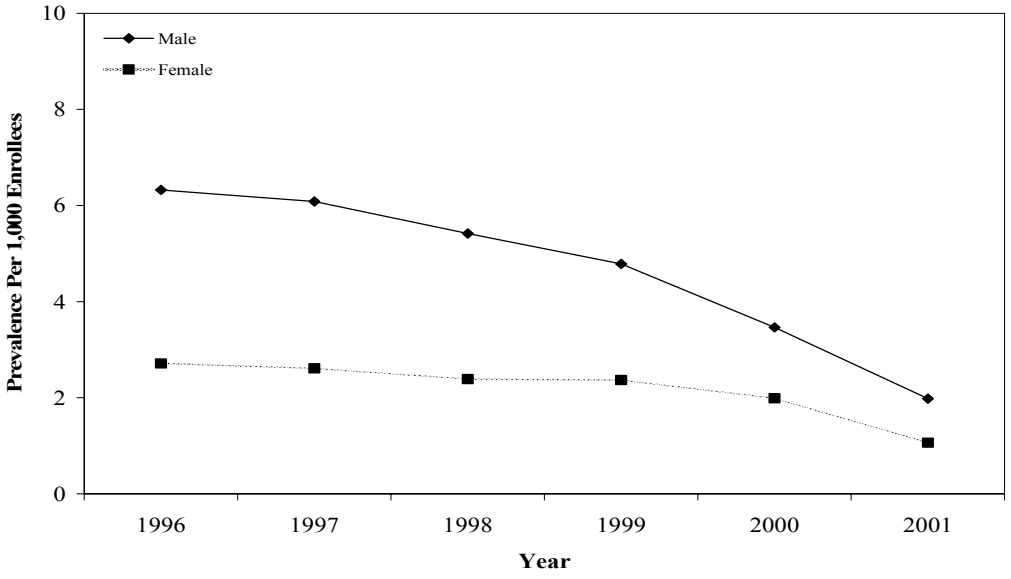
Result: H_{10} accepted.

Table 3.44. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	6.33	5.42	1.98	0.31	-68.67	1688.52	<0.0001
Female	2.71	2.39	1.06	0.39	-60.84	472.11	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.32. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Texas Medicaid Youths from 1996 to 2001



H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.

A trend toward lower mean daily doses of risperidone over the six-year period existed in children and adolescents above the age of five years. A trend toward lower risperidone doses existed in children younger than five years after 1998. ANOVA showed significant differences in mean risperidone doses between calendar years for age categories greater than two years of age ($p<0.001$).

In the two- to four-year age group, mean risperidone doses in 1996 through 1998 were significantly higher than those in 2000 and 2001 ($p\leq0.002$). Mean risperidone doses in children aged five and nine years were significantly higher from 1996 to 1999 compared to 2000 and 2001 ($p<0.001$). In ten- to 14-year olds, risperidone doses in 1996 were significantly higher than all subsequent years ($p<0.001$). Risperidone doses in this age group in 1997 and 1998 were significantly higher than those in 2000 and 2001 ($p<0.001$). Mean risperidone doses in 15- to 19-year olds were significantly higher in 1996 compared to 1998 through 2001. Risperidone doses in 1997 and 1998 were higher than 2000 and 2001 ($p<0.001$).

Result: H_{11} rejected.

H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

Mean daily doses of olanzapine showed a decreasing trend in children and adolescents between the ages of ten and 14 years. In 15- to 19-year olds, olanzapine doses remained fairly constant from 1997 to 2001. Other age groups (<2, 2 to 4, and 5 to 9 years) showed no distinct trends in olanzapine dosing. ANOVA showed significant differences in mean olanzapine doses between calendar years for children and adolescents aged five to 14 years ($p<0.001$). In five- to nine-year olds, post hoc analyses revealed no significant between-year differences. In the ten- to 14-year age group, mean olanzapine doses in 1996 and 1997 were significantly higher than those in 2000 and 2001 ($p\leq0.01$).

Result: H_{12} rejected.

H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

In children and adolescents above the age of two years, a trend in increased quetiapine dosing existed from 1998 to 2001. ANOVA showed significant differences in mean quetiapine doses between calendar years for children and adolescents above the age of five years ($p<0.001$).

In children between the ages of five and nine years, mean quetiapine doses in 1998 were significantly lower than those from 1999 to 2001 ($p\leq0.006$). In ten- to 14-year olds, quetiapine doses in 1998 and 1999 were significantly lower than 2001 doses ($p=0.001$ and $p=0.002$, respectively). Mean quetiapine doses in adolescents aged 15 to 19 years were significantly lower in 1998 compared to 2000 and 2001 ($p\leq0.002$).

Result: H_{13} rejected.

H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.

The prevalence of switches in antipsychotic treatment increased from 160.1 per 1,000 youths receiving an antipsychotic in 1996 to 202.3 per 1,000 in 2001 (Table 3.45, page 260). With each additional calendar year, a child or adolescent had a four percent increase in the odds that they would experience a switch in antipsychotic treatment (OR=1.0392, 95% CI=1.0276 to 1.0510).

Among children and adolescents having at least one switch in antipsychotic treatment, the mean (±SD) number of switches per youth during a calendar year remained fairly steady over the six-year period (range: 1.24±0.54 to 1.30±0.63). No significant differences in the mean number of switches per youth between calendar years existed.

Closer examination of the types of antipsychotic switches revealed a decrease in typical to typical antipsychotic switches over time (1996: 34.3%; 1998: 8.5%; 2001: 1.2%). Conversely, there was an increase in atypical to atypical antipsychotic switches (1996: 4.2%; 1998: 32.2%; 2001: 71.0%). Typical to atypical switches peaked in 1997, and then decreased over time. Atypical to typical switches also peaked in 1997, and then decreased. Chi-square analysis demonstrated a significant relationship between calendar year and type of antipsychotic switch (χ^2=4056.84, df=15, $p<0.001$; Table 3.46, page 260).

Result: H_{14} accepted.

Table 3.45. Prevalence of Antipsychotic Switches in Texas Medicaid Youths from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	7240	8875	10656	12664	14879	17790
Number of youths with at least one switch in antipsychotic treatment	1159	1672	2056	2526	2918	3599
Prevalence per 1,000 youths receiving an antipsychotic	160.1	188.4	192.9	199.5	196.1	202.3

Table 3.46. Types of Antipsychotic Switches in Texas Medicaid Youths from 1996 to 2001[a]

Type of Switch		1996	1997	1998	1999	2000	2001
Typical →Typical	N	492	316	222	185	170	58
	%	34.3	14.8	8.5	5.7	4.5	1.2
Typical → Atypical	N	617	932	1006	1105	1176	831
	%	43.0	43.8	38.7	33.9	31.0	17.9
Atypical → Typical	N	266	462	532	594	567	457
	%	18.5	21.7	20.5	18.2	14.9	9.8
Atypical → Atypical	N	60	419	837	1379	1883	3296
	%	4.2	19.7	32.2	42.3	49.6	71.0

[a] χ^2=4056.84, df=15, p<0.001

H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotic agents, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.

The prevalence of concomitant psychotropic medication use increased by 12 percent from 1996 to 2001 (+107.9 per 1,000 youths receiving an antipsychotic; Table 3.47, page 263). Over the six-year period, the number of youths having at least one concomitant psychotropic medication during antipsychotic treatment steadily increased (Figure 3.33, page 263). With each calendar year, a child or adolescent had a 46 percent increase in the odds of receiving a concomitant psychotropic medication during antipsychotic treatment (OR=1.4643; 95% CI=1.4358 to 1.4934).

Antidepressants (range: 26.1% to 28.8%) were the most commonly used agents during each year, followed by psychostimulants (range: 20.7% to 23.7%; Table 3.48, page 264). The use of antimanic/bipolar agents increased from 1996 to 2001, while the use of anti-parkinsonian agents decreased. Chi-square analysis demonstrated a significant relationship between calendar year and the number of youths receiving different classes of concomitant psychotropic medications (χ^2=1069.30, df=40, p<0.001).

The prevalence of antipsychotic polypharmacy increased by 58 percent from 1996 to 2001 (+23.4 per 1,000 youths receiving an antipsychotic; Table 3.49, page 265). Over the six-year period, the number of youths receiving

treatment with two different antipsychotic medications for at least 30 days steadily increased (Figure 3.34, page 265). With each calendar year, a child or adolescent had an eight percent increase in the odds of receiving two different antipsychotic medications for a period of 30 days or more (OR=1.0778; 95% CI=1.0572 to 1.0988).

The use of two typical agents decreased over time (1996: 32.2%; 1998: 5.5%; 2001: 1.4%), while the use of two atypical agents increased (1996: 2.7%; 1998: 31.9%; 2001: 63.5%). The use of a typical and atypical agent concomitantly was fairly common during all study years (range: 35.1% to 67.5%), and peaked in 1997. Chi-square analysis demonstrated a significant relationship between calendar year and percentage of type of antipsychotic polypharmacy (χ^2=958.118, df=10, p<0.001).

Result: H_{15} accepted.

Table 3.47. Prevalence of Concomitant Psychotropic Medication Use in Texas Medicaid Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	7240	8875	10656	12664	14879	17790
Number of youths receiving any other concomitant psychotropic medication	6290	8042	9927	12053	14455	17375
Prevalence per 1,000 youths receiving an antipsychotic	868.8	906.1	931.6	951.8	971.5	976.7

Figure 3.33. Number of Texas Medicaid Youths Receiving a Concomitant Psychotropic Medication While Receiving an Antipsychotic from 1996 to 2001

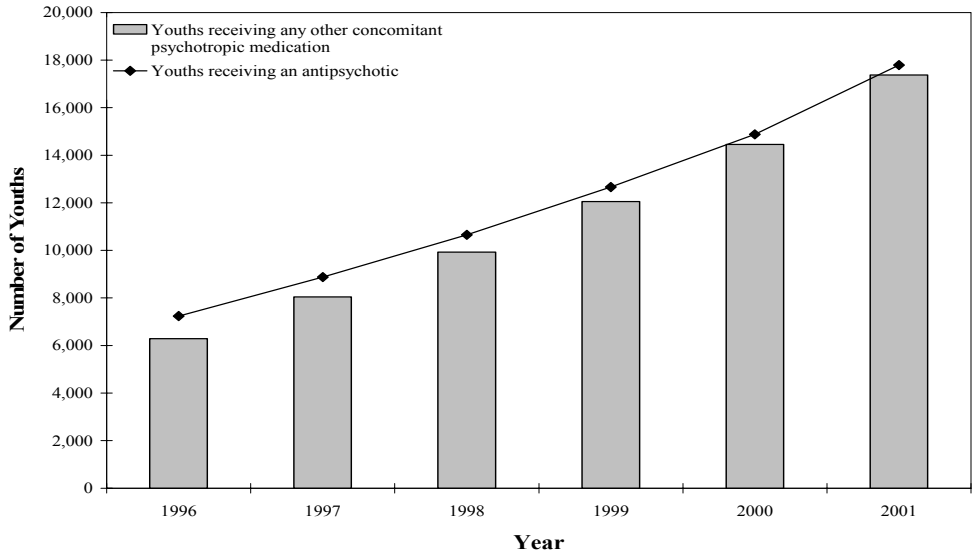


Table 3.48. Medication Class of Concomitant Psychotropic Medications with Antipsychotic Treatment in Texas Medicaid Youths from 1996 to 2001[a]

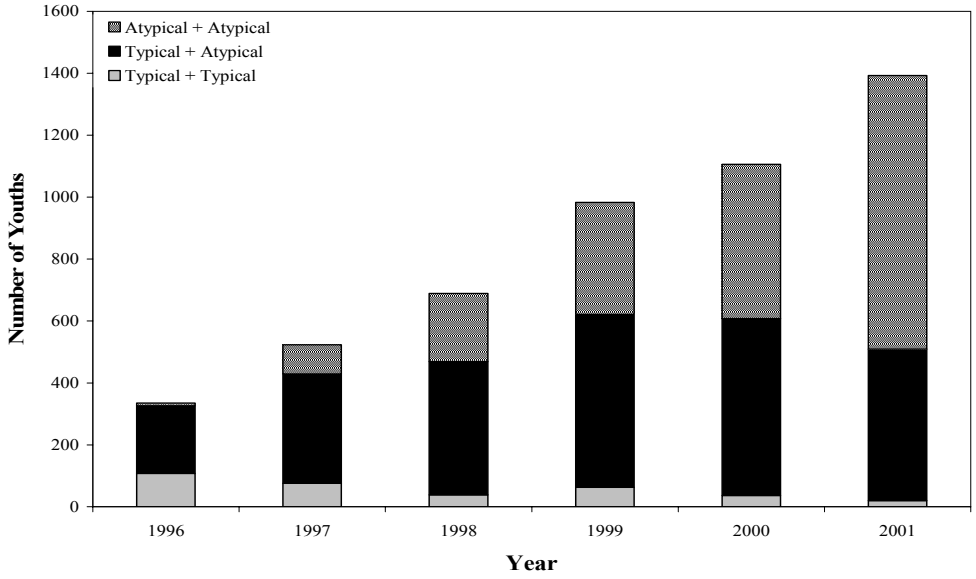
Psychotropic Class		1996	1997	1998	1999	2000	2001
Alpha-agonists	N	1333	1785	2302	2889	3481	4067
	%	10.6	10.8	10.9	11.0	11.0	10.7
Antidepressants	N	3297	4526	5945	7462	8988	10903
	%	26.1	27.4	28.0	28.5	28.5	28.8
Anti-parkinsonian agents	N	1155	1146	1303	1350	1400	1557
	%	9.1	6.9	6.1	5.1	4.4	4.1
Anxiolytics/sedatives/hypnotics	N	1010	1233	1467	1747	1936	2104
	%	8.0	7.5	6.9	6.7	6.1	5.6
Benzodiazepines	N	662	827	985	1114	1285	1450
	%	5.2	5.0	4.6	4.2	4.1	3.8
Antimanic/bipolar agents	N	2250	3163	4250	5513	6743	8145
	%	17.8	19.1	20.1	21.0	21.3	21.5
Psychostimulants	N	2620	3501	4490	5591	7190	8987
	%	20.7	21.2	21.2	21.3	22.8	23.7
Substance abuse agents	N	54	71	60	70	70	70
	%	0.4	0.4	0.3	0.3	0.2	0.2
Other psychotropic agents	N	249	279	393	468	492	584
	%	2.0	1.7	1.9	1.8	1.6	1.5

$\chi 2=1069.30$, df=40, $p<0.001$

Table 3.49. Prevalence of Antipsychotic Polypharmacy in Texas Medicaid Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	7240	8875	10656	12664	14879	17790
Number of youths receiving antipsychotic polypharmacy	293	453	602	803	930	1136
Prevalence per 1,000 youths receiving an antipsychotic	40.5	51.0	56.5	63.4	62.5	63.9

Figure 3.34. Number of Texas Medicaid Youths with Antipsychotic Polypharmacy and Type of Antipsychotic Polypharmacy from 1996 to 2001

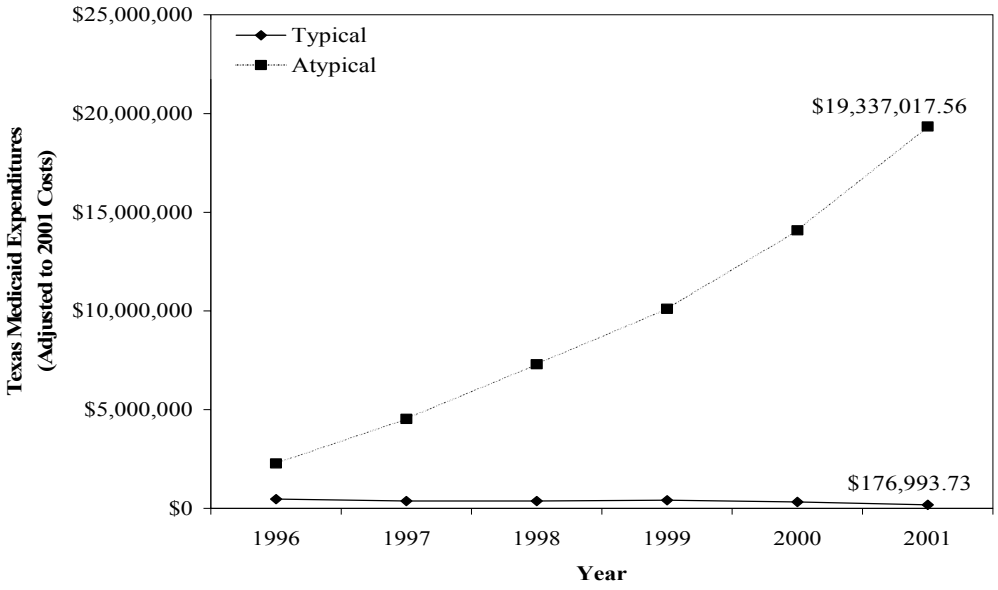


H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.

In 1996, a total of $2,735,845 was spent on antipsychotic medications for children and adolescents. Typical antipsychotics cost $467,522, and atypical antipsychotics cost $2,268,323. Over the six-year period, substantial increases in the cost of all antipsychotics occurred, primarily due to the cost associated with the increased use of atypical antipsychotics (Figure 3.35, page 267). In 2001, a total of $19,514,011 was spent on antipsychotic medications, and 99 percent of this total was associated with atypical antipsychotics ($19,337,017).

Result: H_{16} accepted.

Figure 3.35. Cost Associated with Antipsychotic Medications for Texas Medicaid Youths from 1996 to 2001



Prevalence of Antipsychotic Use in Children and Adolescents Enrolled in the Private Managed Care Organization (1996 to 2001)

H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of total antipsychotic use increased 2.32-fold (Figure 3.36, page 269). In 1996, 1.48 youths per 1,000 enrollees had at least one prescription for an antipsychotic. The prevalence rate of total antipsychotic use increased steadily over the six-year period, with much of the growth occurring after 1998. From 2000 to 2001, there was a decrease in the prevalence of total antipsychotic use in MCO youths. In 2001, an additional 1.95 youths per 1,000 enrollees received an antipsychotic compared to 1996 (PREV in 2001=3.43; % change=132.4%).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of total antipsychotic use (χ^2=1771.75, df=5, $p<0.0001$; Table 3.50, page 269). Logistic regression analysis showed a 24 percent increase in the odds of receiving any antipsychotic with each additional year (OR=1.2364; 95% CI=1.2229 to 1.2501).

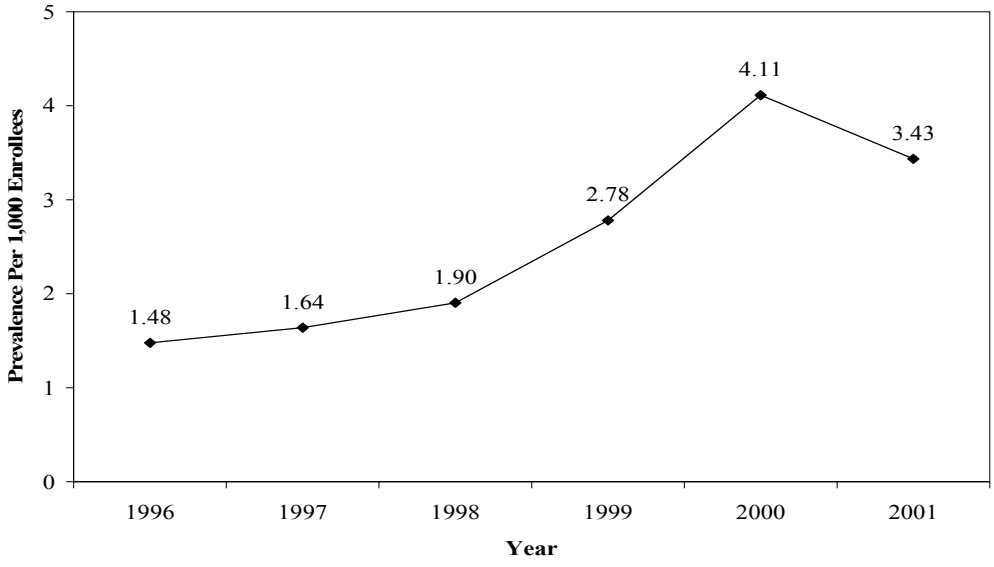
Result: H_1 accepted.

Table 3.50. Chi-Square Analysis of the Relationship Between Prevalence Rate of Total Antipsychotic Use in Managed Care Organization Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	903972	866512	904618	826647	693001	630267
Youths who received an antipsychotic	1338	1423	1725	2305	2861	2172

[a]χ^2=1771.75, df=5, p<0.0001.
[b]OR=1.2364 (95% CI: 1.2229 – 1.2501).

Figure 3.36. Prevalence Rates of Total Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.

From 1996 to 2001, the prevalence rate of atypical antipsychotic use increased 7-fold (Figure 3.37, page 271). In 1996, 0.37 youths per 1,000 enrollees had at least one prescription for an atypical antipsychotic. The use of atypical antipsychotics increased from 1996 to 2000, and then decreased in 2001. In 2001, the prevalence rate of atypical antipsychotic use was 2.67 youths per 1,000 enrollees, which represented a 616.2 percent increase from 1996 (+2.30 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of atypical antipsychotic use (χ^2=3060.49, df=5, p<0.0001; Table 3.51, page 271). Logistic regression analysis showed a 48 percent increase in the odds of receiving an atypical antipsychotic with each additional year (OR=1.4779; 95% CI=1.4557 to 1.5005).

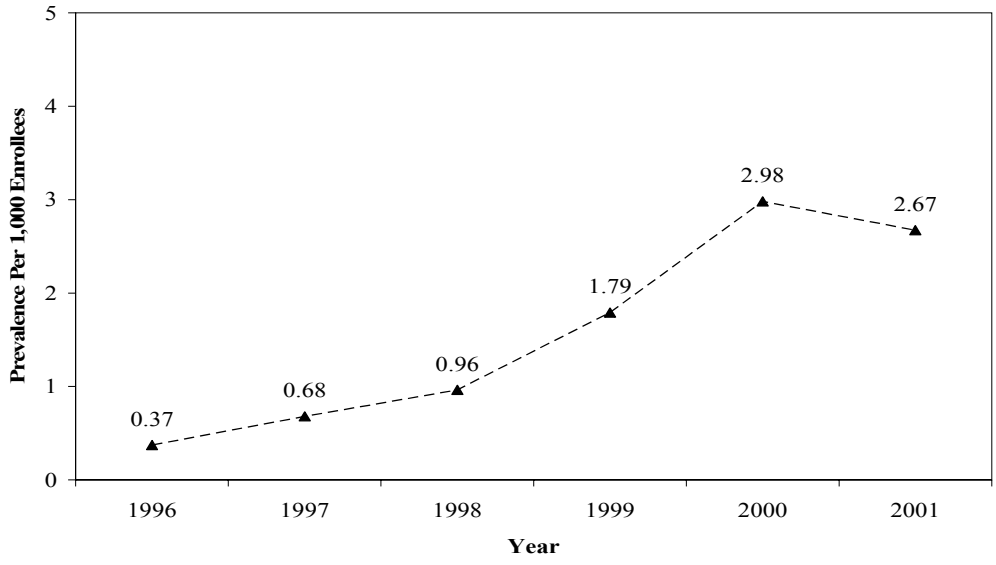
Result: H_2 accepted.

Table 3.51. Chi-Square Analysis of the Relationship Between Prevalence Rate of Atypical Antipsychotic Use in Managed Care Organization Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	904972	867345	905470	827466	693787	630748
Youths who received an antipsychotic	338	590	873	1486	2075	1691

[a]χ^2=3060.49, df=5, p<0.0001.
[b]OR=1.4779 (95% CI: 1.4557 – 1.5005).

Figure 3.37. Prevalence Rates of Atypical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.

From 1996 to 2001, the use of typical antipsychotics in youths enrolled in MCO decreased by 27.8 percent (PR=0.72; Figure 3.38, page 273). In 1996, 1.19 youths per 1,000 enrollees had at least one prescription for a typical antipsychotic. Over the study period, the prevalence rate of typical antipsychotic use slightly decreased from 1996 to 1998. During the next couple of years, the use of typical antipsychotics increased until 2000, and then decreased in 2001. In 2001, 0.33 fewer youths per 1,000 enrollees received a typical antipsychotic (PREV=0.86 per 1,000).

Chi-square analysis demonstrated a significant relationship between calendar year and prevalence rate of typical antipsychotic use (χ^2=67.50, df=5, p<0.01; Table 3.52, page 273). Logistic regression analysis showed a two percent decrease in the odds of receiving a typical antipsychotic with each additional year (OR=0.9801; 95% CI=0.9643 to 0.9962).

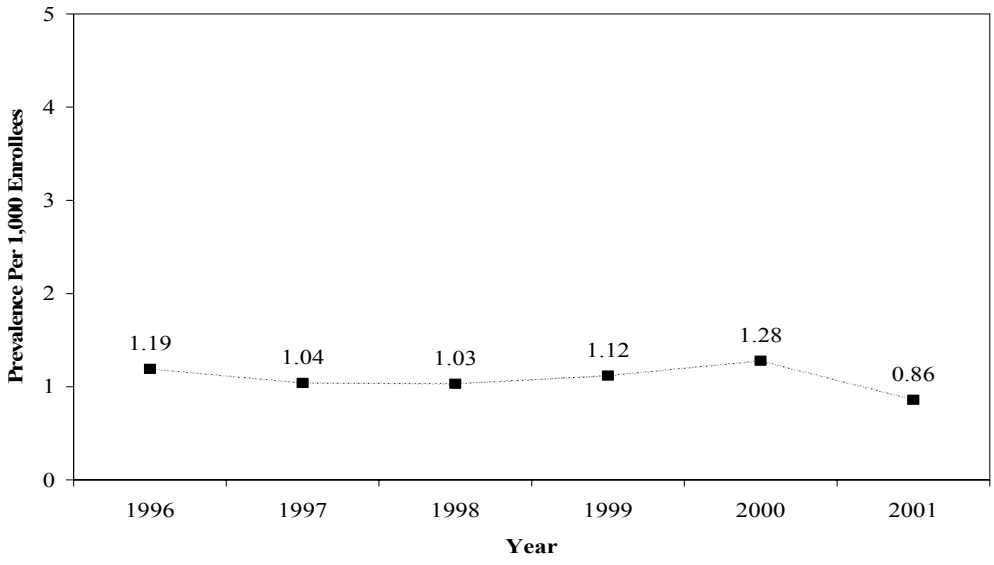
Result: H_3 accepted.

Table 3.52. Chi-Square Analysis of the Relationship Between Prevalence Rate of Typical Antipsychotic Use in Managed Care Organization Youths and Calendar Year[a,b]

Number of	1996	1997	1998	1999	2000	2001
Youths who did not receive an antipsychotic	904231	867032	905408	828024	694972	631895
Youths who received an antipsychotic	1079	903	935	928	890	544

[a]χ^2=67.50, df=5, p<0.01.
[b]OR=0.9801 (95% CI: 0.9643 – 0.9962).

Figure 3.38. Prevalence Rates of Typical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_4: During each study year (1996 – 2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.

Rank order of prevalence rates of specific atypical antipsychotic demonstrated that risperidone was the most commonly used agent in children and adolescents enrolled in MCO over the six-year period (Table 3.53, page 274). The prevalence rate of clozapine use was lower than that of olanzapine in 1996, and slightly higher than that of quetiapine in 1997. From 1998 to 2001, the prevalence rate of risperidone use was highest, followed by olanzapine, quetiapine, and clozapine. In 2001, risperidone use was more than double the use of olanzapine (PREV: 1.68 versus 0.65), and triple that of quetiapine (PREV: 1.68 versus 0.56).

Result: H_4 accepted.

Table 3.53. Prevalence Rates of Specific Atypical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Atypical Antipsychotic	1996	1997	1998	1999	2000	2001	Prevalence Ratio (2001:1996)	Percent Change (%)
CLZ	0.004	0.003	0.003	0.01	0.009	0.006	1.43	43.14
OLZ	0.01	0.13	0.26	0.47	0.75	0.65	44.93	4392.58
QUET		0.002	0.03	0.14	0.43	0.56	244.28[c]	24328.04[d]
RIS	0.36	0.58	0.73	1.33	2.07	1.68	4.61	360.67

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: CLZ=clozapine; OLZ=olanzapine; QUET=quetiapine; RIS=risperidone.
[c]Prevalence ratio (2001:market entry).
[d]Percent change from market entry to 2001.

H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

From 1996 to 2001, the overall use of antipsychotics increased in all age groups (<2 years: PR=1.48, % change=48.4%; 2 to 4 years: PR=2.30, % change=130.2%; 5 to 9 years: PR=3.51, % change=251.0%; 10 to 14 years: PR=2.64, % change=164.3%; 15 to 19 years: PR=1.68, % change=68.1%; Table 3.54, page 276). Adolescents aged 15 to 19 years had the highest prevalence rates from 1996 to 1999. Ten- to 14-year olds had the highest prevalence rates in 2000 and 2001, and had the steepest growth (+3.04 per 1,000; Figure 3.39, page 276). Children between the ages of five and nine years had the greatest percent change in prevalence rates from 1996 to 2001.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use across all age groups ($p<0.001$; Table 3.54, page 276). Children and adolescents aged five to nine years had the highest odds of receiving any antipsychotic with each calendar year (OR=1.3392; 95% CI=1.3066 to 1.3726), followed by ten- to 14-year olds (OR=1.2644; 95% CI=1.2411 to 1.2882) and two- to four-year olds (OR=1.2340; 95% CI=1.1697 to 1.3019). Children below the age of two years and adolescents between the ages of 15 and 19 years had similar odds of receiving any antipsychotic with each additional calendar year (OR=1.1590 and OR=1.1523, respectively).

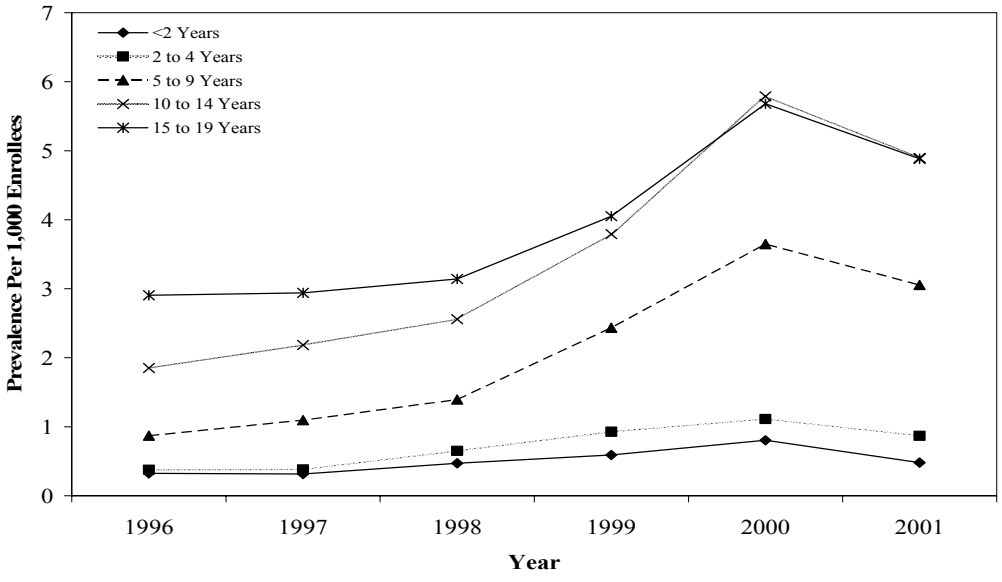
Result: H_5 accepted.

Table 3.54. Age-Specific Prevalence Rates of Total Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	0.32	0.47	0.48	1.48	48.42	24.11	<0.01
2 – 4 y	0.38	0.65	0.87	2.30	130.16	77.35	<0.01
5 – 9 y	0.87	1.39	3.05	3.51	251.00	656.53	<0.001
10 – 14 y	1.85	2.56	4.89	2.64	164.30	742.58	<0.001
15 – 19 y	2.90	3.14	4.88	1.68	68.05	321.03	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.39. Age-Specific Prevalence Rates of Total Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).

The use of atypical antipsychotics increased across all age groups (Figure 3.40, page 278). In children less than two years of age, a 4-fold increase in the prevalence of atypical antipsychotic use existed (+0.07 per 1,000; % change=298.5%). Compared to 1996, an additional 0.48 and 2.35 youths per 1,000 enrollees received an atypical antipsychotic in the two- to four-year old (PR=10.14, % change=914.4%) and five- to nine-year old (PR=11.43, % change=1043.2%) groups, respectively, in 2001. The prevalence of atypical antipsychotic use increased 7-fold in the ten- to 14-year age group (+3.56 per 1,000), and 5.2-fold in the 15- to 19-year age group (+2.77 per 1,000).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use across all age groups ($p<0.01$; Table 3.55, page 278). Children between the ages of five and nine years had the highest odds (OR=1.5845; 95% CI=1.5345 to 1.6362), followed by two- to four-year olds (OR=1.5043; 95% CI=1.3816 to 1.6378), and ten- to 14-year olds (OR=1.4729; 95% CI=1.4379 to 1.5087). Fifteen- to 19-year olds had a 40 percent increase in the odds of receiving an atypical antipsychotic with each year (OR=1.3965; 95% CI=1.3604 to 1.4336), while less than two year olds had a 29 percent increase in odds (OR=1.2871; 95% CI=1.0932 to 1.5155).

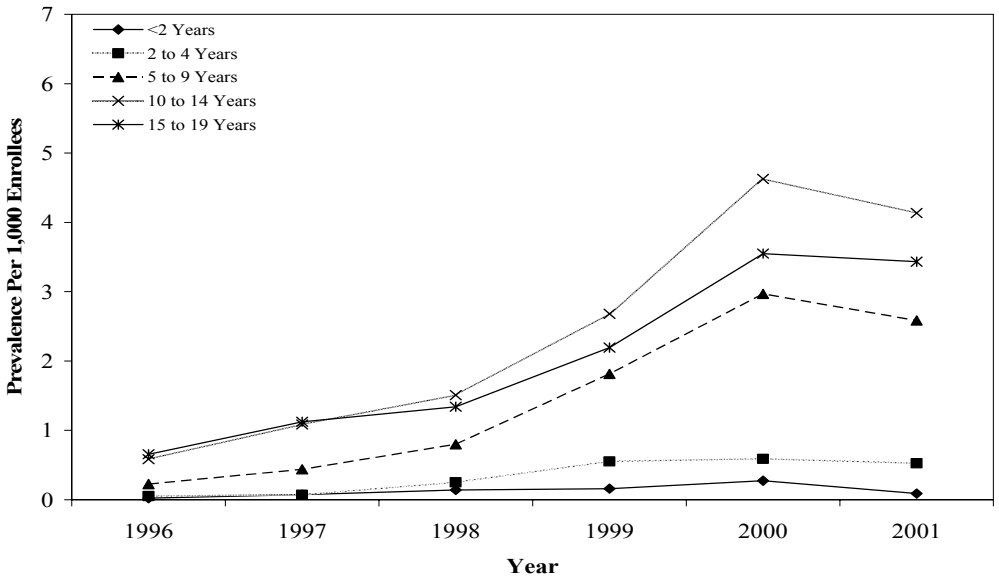
Result: H_6 accepted.

Table 3.55. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	$\chi 2$ Value	p-value
<2 y	0.02	0.14	0.09	3.99	298.52	22.24	<0.01
2 – 4 y	0.05	0.25	0.53	10.14	914.43	115.08	<0.001
5 – 9 y	0.23	0.80	2.58	11.43	1043.17	987.40	<0.001
10 – 14 y	0.58	1.51	4.14	7.08	608.18	1201.80	<0.0001
15 – 19 y	0.66	1.34	3.43	5.23	423.43	717.55	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.40. Age-Specific Prevalence Rates of Atypical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).

The use of typical antipsychotics decreased from 1996 to 2001 across age categories greater than two years of age (Table 3.56, page 280). Prevalence rates of typical antipsychotic use in all age groups remained fairly constant from 1996 to 2000. In 2001, there was a decrease in the use of typical antipsychotics in youths older than two years of age (Figure 3.41, page 280). Compared to 1996, there was a 30 percent increase in the prevalence rate of typical antipsychotic use in children less than two years of age. In youths above the age of two years, a one to 36 percent decrease occurred in the use of typical antipsychotics.

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use in youths above the age of ten years ($p<0.01$; Table 3.56, page 280). Children below the age of two years had a 12 percent increase in odds of receiving a typical antipsychotic with each calendar year (OR=1.1198; 95% CI=1.0216 to 1.2274). The odds of receiving a typical antipsychotic with each calendar year were similar for the ten- to 14-year and 15- to 19-year age groups (10 to 14 years: OR=0.9574; 15 to 19 years: OR=0.9675).

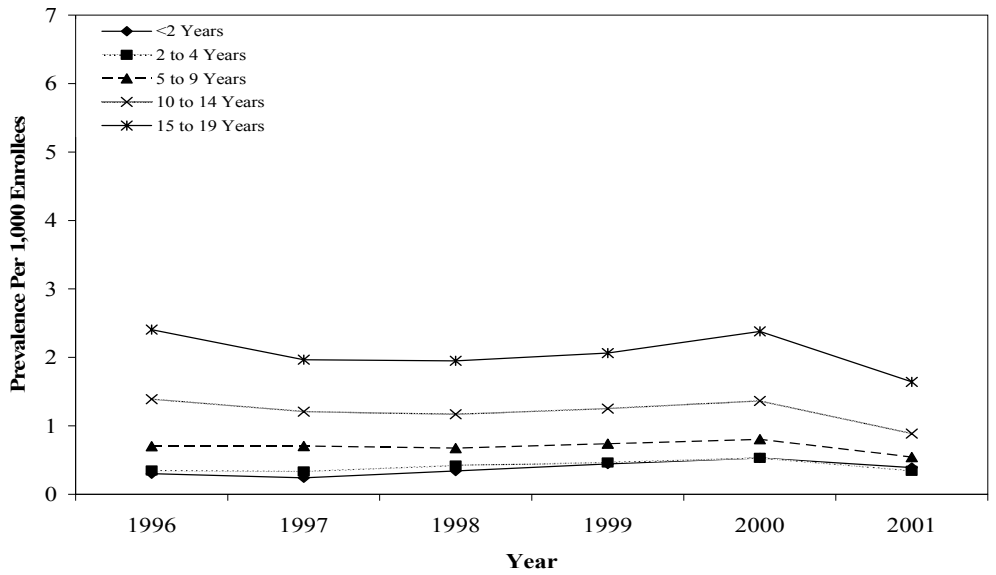
Result: H_7 rejected.

Table 3.56. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Age	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
<2 y	0.30	0.34	0.39	1.30	29.89	10.32	0.07
2 – 4 y	0.35	0.42	0.34	0.99	-1.33	8.62	0.13
5 – 9 y	0.70	0.68	0.54	0.77	-22.69	9.14	0.10
10 – 14 y	1.39	1.17	0.89	0.64	-36.25	24.41	<0.01
15 – 19 y	2.41	1.95	1.64	0.68	-31.74	35.89	<0.01

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: y=years; χ^2=chi-square.

Figure 3.41. Age-Specific Prevalence Rates of Typical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

The use of antipsychotics increased in both male and female groups from 1996 to 2001 (Table 3.57, page 282). Compared to 1996, an additional 2.56 males and 1.32 females per 1,000 enrollees received an antipsychotic in 2001 (Male: PR=2.61, % change=160.5%; Female: PR=1.98, % change=97.9%). During each calendar year, male prevalence rates of total antipsychotic use were higher than those of females (Figure 3.42, page 282).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of total antipsychotic use in males and females ($p<0.0001$; Table 3.57, page 282). Males (OR=1.2654, 95% CI=1.2474 to 1.2836) had higher odds of receiving any antipsychotic with each calendar year compared to females (OR=1.1954, 95% CI=1.1751 to 1.2161).

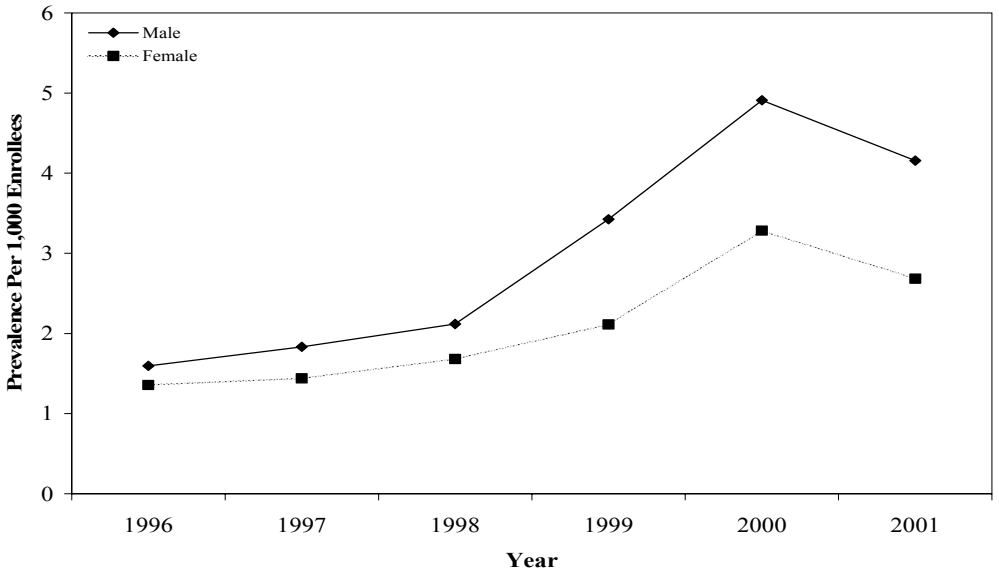
Result: H_8 accepted.

Table 3.57. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	1.60	2.12	4.16	2.61	160.53	1270.42	<0.0001
Female	1.36	1.68	2.68	1.98	97.90	535.43	<0.001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.42. Gender-Specific Prevalence Rates of Total Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increases across gender groups: male and female.

Prevalence rates of atypical antipsychotic use increased in both male and female groups from 1996 to 2001 (Table 3.58, page 284). Compared to 1996, there was a 7.6-fold increase in atypical antipsychotic use in males in 2001, and a 6.5-fold increase in females (Male: +3.01 per 1,000, % change=656.0%; Female: +1.56 per 1,000, % change=548.9%). Male prevalence rates of atypical antipsychotic use were higher than those of females (Figure 3.43, page 284).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of atypical antipsychotic use in males and females ($p<0.001$; Table 3.58, page 284). Males showed a 49 percent increase in the odds of receiving an atypical antipsychotic with each additional calendar year (OR=1.4867, 95% CI=1.4592 to 1.5147), and females showed a 46 percent increase (OR=1.4610, 95% CI=1.4234 to 1.4995).

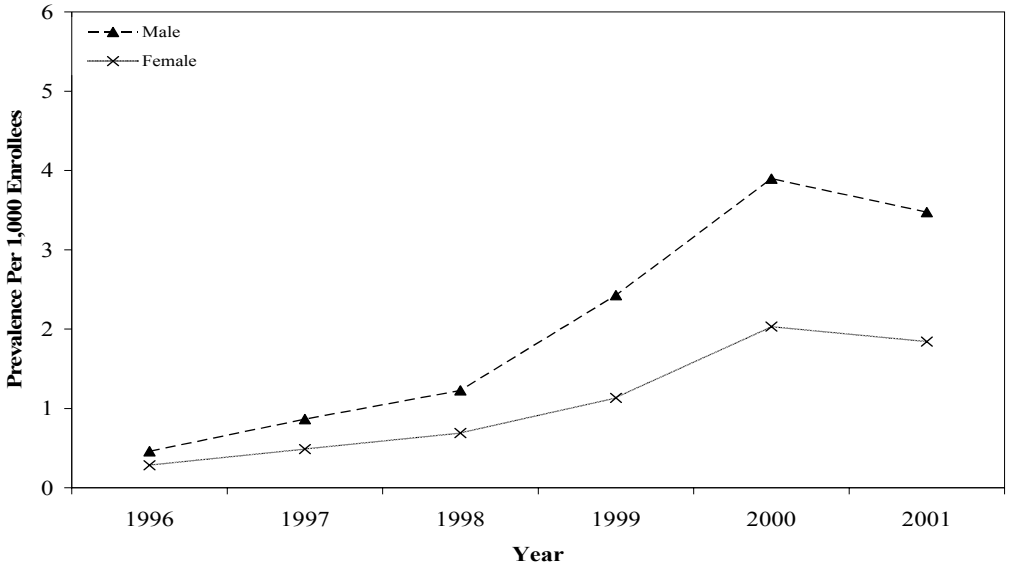
Result: H_9 accepted.

Table 3.58. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	0.46	1.23	3.47	7.56	656.00	2090.69	<0.0001
Female	0.28	0.69	1.84	6.49	548.92	977.32	<0.0001

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.43. Gender-Specific Prevalence Rates of Atypical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decreases across gender groups: male and female.

The use of typical antipsychotic use decreased by 69 percent in males, and 61 percent in females from 1996 to 2001 (Table 3.59, page 286). In 2001, 0.43 fewer males and 0.22 fewer females per 1,000 received a typical antipsychotic compared to 1996 (Male: PR=0.65; Female: PR=0.80). Male prevalence rates of typical antipsychotic use remained higher than those of females from 1996 to 1999. Female use of typical antipsychotics was greater than that of males in 2000 and 2001 (Figure 3.44, page 286).

Chi-square analysis demonstrated significant relationships between calendar year and prevalence rates of typical antipsychotic use in males and females ($p<0.01$; Table 3.59, page 286). Males showed a four percent decrease in the odds of receiving a typical antipsychotic with each additional calendar year (OR=0.9621, 95% CI=0.9404 to 0.9844).

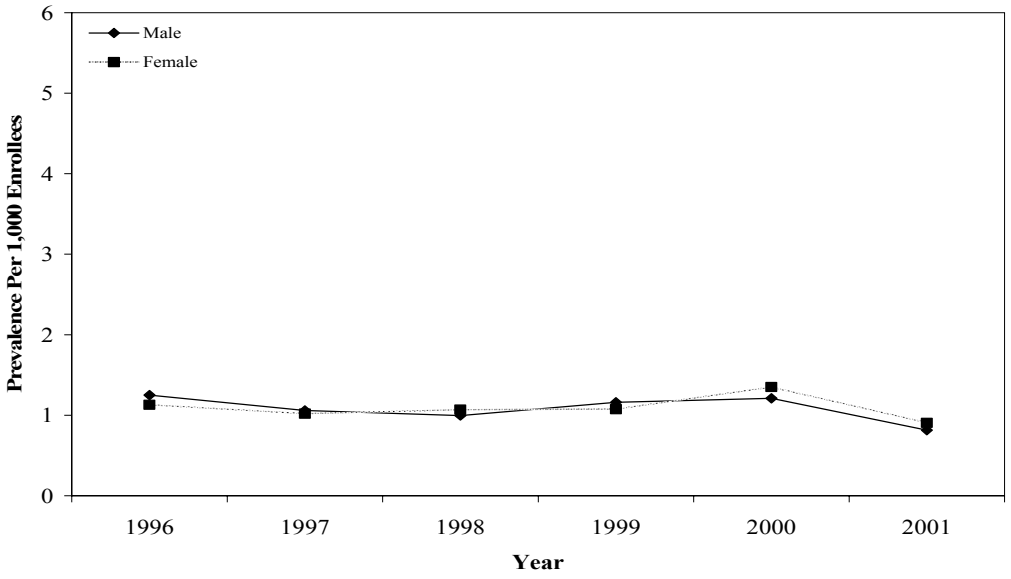
Result: H_{10} accepted.

Table 3.59. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001[a,b]

Gender	1996	1998	2001	Prevalence Ratio (2001:1996)	Percent Change	χ2 Value	p-value
Male	1.25	1.00	0.82	0.65	-34.77	44.10	<0.01
Female	1.13	1.07	0.91	0.80	-19.86	33.56	<0.01

[a]Prevalence values reported as X per 1,000 enrollees.
[b]Abbreviations: χ^2=chi-square.

Figure 3.44. Gender-Specific Prevalence Rates of Typical Antipsychotic Use in Managed Care Organization Youths from 1996 to 2001



H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.

A trend toward lower mean daily doses of risperidone over the six-year period existed in children and adolescents above the age of two years. In the ten- to 14-year and 15- to 19-year age groups, a peak in the mean daily dose of risperidone occurred. No distinct trend in risperidone dosing existed in children below the age of two years. ANOVA showed significant differences in mean risperidone doses between calendar years for the following age categories: two- to four-year olds, five- to nine-year olds, and 15- to 19-year olds ($p \leq 0.003$).

In the two- to four-year age group, post hoc analysis showed no significant between-year differences in risperidone doses. Mean risperidone doses in children aged five and nine years were significantly higher from 1996 to 1999 compared to 2001 ($p < 0.001$). In 15- to 19-year olds, risperidone doses in 1996 were significantly higher than those in 2001 ($p < 0.001$).

Result: H_{11} rejected.

H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

Mean daily doses of olanzapine showed a decreasing trend in children and adolescents less than two years, and between the ages of ten and 14 years. No definitive trends in olanzapine dosing existed in the other age groups. ANOVA showed no significant differences in mean olanzapine doses between calendar years for all age categories.

Result: H_{12} rejected.

H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.

In children and adolescents above the age of two years, a trend in increased quetiapine dosing existed. In two- to four-year olds, the trend of increasing mean quetiapine doses started in 1999. In the ten- to 14-year and 15- to 19-year age groups, a peak in quetiapine dosing occurred in 2000 and 1999, respectively. ANOVA showed no significant differences in mean quetiapine doses between calendar years for children and adolescents enrolled in MCO ($p<0.001$).

Result: H_{13} rejected.

H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.

The prevalence of switches in antipsychotic treatment increased from 87.4 per 1,000 youths receiving an antipsychotic in 1996 to 111.0 per 1,000 in 2001 (Table 3.60, page 291). With each additional calendar year, a child or adolescent had a seven percent increase in the odds that they would experience a switch in antipsychotic treatment (OR=1.0676, 95% CI=1.0267 to 1.1100).

Among children and adolescents having at least one switch in antipsychotic treatment, the mean (±SD) number of switches per youth during a calendar year remained fairly steady over the six-year period (range: 1.13±0.36 to 1.26±0.61). No significant differences in the mean number switches per youth between calendar years existed.

Closer examination of the types of antipsychotic switches revealed a decrease in typical to typical antipsychotic switches over time (1996: 33.3%; 1998: 9.6%; 2001: 0.3%). Conversely, there was an increase in atypical to atypical antipsychotic switches (1996: 5.6%; 1998: 32.2%; 2001: 72.7%). Typical to atypical switches peaked in 1997, and then decreased over time. Atypical to typical switches decreased initially from 1996 to 1997, peaked in 1998, and then decreased thereafter. Chi-square analysis demonstrated a significant relationship between calendar year and type of antipsychotic switch (χ^2=316.92, df=15, p<0.001; Table 3.61, page 291).

Result: H_{14} accepted.

Table 3.60. Prevalence of Antipsychotic Switches in Managed Care Organization Youths from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	1338	1423	1725	2305	2861	2172
Number of youths with at least one switch in antipsychotic treatment	117	112	140	227	272	241
Prevalence per 1,000 youths receiving an antipsychotic	87.4	78.7	81.2	98.5	95.1	111.0

Table 3.61. Types of Antipsychotic Switches in Managed Care Organization Youths from 1996 to 2001[a]

Type of Switch		1996	1997	1998	1999	2000	2001
Typical →Typical	N	48	19	17	19	13	1
	%	33.3	15.1	9.6	6.9	4.0	0.3
Typical → Atypical	N	53	51	62	72	75	40
	%	36.8	40.5	35.0	26.3	23.1	13.7
Atypical → Typical	N	35	23	41	57	44	39
	%	24.3	18.3	23.2	20.8	13.5	13.3
Atypical → Atypical	N	8	33	57	126	193	213
	%	5.6	26.2	32.2	46.0	59.4	72.7

[a] χ^2=316.92, df=15, p<0.001

H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotic agents, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.

The prevalence of concomitant psychotropic medication use increased by 54 percent from 1996 to 2001 (+255.7 per 1,000 youths receiving an antipsychotic; Table 3.62, page 294). The number of youths having at least one concomitant psychotropic medication during antipsychotic treatment steadily increased until 2000, and then decreased in 2001 (Figure 3.45, page 294). With each calendar year, a child or adolescent had a 26 percent increase in the odds of receiving a concomitant psychotropic medication during antipsychotic treatment (OR=1.2553; 95% CI=1.2260 to 1.2853).

Antidepressants (range: 33.0% to 38.6%) were the most commonly used agents during each year (Table 3.63, page 295). From 1996 to 1999, the concomitant use of antimanic/bipolar agents increased by six percent, and was second most common. Over the six-year period, the use of psychostimulants increased dramatically, and exceeded that of antimanic/bipolar agents in 2000 and 2001. The use of anti-parkinsonian agents decreased. Chi-square analysis demonstrated a significant relationship between calendar year and the number of youths receiving different classes of concomitant psychotropic medications (χ^2=405.29, df=40, p<0.001).

The prevalence of antipsychotic polypharmacy increased by 117 percent from 1996 to 2001 (+14.9 per 1,000 youths receiving an antipsychotic; Table 3.64, page 296). Over the six-year period, the number of youths receiving treatment with two different antipsychotic medications for at least 30 days steadily increased until 2000 (Figure 3.46, page 296). With each calendar year, a child or adolescent had an 18 percent increase in the odds of receiving two different antipsychotic medications for a period of 30 days or more (OR=1.1800; 95% CI=1.0846 to 1.2839).

The use of two typical agents peaked in 1997, and then decreased over time (1996: 30.0%; 1998: 11.8%; 2001: 1.5%), while the use of two atypical agents increased over the study period (1996: 10.0%; 1998: 26.5%; 2001: 64.7%). The use of a typical and atypical agent concomitantly was fairly common during all study years (range: 33.8% to 61.8%), and peaked in 1998. Chi-square analysis demonstrated a significant relationship between calendar year and percentage of type of antipsychotic polypharmacy (χ^2=56.00, df=10, p<0.001).

Result: H_{15} accepted.

Table 3.62. Prevalence of Concomitant Psychotropic Medication Use in Managed Care Organization Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	1338	1423	1725	2305	2861	2172
Number of youths receiving any other concomitant psychotropic medication	638	758	1039	1560	2007	1591
Prevalence per 1,000 youths receiving an antipsychotic	476.8	532.7	602.3	676.8	701.5	732.5

Figure 3.45. Number of Managed Care Organization Youths Receiving a Concomitant Psychotropic Medication While Receiving an Antipsychotic from 1996 to 2001

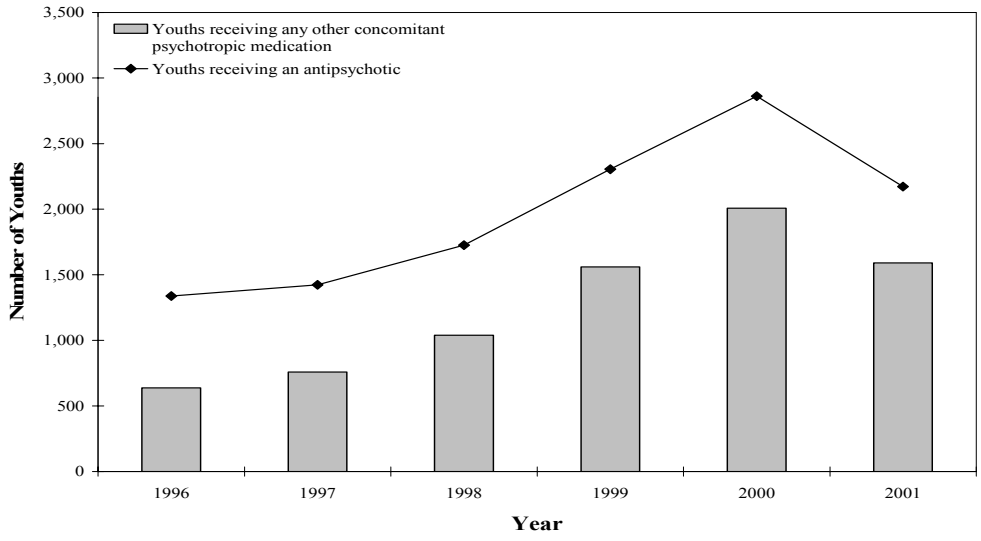


Table 3.63. Medication Class of Concomitant Psychotropic Medications with Antipsychotic Treatment in Managed Care Organization Youths from 1996 to 2001[a]

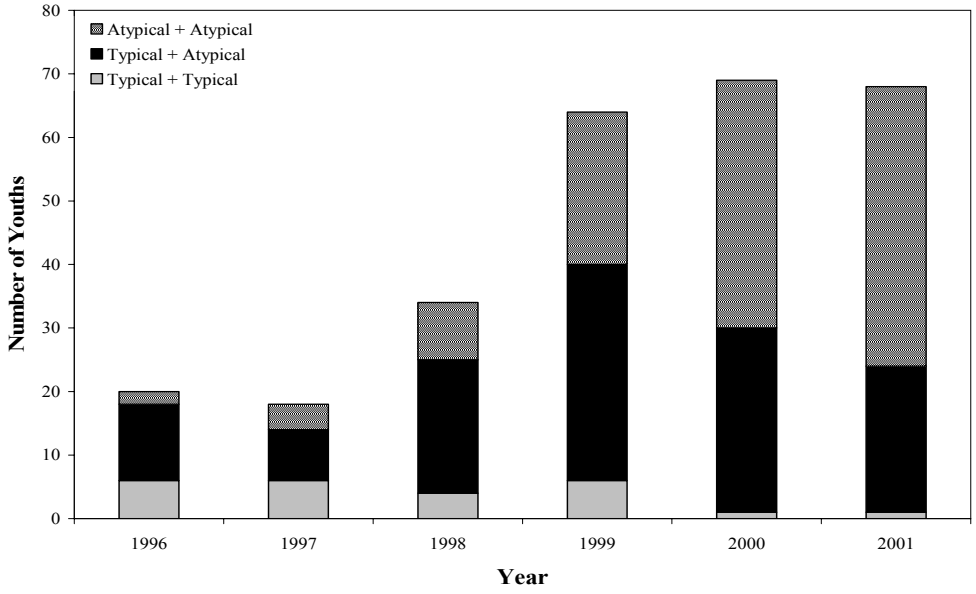
Psychotropic Class		1996	1997	1998	1999	2000	2001
Alpha-agonists	N	85	108	176	270	281	177
	%	8.2	8.5	9.6	9.5	7.7	6.2
Antidepressants	N	393	490	666	941	1236	989
	%	38.0	38.6	36.4	33.0	34.1	34.4
Anti-parkinsonian agents	N	116	102	105	148	161	82
	%	11.2	8.0	5.7	5.2	4.4	2.8
Anxiolytics/sedatives/hypnotics	N	61	70	65	116	144	110
	%	5.9	5.5	3.5	4.1	4.0	3.8
Benzodiazepines	N	83	104	146	185	187	154
	%	8.0	8.2	8.0	6.5	5.2	5.4
Antimanic/bipolar agents	N	159	230	380	611	774	644
	%	15.4	18.1	20.7	21.4	21.3	22.4
Psychostimulants	N	107	145	264	550	799	678
	%	10.3	11.4	14.4	19.3	22.0	23.6
Substance abuse agents	N	2	3	3	4	5	7
	%	0.2	0.2	0.2	0.1	0.1	0.2
Other psychotropic agents	N	29	18	27	30	41	37
	%	2.8	1.4	1.5	1.1	1.1	1.3

$\chi 2=405.29$, df=40, $p<0.001$

Table 3.64. Prevalence of Antipsychotic Polypharmacy in Managed Care Organization Youths Receiving an Antipsychotic from 1996 to 2001

	1996	1997	1998	1999	2000	2001
Number of youths receiving an antipsychotic	1338	1423	1725	2305	2861	2172
Number of youths receiving antipsychotic polypharmacy	17	16	31	55	62	60
Prevalence per 1,000 youths receiving an antipsychotic	12.7	11.2	18.0	23.9	21.7	27.6

Figure 3.46. Number of Managed Care Organization Youths with Antipsychotic Polypharmacy and Type of Antipsychotic Polypharmacy from 1996 to 2001

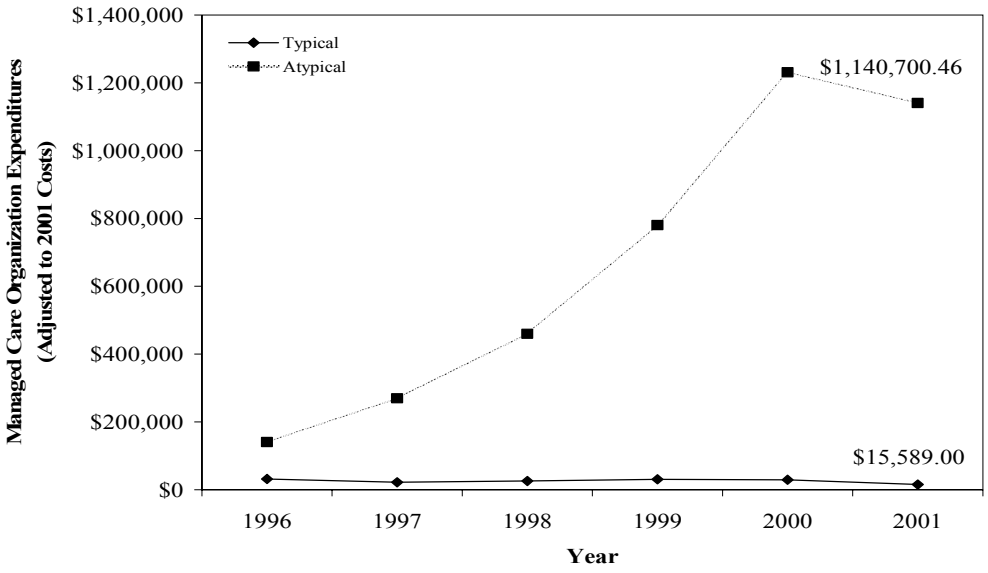


H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.

In 1996, a total of $172,440 was spent on antipsychotic medications for children and adolescents. Typical antipsychotics cost $31,603, and atypical antipsychotics cost $140,837. Over the six-year period, substantial increases in the cost of all antipsychotics occurred, primarily due to the cost associated with the increased use of atypical antipsychotics (Figure 3.47, page 298). In 2001, a total of $1,156,289 was spent on antipsychotic medications, and 99 percent of this total was associated with atypical antipsychotics ($1,140,700).

Result: H_{16} accepted.

Figure 3.47. Cost Associated with Antipsychotic Medications for Managed Care Organization Youths from 1996 to 2001



Hypothesis Testing: Phase I Comparisons of Antipsychotic Prevalence Rates

Prevalence rates in the Medicaid systems were compared for geographic variations in antipsychotic prescribing (H_{17} to H_{19}). Prevalence rates of antipsychotic use in public versus private health insurance systems were also compared (H_{20} to H_{22}).

Comparative Analyses of Antipsychotic Prevalence Rates

H_{17}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of total antipsychotic use, followed by Ohio and California.

From 1996 to 2001, prevalence rates of total antipsychotic use were highest in Texas Medicaid children and adolescents, followed by Ohio and California Medicaid programs (Table 3.65, page 300). In 1996, the prevalence of total antipsychotic use in Texas Medicaid was 1.40 and 1.34 times that of California and Ohio, respectively. Over the six-year period, the growth of total antipsychotic use in Ohio Medicaid paralleled that of Texas Medicaid (Figure 3.48, page 300). Conversely, the growth of total antipsychotic use in California Medi-Cal was not as steep as Texas and Ohio Medicaid.

Chi-square analysis showed a significant relationship between annual prevalence rates of total antipsychotic use and state Medicaid program ($p<0.001$).

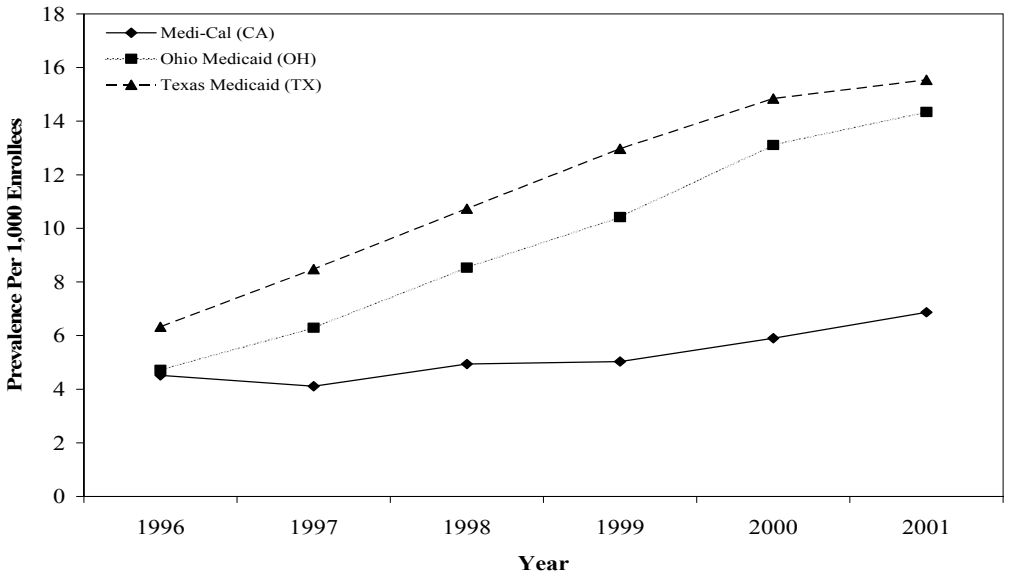
Result: H_{17} accepted.

Table 3.65. A Comparison of Total Antipsychotic Prevalence Rates Between State Medicaid Programs from 1996 to 2001[a]

Year	Prevalence of Total Antipsychotic Use			Chi-Square	p-value
	CA	OH	TX		
1996	4.52	4.72	6.33	555.50	<0.001
1998	4.94	8.53	10.73	3909.05	<0.0001
2001	6.87	14.34	15.54	7355.53	<0.0001

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid.

Figure 3.48. A Comparison of Total Antipsychotic Prevalence Rates Between State Medicaid Programs from 1996 to 2001



H_{18}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of atypical antipsychotic use, followed by Ohio and California.

From 1996 to 2001, prevalence rates of atypical antipsychotic use were highest in Texas Medicaid children and adolescents, followed by Ohio and California Medicaid programs (Table 3.66, page 302). In 1996, the prevalence of atypical antipsychotic use in Texas Medicaid was 8.0 and 1.74 times that of California and Ohio, respectively. Over the six-year period, the growth of atypical antipsychotic use in Ohio Medicaid was similar to that of Texas Medicaid (Figure 3.49, page 302). In California Medi-Cal, the growth of atypical antipsychotic use was not as steep as seen in the other Medicaid states.

Chi-square analysis showed a significant relationship between annual prevalence rates of atypical antipsychotic use and state Medicaid program ($p<0.001$).

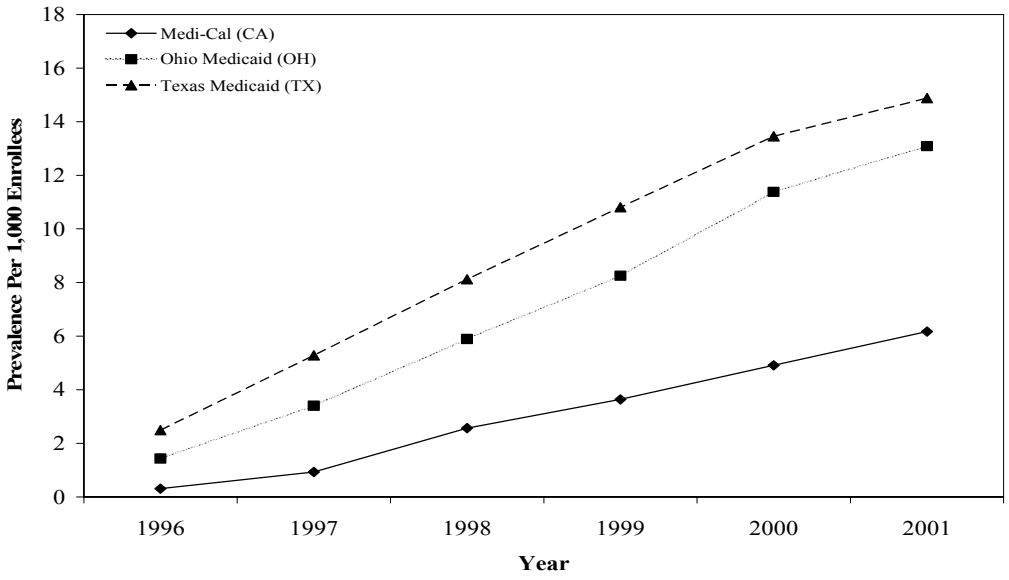
Result: H_{18} accepted.

Table 3.66. A Comparison of Atypical Antipsychotic Prevalence Rates Between State Medicaid Programs from 1996 to 2001[a]

Year	Prevalence of Atypical Antipsychotic Use			Chi-Square	p-value
	CA	OH	TX		
1996	0.31	1.43	2.49	4008.49	<0.0001
1998	2.57	5.89	8.12	5522.10	<0.0001
2001	6.17	13.09	14.88	7654.40	<0.0001

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid.

Figure 3.49. A Comparison of Atypical Antipsychotic Prevalence Rates Between State Medicaid Programs from 1996 to 2001



H_{19}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of typical antipsychotic use, followed by Ohio and California.

In 1996, rank order showed that the use of typical antipsychotics in children and adolescents were highest for Texas Medicaid, then California Medi-Cal and Ohio Medicaid. From 1997 to 2000, typical antipsychotic use remained highest in Texas Medicaid children and adolescents, but use in Ohio Medicaid exceeded California Medi-Cal (Table 3.67, page 304). In 2001, the prevalence rate of typical antipsychotic use was highest in Ohio Medicaid, followed by Texas and California. During the study period, prevalence rates of typical antipsychotic were similar across all three state Medicaid programs. The decline in use of typical antipsychotics were gradual, and the greatest percent change in use was in California Medi-Cal (-71.4%; Figure 3.50, page 304).

Chi-square analysis showed a significant relationship between annual prevalence rates of typical antipsychotic use and state Medicaid program ($p<0.001$).

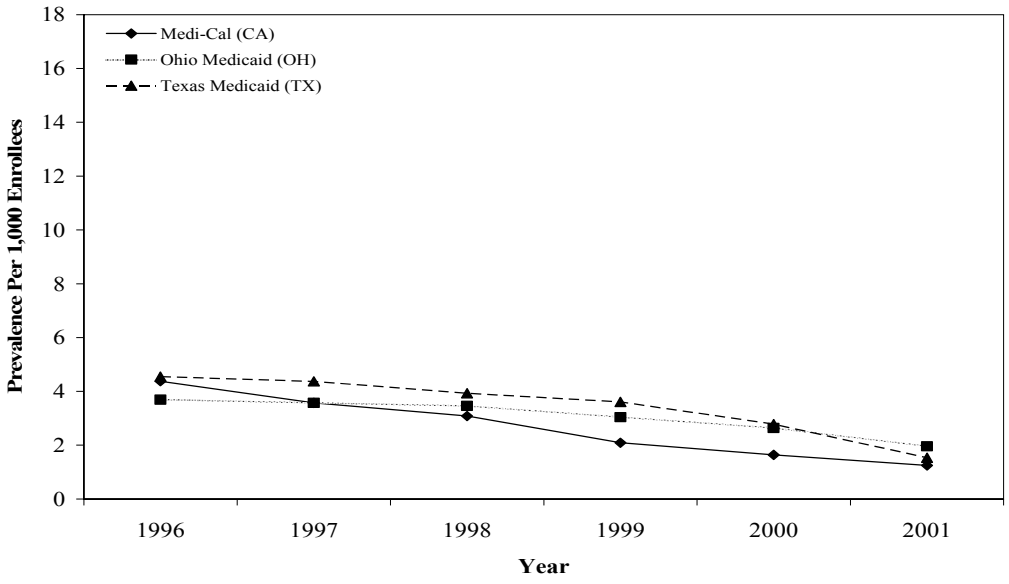
Result: H_{19} rejected.

Table 3.67. A Comparison of Typical Antipsychotic Prevalence Rates Between State Medicaid Programs from 1996 to 2001[a]

Year	Prevalence of Typical Antipsychotic Use			Chi-Square	p-value
	CA	OH	TX		
1996	4.38	3.69	4.55	85.54	<0.01
1998	3.08	3.46	3.93	163.90	<0.001
2001	1.25	1.96	1.53	225.77	<0.001

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid.

Figure 3.50. A Comparison of Typical Antipsychotic Prevalence Rates Between State Medicaid Programs from 1996 to 2001



H_{20}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of total antipsychotic use compared to the Managed Care Organization.

From 1996 to 2001, prevalence rates of total antipsychotic use were higher in the three Medicaid programs compared to the Managed Care Organization (Table 3.68, page 305). In 1996, the prevalence rate of total antipsychotic use was at least three-times higher in Medicaid programs than in the Managed Care Organization. In 2001, the use of antipsychotics in Medicaid youths was at least double that of Managed Care Organization youths. Chi-square analysis showed a significant relationship between annual prevalence rates of total antipsychotic use and health insurance program ($p<0.001$).

Result: H_{20} accepted.

Table 3.68. A Comparison of Total Antipsychotic Prevalence Rates Between Public and Private Payer Insurance Programs from 1996 to 2001[a]

Year	Prevalence of Total Antipsychotic Use				Chi-Square	p-value
	CA	OH	TX	MCO		
1996	4.52	4.72	6.33	1.48	2749.79	<0.0001
1998	4.94	8.53	10.73	1.90	7534.72	<0.0001
2001	6.87	14.34	15.54	3.43	10850.50	<0.00001

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid; MCO=Managed Care Organization.

H_{21}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of atypical antipsychotic use compared to the Managed Care Organization.

In 1996, the prevalence of atypical antipsychotic use in Managed Care Organization youths was slightly higher than that of California Medi-Cal youths. From 1997 to 2001, prevalence rates of atypical antipsychotic use were higher in the three Medicaid programs compared to the Managed Care Organization (Table 3.69, page 306). In 2001, the use of atypical antipsychotics in Medicaid youths was at least 2.3 times that of Managed Care Organization youths. Chi-square analysis showed a significant relationship between annual prevalence rates of atypical antipsychotic use and health insurance program ($p<0.001$).

Result: H_{21} rejected.

Table 3.69. A Comparison of Atypical Antipsychotic Prevalence Rates Between Public and Private Payer Insurance Programs from 1996 to 2001[a]

Year	Prevalence of Atypical Antipsychotic Use				Chi-Square	p-value
	CA	OH	TX	MCO		
1996	0.31	1.43	2.49	0.37	4790.96	<0.0001
1998	2.57	5.89	8.12	0.96	8699.23	<0.0001
2001	6.17	13.09	14.88	2.67	11458.04	<0.00001

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid; MCO=Managed Care Organization.

H_{22}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of typical antipsychotic use compared to the Managed Care Organization.

From 1996 to 2001, prevalence rates of typical antipsychotic use were higher in the three Medicaid programs compared to the Managed Care Organization (Table 3.70, page 307). In 1996, the prevalence rate of typical antipsychotic use was at least three-times higher in Medicaid programs than in the Managed Care Organization. In 2001, typical antipsychotic use in Medicaid youths was at least 1.5-times that of Managed Care Organization youths. Chi-square analysis showed a significant relationship between annual prevalence rates of typical antipsychotic use and health insurance program ($p<0.001$).

Result: H_{29} accepted.

Table 3.70. A Comparison of Typical Antipsychotic Prevalence Rates Between Public and Private Payer Insurance Programs from 1996 to 2001[a]

Year	Prevalence of Typical Antipsychotic Use				Chi-Square	p-value
	CA	OH	TX	MCO		
1996	4.38	3.69	4.55	1.19	2047.82	<0.0001
1998	3.08	3.46	3.93	1.03	1544.32	<0.0001
2001	1.25	1.96	1.53	0.86	379.04	<0.001

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid; MCO=Managed Care Organization.

Hypothesis Testing: Phase II (Prescribing Practices for Antipsychotic Agents)

Phase II evaluated data from the Texas Medicaid and TDMHMR systems to examine prescribing practices related to antipsychotic use in children and adolescents. The number of antipsychotic prescriptions per year based upon the specialty of physician (neurology [including child neurology], pediatrics, primary care [including family practice and general practice], psychiatry [including child and adolescent psychiatry], other, or unspecified) were determined (H_{23} and H_{24}). Diagnostic data were collected to determine the documented diagnoses (anxiety, bipolar, depressive, disruptive, psychotic, substance abuse, developmental, other psychiatric, other childhood psychiatric, or no psychiatric or behavioral diagnosis) for which antipsychotics are being prescribed (H_{25}).

Prescribing practices for antipsychotic agents in Texas

H_{23}: The number of antipsychotic prescriptions for a child or adolescent from primary care physicians (family practice physicians, general practice physicians, and pediatricians) increases from 1996 to 2001.

Over the six-year period, there was a 69 percent increase in the number of antipsychotic prescriptions from primary care physicians. In 1996, primary care physicians wrote 5,961 antipsychotic prescriptions for children and adolescents. In 2001, 10,098 antipsychotic prescriptions were written by primary care physicians (Table 3.71, page 312; Figure 3.51, page 312). Chi-square analysis showed a significant relationship between physician specialty associated with antipsychotic prescribing and calendar year (χ^2=5064.56, df=20, p<0.001).

Within this specialty group, more antipsychotic prescriptions originated from pediatricians (n=27,766) compared to family/ general practice physicians (n=17,931). From 1996 to 2001, there was a 38 percent and 130 percent increase in the number of antipsychotic prescriptions from pediatricians and family/ general practice physicians, respectively.

With regard to atypical antipsychotics, a 444 percent increase in the number of atypical antipsychotic prescriptions from primary care physicians existed (1996: n=1,616; 1998: n=4,450; 2001: n=8,791; Table 3.72, page 313; Figure 3.52, page 313). The number of atypical antipsychotic prescriptions from

pediatricians and family/ general practice physicians increased from 1996 to 2001 (% change: 369.5% and 563.7%, respectively). The number of typical antipsychotic prescriptions from primary care physicians decreased by 70 percent, from 4,345 prescriptions in 1996 to 1,307 in 2001 (Table 3.73, page 314; Figure 3.53, page 314). The number of typical antipsychotic prescriptions from pediatricians and family/ general practice physicians decreased by 74 percent and 62 percent, respectively.

Across all age groups, the number of antipsychotic prescriptions from primary care physicians increased from 1996 to 2001. More specifically, the number of antipsychotic prescriptions from primary care physicians nearly doubled from 1996 to 2001 for five- to nine-year olds (1996: n=1,689; 2001: n=3,225) and ten- to 14-year olds (1996: n=2,117; 2001: n=3,931). It must be noted, however, that over time, primary care physicians accounted for a smaller percentage of the total volume of antipsychotic prescriptions for all age groups. With regard to atypical antipsychotics, substantial increases in the number of prescriptions from primary care physicians existed (<2 years: 36 more prescriptions in 2001 compared to 1996 [% change: not calculated since 0 prescriptions in 1996]; 2- to 4-years: +481 [2091%]; 5- to 9-years: +2,450 [553%]; 10- to 14-years: +2,793 [449%]; 15- to 19-years: +1,487 [283%]). The number of typical antipsychotic prescriptions decreased across all age groups (<2 years: 5 fewer prescriptions in 2001 compared to 1996 [% change: -15%]; 2- to 4-years: -226 [-78%]; 5- to 9-years: -914 [-73%]; 10- to 14-years: -979 [-65%]; 15- to 19-years: -950 [-76%]).

The number of antipsychotic prescriptions from primary care physicians increased for both males and females over the six-year period. In 1996, 4,135 and 1,777 antipsychotic prescriptions were written by primary care physicians for males and females, respectively. In 2001, primary care physicians wrote 7,291 antipsychotic prescriptions for males (% change: 76%), and 2,767 antipsychotic prescriptions for females (56%). An additional 5,384 prescriptions for atypical antipsychotics were written by primary care physicians for male youths in 2001 (n=6,407), which represented a 526 percent increase from the number of atypical antipsychotic prescriptions in 1996 (n=1,023). Similarly, the number of atypical antipsychotic prescriptions from primary care physicians for female youths increased by 333 percent (1996: n=571; 2001: n=2,414). The number of typical antipsychotic prescriptions from primary care physicians for males and females decreased by 72 percent (1996: n=3,112; 2001: n=884) and 71 percent (1996: n=1,206; 2001: n=353), respectively.

Result: H_{23} accepted.

Table 3.71. Physician Specialty and the Number of Antipsychotic Prescriptions for Texas Medicaid Youths from 1996 to 2001[a]

Physician Specialty	1996	1997	1998	1999	2000	2001	Total	Percent Change
Psychiatry	24765	33050	43333	54375	69345	85066	309934	243.5%
	65.5%	69.9%	72.9%	75.8%	78.4%	78.0%	74.9%	
Primary Care	5961	6200	7284	7884	8270	10098	45697	69.4%
	15.8%	13.1%	12.3%	11.0%	9.3%	9.3%	11.0%	
Neurology	1453	1990	2743	2741	2446	2359	13732	62.4%
	3.8%	4.2%	4.6%	3.8%	2.8%	2.2%	3.3%	
Other	2209	2007	2338	3097	4027	5343	19021	142.0%
	5.8%	4.2%	3.9%	4.3%	4.6%	4.9%	4.6%	
Unspecified	3425	4045	3704	3681	4394	6256	25505	82.7%
	9.1%	8.6%	6.2%	5.1%	5.0%	5.7%	6.2%	

[a] χ^2=5064.56, df=20, p<0.001

Figure 3.51. Physician Specialty and the Percentage of Antipsychotic Prescriptions for Texas Medicaid Youths from 1996 to 2001

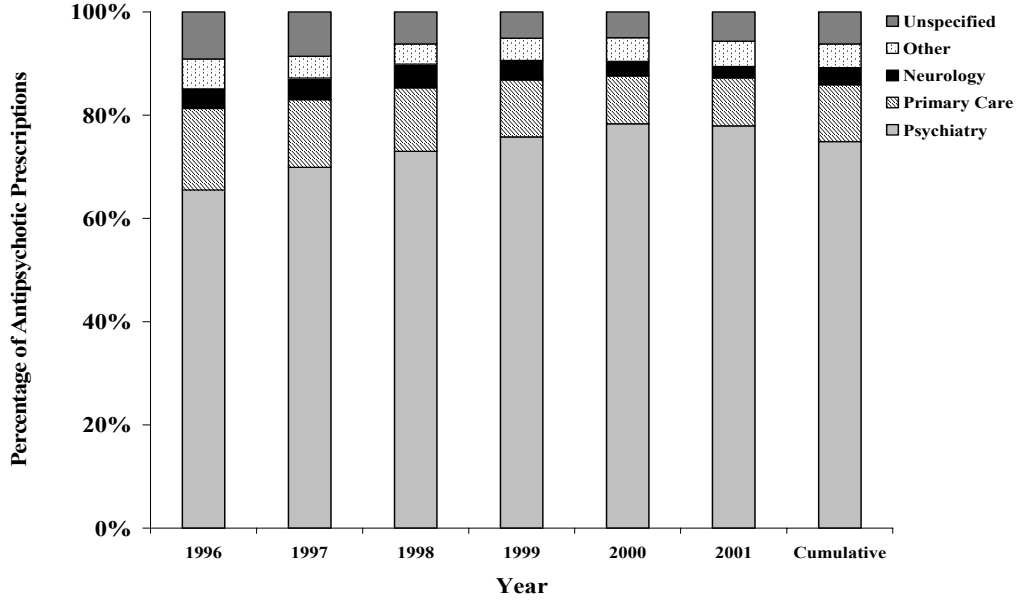


Table 3.72. Physician Specialty and the Number of Atypical Antipsychotic Prescriptions for Texas Medicaid Youths from 1996 to 2001

Physician Specialty	1996	1997	1998	1999	2000	2001	Total	Percent Change
Psychiatry	10066	20241	32344	44733	61447	78801	247632	682.8%
	71.7%	74.5%	75.6%	78.2%	79.9%	78.6%	77.8%	
Primary Care	1616	2760	4450	5387	6252	8791	29256	444.0%
	11.5%	10.2%	10.4%	9.4%	8.1%	8.8%	9.2%	
Neurology	418	982	1858	1913	1918	1936	9025	363.2%
	3.0%	3.6%	4.3%	3.3%	2.5%	1.9%	2.8%	
Other	933	1110	1636	2264	3454	4866	14263	421.5%
	6.6%	4.1%	3.8%	4.0%	4.5%	4.9%	4.5%	
Unspecified	1010	2073	2507	2884	3846	5801	18121	474.4%
	7.2%	7.6%	5.9%	5.0%	5.0%	5.8%	5.7%	

Figure 3.52. Physician Specialty and the Percentage of Atypical Antipsychotic Prescriptions for Texas Medicaid Youths from 1996 to 2001

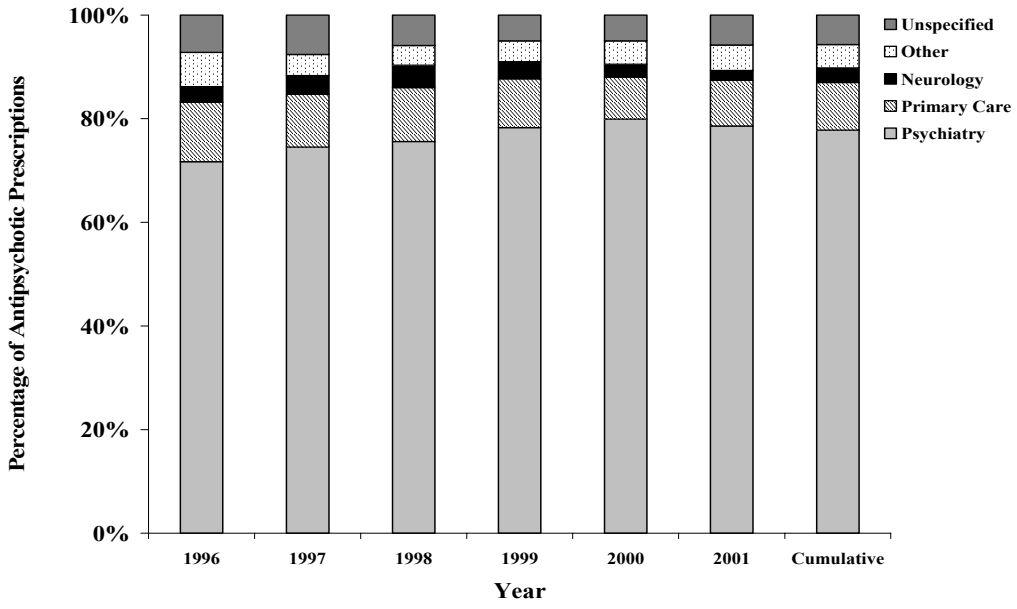
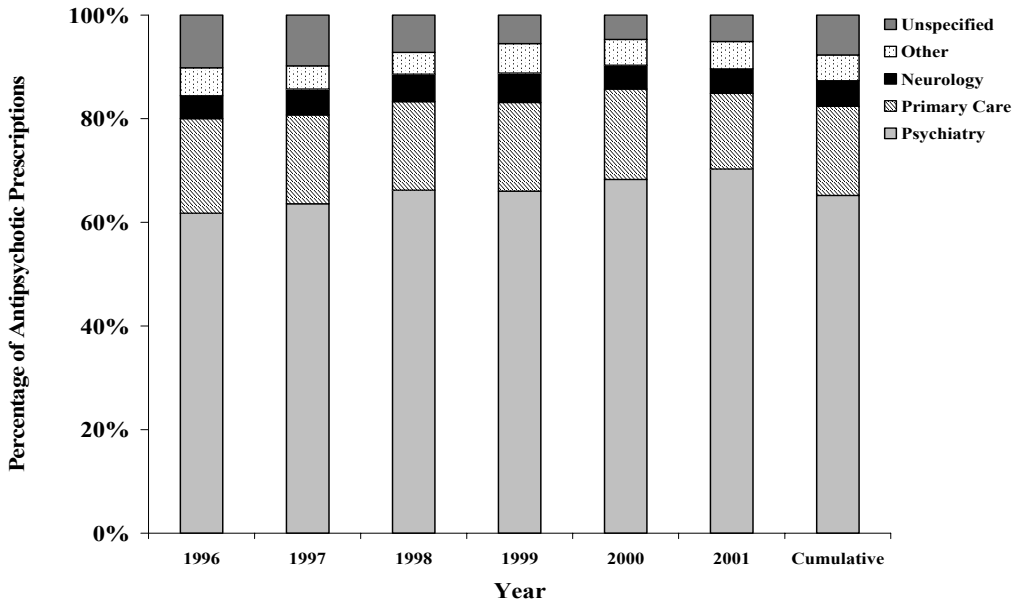


Table 3.73. Physician Specialty and the Number of Typical Antipsychotic Prescriptions for Texas Medicaid Youths from 1996 to 2001

Physician Specialty	1996	1997	1998	1999	2000	2001	Total	Percent Change
Psychiatry	14699	12809	10989	9642	7898	6265	62302	-57.4%
	61.8%	63.6%	66.2%	66.1%	68.3%	70.2%	65.2%	
Primary Care	4345	3440	2834	2497	2018	1307	16441	-69.9%
	18.3%	17.1%	17.1%	17.1%	17.4%	14.6%	17.2%	
Neurology	1035	1008	885	828	528	423	4707	-59.1%
	4.4%	5.0%	5.3%	5.7%	4.6%	4.7%	4.9%	
Other	1276	897	702	833	573	477	4758	-62.6%
	5.4%	4.5%	4.2%	5.7%	5.0%	5.3%	5.0%	
Unspecified	2415	1972	1197	797	548	455	7384	-81.2%
	10.2%	9.8%	7.2%	5.5%	4.7%	5.1%	7.7%	

Figure 3.53. Physician Specialty and the Percentage of Typical Antipsychotic Prescriptions for Texas Medicaid Youths from 1996 to 2001



H_{24}: The number of antipsychotic prescriptions for a child or adolescent from psychiatrists, including child and adolescent psychiatrists, increases from 1996 to 2001.

Over the six-year period, there was a 244 percent increase in the number of antipsychotic prescriptions from psychiatrists, including child and adolescent psychiatrists. In 1996, psychiatrists wrote 24,765 antipsychotic prescriptions for children and adolescents. In 2001, 85,066 antipsychotic prescriptions were written by psychiatrists (Table 3.71, page 312; Figure 3.51, page 312). Chi-square analysis showed a significant relationship between physician specialty associated with antipsychotic prescribing and calendar year (χ^2=5064.56, df=20, p<0.001).

Within this specialty group, more antipsychotic prescriptions originated from psychiatrists (n=213,636) compared to child and adolescent psychiatrists (n=96,298). From 1996 to 2001, there was a 240 percent and 252 percent increase in the number of antipsychotic prescriptions from psychiatrists and child and adolescent psychiatrists, respectively.

With regard to atypical antipsychotics, a 683 percent increase in the number of atypical antipsychotic prescriptions from psychiatrists existed (1996: 10,066; 1998: 32,344; 2001: 78,801; Table 3.72, page 313; Figure 3.52, page 313). The number of atypical antipsychotic prescriptions from psychiatrists and child and adolescent psychiatrists increased from 1996 to 2001 (% change: 695.6% and 656.2%, respectively). The number of typical antipsychotic

prescriptions from psychiatrists decreased by 57 percent, from 14,699 prescriptions in 1996 to 6,265 in 2001 (Table 3.73, page 314; Figure 3.53, page 314). The number of typical antipsychotic prescriptions from psychiatrists and child and adolescent psychiatrists decreased by 59 percent and 54 percent, respectively.

Across all age groups, the number of antipsychotic prescriptions from psychiatrists increased from 1996 to 2001. More specifically, the number of antipsychotic prescriptions from psychiatrists nearly quadrupled from 1996 to 2001 for five- to nine-year olds (1996: n=7,072; 2001: n=26,946) and ten- to 14-year olds (1996: n=10,255; 2001: n=37,371). The number of antipsychotic prescriptions from psychiatrists nearly tripled over the six-year period for two- to four-year olds (1996: n=1,427; 2001: n=4,020) and 15- to 19-year olds (1996: n=5,901; 2001: n=16,597). Furthermore, psychiatrists accounted for a larger percentage of the total volume of antipsychotic prescriptions for all age groups over the six-year period. With regard to atypical antipsychotics, substantial increases in the number of prescriptions from psychiatrists existed (<2 years: 93 more prescriptions in 2001 compared to 1996 [% change: 372%]; 2- to 4-years: +3,505 [920%]; 5- to 9-years: +23,085 [827%]; 10- to 14-years: +31,031 [735%]; 15- to 19-years: +12,474 [472%]). The number of typical antipsychotic prescriptions decreased across all age groups (<2 years: 64 fewer prescriptions in 2001 compared to 1996 [% change: -64%]; 2- to 4-years: -912 [-87%]; 5- to 9-years: -3,211 [-75%]; 10- to 14-years: -3,915 [-65%]; 15- to 19-years: -1,778 [-55%]).

The number of antipsychotic prescriptions from psychiatrists increased for both males and females over the six-year period. In 1996, 16,923 and 7,587 antipsychotic prescriptions were written by psychiatrists for males and females, respectively. In 2001, psychiatrists wrote 57,099 antipsychotic prescriptions for males (% change: 237%), and 27,456 antipsychotic prescriptions for females (262%). An additional 47,220 prescriptions for atypical antipsychotics were written by psychiatrists for male youths in 2001 (n=53,906), which represented a 706 percent increase from the number of atypical antipsychotic prescriptions in 1996 (n=6,686). Similarly, the number of atypical antipsychotic prescriptions from psychiatrists for female youths increased by 689 percent (1996: n=3,278; 2001: n=25,862). The number of typical antipsychotic prescriptions from psychiatrists for males and females decreased by 69 percent (1996: n=10,237; 2001: n=3,193) and 63 percent (1996: n=4,309; 2001: n=1,594), respectively.

Result: H_{24} accepted.

H_{25}: From 1998 to 2001, antipsychotics are most prescribed for disruptive behavioral disorders, such as oppositional defiant disorder, conduct disorder, intermittent explosive disorder, and attention-deficit hyperactivity disorders.

Diagnostic data from the TDMHMR CARE database were available for 97.6 percent (2,355/2,413) of matched youths in 1998, 98.1 percent (2,902/2,957) in 1999, 85.2 percent (2,892/3,394) in 2000, and 60.8 percent (2,506/4,124) in 2001. Chi-square analysis showed a significant relationship between diagnostic category associated with antipsychotic prescribing and calendar year (χ^2=93.067, df=27, p<0.001; Table 3.74, page 322).

Disruptive behavioral disorders accounted for the highest percentage of diagnoses associated with children and adolescents receiving antipsychotic treatment and mental health care services from TDMHMR over the four-year period (Figure 3.54, page 323). In 1998, 35.9 percent (1,400/3,897) of the diagnoses were categorized as a disruptive behavioral disorder. In 2001, 35.1 percent (1,234/3,512) of the diagnoses were categorized as a disruptive behavioral disorder. Closer examination of disruptive behavioral disorder diagnoses showed that attention-deficit hyperactivity disorder was the most common diagnosis in this category (47.8% to 52.6%), followed by oppositional defiant disorder and conduct disorder (38.3% to 42.2%; Table 3.75, page 324).

Depressive disorders were the second most common diagnosis in children and adolescents receiving antipsychotic treatment and services from TDMHMR. The percentage of depressive diagnoses remained consistent over the four-year

period (1998: 17.4%; 1999: 19.1%; 2000: 17.9%; and, 2001: 18.1%). Bipolar disorders accounted for roughly 12 percent of all diagnoses, and a trend toward more children and adolescents diagnosed with bipolar disorder existed. In 1998, 9.5 percent of youths (371/3,897) had a bipolar disorder diagnosis. In 2001, 14.5 percent (508/3,512) had a bipolar disorder diagnosis, representing a significant increase over the four-year period.

Among children and adolescents with a diagnosis associated with a thought disorder (bipolar disorder with psychosis, major depressive disorder with psychosis, and psychotic disorders [schizophrenia, schizophreniform disorder, schizoaffective disorder]) and receiving an antipsychotic and TDMHMR mental health services, the majority had a diagnosis of a psychotic disorder (Table 3.75, page 324). In 1998, 57.0 percent (437/766) of youths with a thought disorder were diagnosed with a psychotic disorder, followed by 33.0 percent (253/766) diagnosed with major depressive disorder with psychosis. In 2001, psychotic disorder remained the most common diagnosis (51.0%), followed by major depressive disorder with psychosis (32.3%). Over the four-year period, trends toward fewer children and adolescents diagnosed with a psychotic disorder, and more diagnosed with bipolar disorder with psychosis existed.

The percentage of youths with a diagnosis of mental retardation or a pervasive developmental disorder was fairly steady (1998: 6.1%; 1999: 5.2%; 2000: 5.9%; and, 2001: 5.4%). Of these, the majority had mental retardation (69.0% to 71.5%), compared to a pervasive developmental disorder (28.5% to 31.0%; Table 3.75, page 324).

Approximately three percent of children and adolescents receiving antipsychotic treatment and mental health care services from TDMHMR did not have a psychiatric or behavioral diagnosis. In 1998, 133 youths (3.4%) were not diagnosed with a psychiatric or behavioral disorder. In 2001, 91 youths (2.6%) did not receive a psychiatric or behavioral diagnosis.

In the 5- to 9-year age group, disruptive behavioral disorders were the most common diagnoses during each year (Table 3.76, page 325). Depressive disorders were the second most common from 1998 to 2000, followed by bipolar disorders. In 2001, a slightly higher percentage of 5- to 9-year olds had bipolar disorder diagnoses compared to depressive disorders. In 10- to 14-year olds, disruptive behavioral disorders were most common over the four-year period, followed by depressive disorders. The percentage of 10- to 14-year olds diagnosed with a bipolar disorder increased over time (1998: 9.9%; 2001: 15.2%). Additionally, a higher percentage of the 10- to 14-year age group had a psychotic disorder during each year compared to younger children and adolescents. In 15- to 19-year olds, depressive disorders were the most common diagnoses, as approximately 23 percent of the age group received such a diagnosis. Compared to 10- to 14-year olds, a higher percentage of 15- to 19-year olds had a psychotic disorder diagnosis and a lower percentage had a disruptive behavioral disorder diagnosis. Similar to younger aged children and adolescents, the percentage of 15- to 19-year olds diagnosed with bipolar disorder increased over time (1998: 10.2%; 2001: 17.7%).

From 1998 to 2001, a higher percentage of male youths had disruptive behavioral disorders than females (Table 3.77, page 326). Depressive and anxiety disorders were more common in females during each year. Both males and females showed comparable percentages of psychotic disorders, and a trend toward increasing percentages of bipolar disorders.

H_{25}: Accepted.

Table 3.74. Diagnostic Categories for Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR from 1998 to 2001[a]

Diagnostic Category	1998	1999	2000	2001	Total
Anxiety disorders	320	358	349	259	1286
	8.2%	7.7%	7.7%	7.4%	7.8%
Bipolar disorders	371	511	551	508	1941
	9.5%	10.9%	12.2%	14.5%	11.7%
Depressive disorders	677	891	809	635	3012
	17.4%	19.1%	17.9%	18.1%	18.2%
Disruptive behavioral disorder	1400	1573	1563	1234	5770
	35.9%	33.7%	34.7%	35.1%	34.8%
Psychotic disorders	336	427	376	289	1428
	8.6%	9.1%	8.3%	8.2%	8.6%
Substance abuse disorders	102	112	106	70	390
	2.6%	2.4%	2.4%	2.0%	2.4%
Mental retardation/ developmental disorders	238	244	265	190	937
	6.1%	5.2%	5.9%	5.4%	5.6%
Other mental health disorders	75	102	75	47	299
	1.9%	2.2%	1.7%	1.3%	1.8%
Other childhood mental health disorders	245	274	303	189	1011
	6.3%	5.9%	6.7%	5.4%	6.1%
No psychiatric or behavioral disorder	133	178	111	91	513
	3.4%	3.8%	2.5%	2.6%	3.1%

[a] $\chi^2=93.067$, df=27, $p<0.001$

Figure 3.54. Diagnostic Categories for Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR from 1998 to 2001

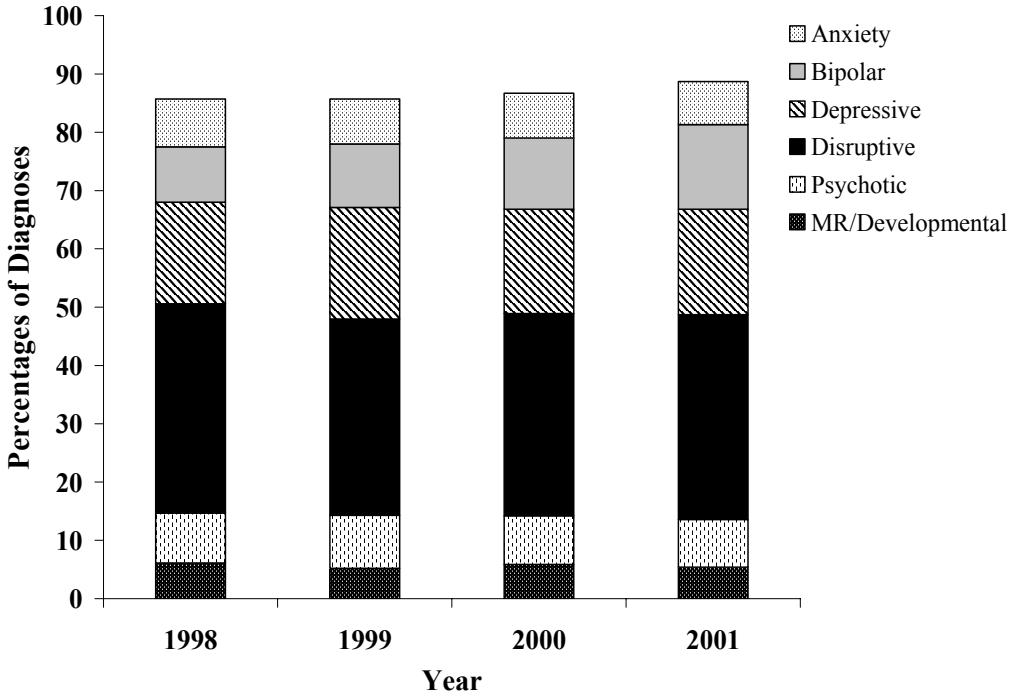


Table 3.75. Diagnostic Subgroups for Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR from 1998 to 2001[a]

Diagnostic Category	Subgroup	1998	1999	2000	2001	Total
Disruptive behavioral disorders	ADHD	1315	1683	1757	1333	6088
		47.8%	47.9%	50.2%	52.6%	49.5%
	ODD, CD	1155	1482	1413	969	5019
		42.0%	42.2%	40.4%	38.3%	40.8%
	ICD	279	350	331	231	1191
		10.1%	10.0%	9.5%	9.1%	9.7%
Thought disorders	BP + Psy	76	133	177	116	502
		9.9%	12.8%	18.0%	16.7%	14.4%
	MDD + Psy	253	365	321	225	1164
		33.0%	35.0%	32.7%	32.3%	33.4%
	Psy	437	545	483	355	1820
		57.0%	52.3%	49.2%	51.0%	52.2%
Mental retardation/ developmental disorders	MR	327	373	383	243	1326
		71.4%	71.5%	71.2%	69.0%	70.9%
	PDD	131	149	155	109	544
		28.6%	28.5%	28.8%	31.0%	29.1%

[a]Abbreviations: ADHD = attention-deficit hyperactivity disorder, BP + Psy = bipolar disorder with psychosis, CD = conduct disorder, ICD = impulse control disorders, MDD + Psy = major depressive disorder with psychosis, MR = mental retardation, PDD = pervasive developmental disorders, Psy = psychotic disorders.

Table 3.76. Diagnostic Categories for Age-Specific Groups of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR from 1998 to 2001[a]

Age	Diagnostic Category	1998	1999	2000	2001	Total
5 to 9 years	Anxiety disorders	8.5	9.6	9.6	7.3	8.9
	Bipolar disorders	8.7	9.7	11.8	12.7	10.7
	Depressive disorders	11.6	12.0	11.9	12.4	12.0
	Disruptive behavioral disorders	48.1	45.1	45.0	45.8	45.9
	Psychotic disorders	5.9	6.2	4.8	5.8	5.7
	Mental retardation/ developmental disorders	5.0	5.2	5.9	5.1	5.3
10 to 14 years	Anxiety disorders	7.8	7.2	6.7	7.6	7.3
	Bipolar disorders	9.9	11.1	12.5	15.2	12.1
	Depressive disorders	20.2	22.6	20.7	21.3	21.3
	Disruptive behavioral disorders	33.4	30.8	32.3	31.9	32.0
	Psychotic disorders	8.0	8.3	8.0	7.7	8.0
	Mental retardation/ developmental disorders	5.8	4.4	4.8	5.1	5.0
15 to 19 years	Anxiety disorders	8.4	5.6	7.1	6.1	6.8
	Bipolar disorders	10.2	13.4	12.6	17.7	13.2
	Depressive disorders	21.4	23.6	23.4	23.4	23.0
	Disruptive behavioral disorders	19.8	18.3	19.1	15.9	18.5
	Psychotic disorders	16.2	17.5	16.0	16.9	16.7
	Mental retardation/ developmental disorders	8.7	7.0	8.5	6.7	7.8

[a]All values reported as percentages.

Table 3.77. Diagnostic Categories for Gender-Specific Groups of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR from 1998 to 2001[a]

Gender Group	Diagnostic Category	1998	1999	2000	2001	Total
Male	Anxiety disorders	7.2	6.3	6.9	6.4	6.7
	Bipolar disorders	8.9	10.6	11.7	13.9	11.2
	Depressive disorders	14.9	16.4	15.0	15.0	15.4
	Disruptive behavioral disorders	39.0	37.6	38.8	39.7	38.7
	Psychotic disorders	8.5	9.3	8.2	8.1	8.6
	Mental retardation/ developmental disorders	6.4	5.4	6.1	5.3	5.8
Female	Anxiety disorders	10.9	10.7	9.9	9.7	10.3
	Bipolar disorders	11.1	11.8	13.5	15.9	13.0
	Depressive disorders	23.9	25.2	25.0	25.5	24.9
	Disruptive behavioral disorders	27.7	24.9	24.6	24.1	25.3
	Psychotic disorders	8.8	8.8	8.7	8.5	8.7
	Mental retardation/ developmental disorders	5.2	4.7	5.3	5.7	5.2

[a]All values reported as percentages.

Hypothesis Testing: Phase III (Relationships of Antipsychotic Use with Patient Health Care Service Utilization)

Phase III evaluated data from the TDMHMR system to examine how the following service utilization parameters were related to antipsychotic use from 1998 to 2001: number and total days of inpatient psychiatric hospitalizations (H_{26} and H_{27}), and enrollment and duration of different types of outpatient mental health services (H_{28} and H_{29}). TDMHMR CARE service utilization data included enrollment in the following types of outpatient mental health services: Assessment Services (TC08), Counseling and Psychotherapy (TC13); Crisis Intervention (In-Home [TC01], Inpatient [TC07], Therapeutic Foster Care [TC09], Other Residential Services [TC17], and Acute Day Treatment [TC20]); Medication-related Services (TC04); Service Coordination (TC06); Skills Training (Rehabilitative Day Treatment [TC03], Individual [TC10], Family [TC19]); and, Supportive Services (Respite [TC05], Family-Focused Services [TC23], and Flexible Community Support [TC24]).

Appendix A provides descriptions of each type of outpatient mental health service. Appendix D provides the details of parametric and nonparametric analyses examining time trends in the number and total days of inpatient hospitalizations. Appendix E provides details of parametric and nonparametric analyses examining the year effect on duration of enrollment in different types of outpatient mental health services.

Relationships of antipsychotic use with patient health care service utilization in Texas

H_{26}: The mean number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.

Analysis of inpatient hospitalization data for all matched youths revealed that a trend toward a greater number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment and mental health services from TDMHMR existed from 1998 to 2001 (Table 3.78, page 330; $p<0.001$ for ANOVA and Kruskal-Wallis test). In 1998, the mean (±SD) number of inpatient psychiatric hospitalizations per matched youth was 0.13±0.44. In 2001, the mean (±SD) number of inpatient psychiatric hospitalizations per matched youth was 0.17±0.49. Over the four-year period, the mean (±SD) number of inpatient psychiatric hospitalizations peaked at 0.19±0.54 during the year 2000. Post-hoc analyses revealed significant differences in the number of inpatient psychiatric hospitalizations per matched youth between 1998 and 2000 ($p<0.001$), and 1998 and 2001 ($p=0.003$). The median number of inpatient psychiatric hospitalizations per matched youth was zero for all four years.

Analysis of inpatient hospitalization data for only those youths who were hospitalized did not reveal a significant year effect on the mean number of inpatient psychiatric hospitalizations (Table 3.78, page 330). The mean (±SD) number of inpatient psychiatric hospitalizations per child or adolescent was

1.28±0.62 in 1998, 1.38±0.87 in 1999, 1.31±0.72 in 2000, and 1.25±0.62 in 2001. The median number of inpatient psychiatric hospitalizations per hospitalized youth was one for all four years.

Age-specific analyses of inpatient hospitalization data for only those youths who were hospitalized showed no significant year effect on the mean number of inpatient psychiatric hospitalizations in the five- to nine-year, ten- to 14-year, and 15- to 19-year age groups. Gender-specific analyses showed no significant year effect on the mean number of inpatient psychiatric hospitalizations in male and female groups. Diagnosis-specific analyses showed no significant year effect on the mean number of inpatient psychiatric hospitalizations in the following diagnostic categories: anxiety disorders, bipolar disorders, depressive disorders, disruptive behavorial disorders, psychotic disorders, mental retardation/developmental disorders, comorbid psychiatric disorders, or no psychiatric disorders.

H_{26}: Rejected.

Table 3.78. Number of Inpatient Psychiatric Hospitalizations Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Sample	Year	N	Mean (±SD)	95% CI	Median	p-value
All matched youths	1998	2413	0.13±0.44	0.12 – 0.15	0.0	<0.001*
	1999	2957	0.16±0.53	0.14 – 0.18	0.0	
	2000	3394	0.19±0.54	0.17 – 0.21	0.0	
	2001	4124	0.17±0.49	0.16 – 0.19	0.0	
Hospitalized youths	1998	251	1.28±0.62	1.20 – 1.36	1.0	0.09†, 0.178‡
	1999	341	1.38±0.87	1.28 – 1.47	1.0	
	2000	487	1.31±0.72	1.25 – 1.37	1.0	
	2001	573	1.25±0.62	1.20 – 1.31	1.0	

*p-value for both ANOVA and Kruskal-Wallis test.
†p-value for ANOVA.
‡p-value for Kruskal-Wallis test.

H_{27}: The mean number of hospital days per each hospitalized child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.

Over the four-year period, the mean number of hospital days per each hospitalized child or adolescent receiving antipsychotic treatment decreased (Table 3.79, page 333; $p<0.001$ for ANOVA and Kruskal Wallis test). In 1998, the mean (±SD) number of hospital days per hospitalized youth was 83.20±80.42. In 2001, the mean (±SD) number of hospital days per hospitalized youth was 56.93±60.64. Post hoc analyses revealed a significant difference in the mean number of hospital days between 1998 and 2001 ($p<0.001$), and 1999 and 2001 ($p<0.001$). The median number of hospital days per hospitalized child or adolescent for 1998, 1999, 2000, and 2001 was 59, 57, 48, and 36, respectively.

Age-specific analyses of the mean number of hospital days per hospitalized youth showed significant year effects for the ten- to 14-year ($p<0.001$ for ANOVA and Kruskal Wallis test; Figure 3.55, page 334) and 15- to 19-year age groups ($p=0.002$ for ANOVA; $p<0.001$ for Kruskal Wallis test; Figure 3.56, page 334). In ten- to 14-year olds, the mean number of hospital days increased slightly in 1999 compared to 1998, but then decreased steadily in 2000 and 2001. A significant difference in the mean number of hospital days for hospitalized ten- to 14-year olds existed between 1998 and 2001 ($p=0.005$), and 1999 and 2001 ($p<0.001$). The median number of hospital days per hospitalized ten- to 14-year old for 1998 and 2001 was 71 and 30, respectively. Similar trends in the mean

number of hospital days were seen in the 15- to 19-year age group. The mean number of hospital days in 2001 were significantly lower than that in 1999 ($p=0.005$). The median number of hospital days per hospitalized 15- to 19-year old for 1998 and 2001 was 45 and 29, respectively.

A trend toward fewer hospital days per hospitalized male existed from 1998 to 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test; Figure 3.57, page 335). Over the four-year period, the mean number of hospital days per male declined continually (1998: 89.44±85.74 days; 2001: 54.68±60.83 days). Compared to 1998, the mean number of hospital days per male was significantly lower in 2000 ($p=0.008$) and 2001 ($p<0.001$). Additionally, the mean number of hospital days per male was significantly lower in 2001 compared to 1999 ($p=0.001$). The median number of hospital days per hospitalized male for 1998 and 2001 was 60 and 33, respectively. Analysis of the mean number of hospital days per hospitalized female did not exhibit the same trend as that seen in males ($p=0.005$ for ANOVA; $p=0.014$ for Kruskal Wallis test; Figure 3.58, page 335). An initial increase was observed in the mean number of hospital days per female, followed by a decrease over the next two years. The mean number of hospital days per female was significantly lower in 2001 compared to 1999 ($p=0.004$). The median number of hospital days per hospitalized female for 1998 and 2001 was 48.5 and 40, respectively.

Diagnosis-specific analyses showed no significant year effect on the mean number of hospital days per hospitalized youth in the following diagnostic categories: anxiety disorders, bipolar disorders, depressive disorders, disruptive

behavorial disorders, psychotic disorders, mental retardation/developmental disorders, comorbid psychiatric disorders, or no psychiatric disorders.

H_{27}: Accepted.

Table 3.79. Number of Hospital Days Per Hospitalized Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Sample	Year	N	Mean (±SD)	95% CI	Median	p-value
Hospitalized youths	1998	251	83.20±80.42	73.20 – 93.19	59.0	<0.001*
	1999	341	82.64±78.45	74.29 – 91.00	57.0	
	2000	487	67.80±66.28	61.90 – 73.70	48.0	
	2001	573	56.93±60.64	51.96 – 61.91	36.0	

*p-value for both ANOVA and Kruskal-Wallis test.

Figure 3.55. Mean and Median Number of Hospital Days Per Hospitalized Ten- to Fourteen-Year Old Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

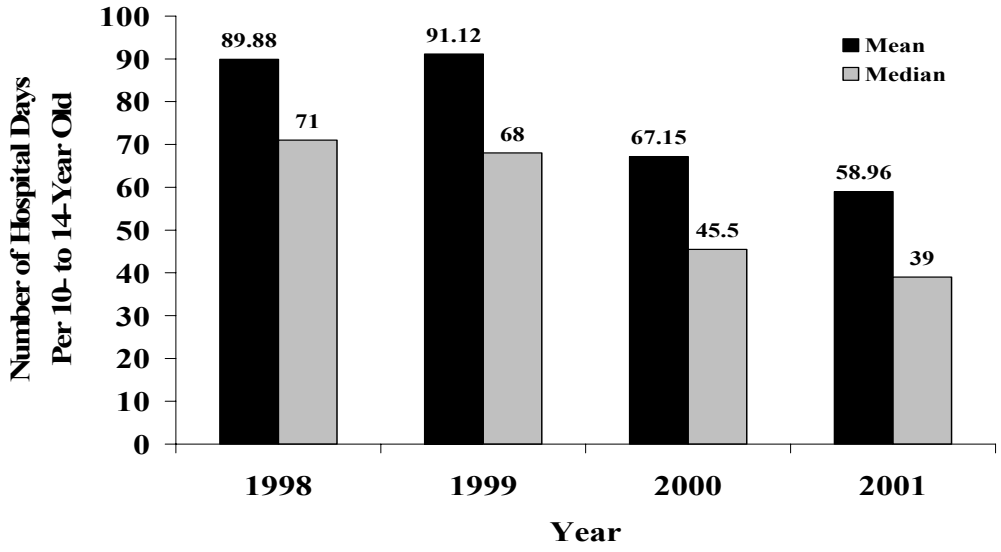


Figure 3.56. Mean and Median Number of Hospital Days Per Hospitalized 15- to 19-Year Old Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

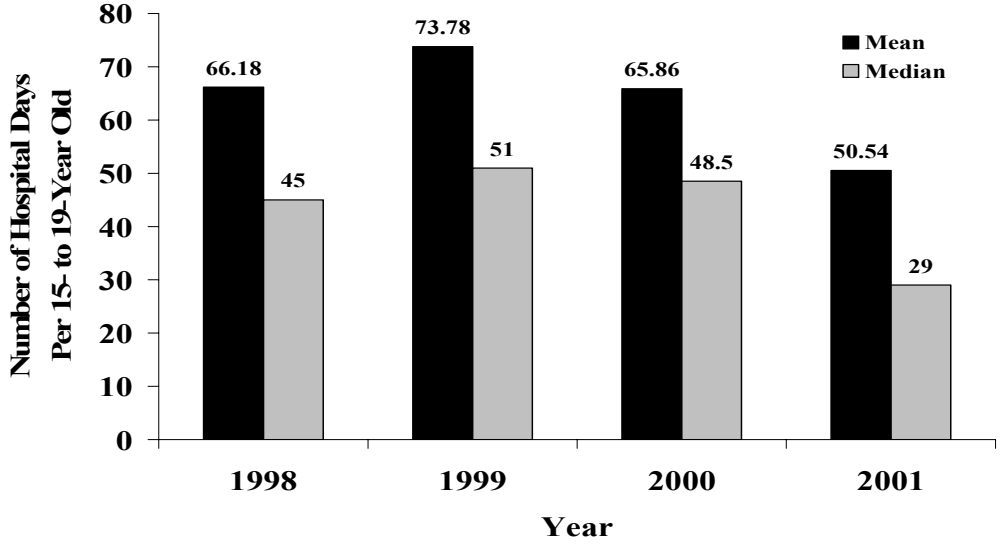


Figure 3.57. Mean and Median Number of Hospital Days Per Hospitalized Male Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

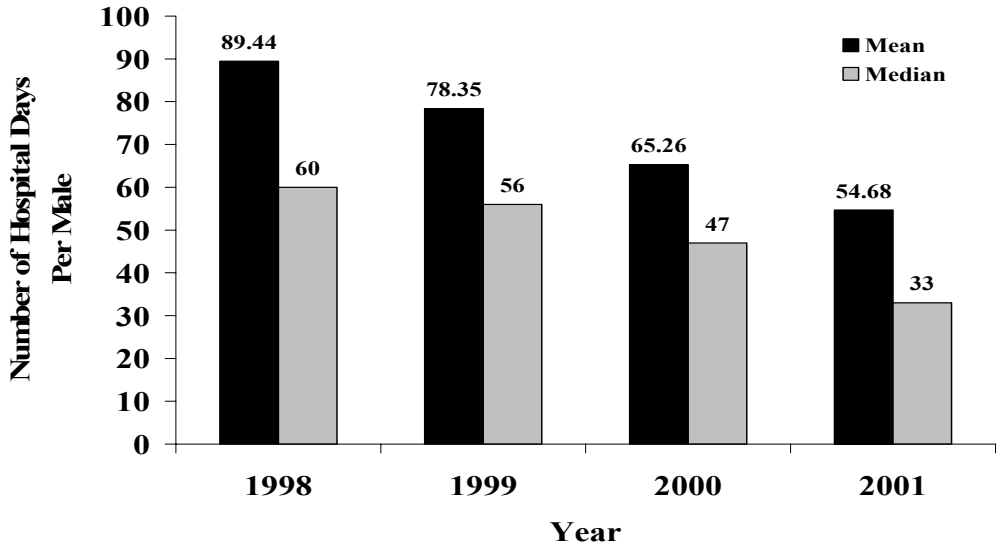
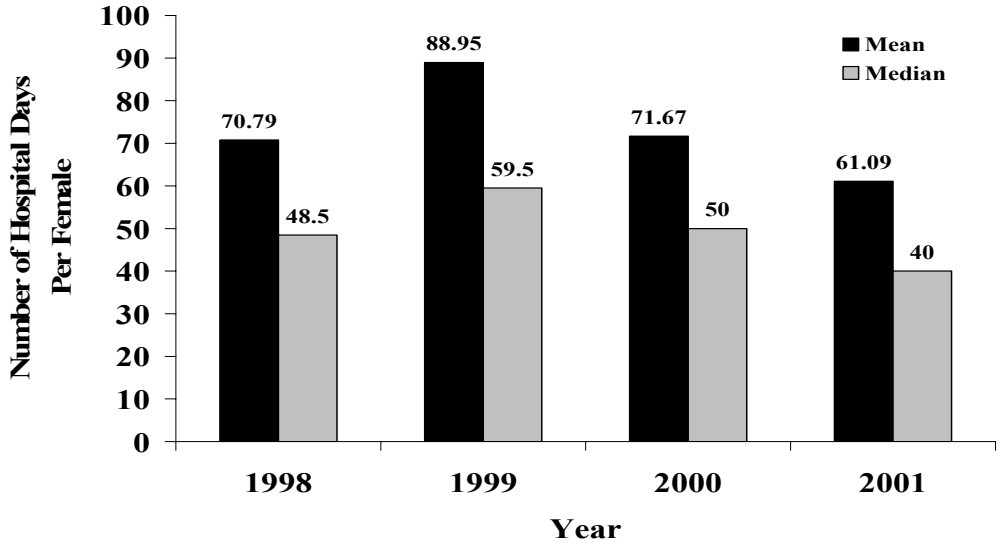


Figure 3.58. Mean and Median Number of Hospital Days Per Hospitalized Female Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



H_{28}: The number of children and adolescents receiving assessment services, crisis intervention, medication-based services, and service coordination increases from 1998 to 2001, while the number of children and adolescents receiving counseling and psychotherapy, skills training, and supportive mental health services decreases from 1998 to 2001.

Over the four-year period, the number of children and adolescents enrolled in assessment services, counseling and psychotherapy, medication-related services, service coordination, and skills training increased (Table 3.80, page 339). The number of youths enrolled in crisis intervention and supportive services decreased from 1998 to 2001. Chi-square analysis revealed a significant relationship between frequencies of children and adolescents enrolled in different types of outpatient mental health care services and calendar year (χ^2=389.389, df=18, $p<0.001$).

During each year, medication-related services accounted for the highest percentage of outpatient service enrollment (79.7% to 83.0%), and a trend toward a higher number of enrolled youths in these services existed. Similar trends were seen with service coordination and skills training. Percent enrollment in assessment services, and counseling and psychotherapy remained consistent over the study period. Percent enrollment in crisis intervention and supportive services decreased from 1998 to 2001.

In five- to nine-year olds, enrollment in medication-related services was most common, followed by service coordination and skills training (Table 3.81, page 340). In 2001, approximately 80 percent of children between the ages of five and nine years were enrolled in medication-related services. Sixty-nine percent of five- to nine-year olds were enrolled in service coordination in 2001, and 51 percent were enrolled in skills training. Trends of decreased enrollment in crisis intervention and supportive services existed in this age group. Similar results regarding enrollment in different outpatient mental health services were seen in the ten- to 14-year and 15- to 19-year age groups. Chi-square analyses for these age groups showed a significant relationship between frequencies of children and adolescents enrolled in different types of outpatient mental health care services and calendar year (5- to 9-years: χ^2=81.581, df=18, p<0.001; 10- to 14-years: χ^2=239.155, df=18, p<0.001; 15- to 19-years: χ^2=106.196, df=18, p<0.001).

Gender-specific analyses of outpatient mental health services revealed higher enrollment in medication-related services, service coordination, and skills training for both males and females (Table 3.82, page 341). Over the four-year period, fewer males and females were enrolled in crisis intervention and supportive services. Chi-square analyses for males and females showed a significant relationship between frequencies of children and adolescents enrolled in different types of outpatient mental health care services and calendar year (males: χ^2=276.37, df=18, p<0.001; females: χ^2=125.846, df=18, p<0.001).

Diagnosis-specific analyses showed similar trends of enrollment in outpatient mental health services (Table 3.83, pages 342-344). Across all diagnostic groups, enrollment was highest in medication-related services, followed by service coordination and skills training. Additionally, youths in each diagnostic group enrolled in crisis intervention and supportive services less frequently from 1998 to 2001. Chi-square analyses showed a significant relationship between frequencies of children and adolescents enrolled in different types of outpatient mental health care services and calendar year for the following diagnostic groups: bipolar disorders (χ^2=42.759, df=18, p<0.001); depressive disorders (χ^2=66.089, df=18, p<0.001); disruptive disorders (χ^2=132.853, df=18, p<0.001); other psychiatric disorders (χ^2=45.353, df=18, p<0.001); and, comorbid psychiatric disorders (χ^2=69.457, df=18, p<0.001).

H_{28}: Rejected.

Table 3.80. Enrollment of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR in Different Types of Outpatient Mental Health Services from 1998 to 2001[a]

Type of Outpatient Service	1998	1999	2000	2001
Assessment services	1093	1257	1153	1574
	46.9%	44.2%	36.0%	40.5%
Counseling and psychotherapy	875	973	971	1307
	37.5%	34.2%	30.3%	33.7%
Crisis intervention	397	386	311	327
	17.0%	13.6%	9.7%	8.4%
Medication-related services	1858	2310	2655	3202
	79.7%	81.2%	83.0%	82.5%
Service coordination	1391	2074	2140	2613
	59.7%	72.9%	66.9%	67.3%
Skills training	1136	1424	1704	1983
	48.7%	50.0%	53.3%	51.1%
Supportive services	177	155	55	62
	7.6%	5.4%	1.7%	1.6%

[a]χ^2=389.389, df=18, p<0.001.

Table 3.81. Age-Specific Enrollment of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR in Different Types of Outpatient Mental Health Services from 1998 to 2001[a,b]

Age	Type of Outpatient Service	1998	1999	2000	2001
5 to 9 years	Assessment services	41.8	42.4	35.5	36.7
	Counseling and psychotherapy	40.9	31.6	27.5	31.5
	Crisis intervention	14.6	9.9	8.5	7.1
	Medication-related services	79.8	82.7	81.2	84.1
	Service coordination	61.4	73.3	66.6	69.4
	Skills training	51.5	50.3	52.5	50.9
	Supportive services	5.9	3.9	1.7	2.0
10 to 14 years	Assessment services	46.7	41.3	31.3	38.5
	Counseling and psychotherapy	35.3	32.6	30.1	32.1
	Crisis intervention	16.8	12.8	9.3	7.4
	Medication-related services	75.0	77.5	80.8	79.0
	Service coordination	58.5	72.6	64.7	66.2
	Skills training	49.7	49.9	53.6	51.7
	Supportive services	8.2	5.8	2.0	1.4
15 to 19 years	Assessment services	42.8	44.5	37.9	40.0
	Counseling and psychotherapy	31.1	34.8	28.2	32.8
	Crisis intervention	15.7	16.0	9.6	9.6
	Medication-related services	74.7	75.2	75.8	76.6
	Service coordination	53.0	64.9	59.9	57.1
	Skills training	39.1	44.1	48.5	45.1
	Supportive services	6.7	5.3	0.8	1.3

[a]All values reported as percentages.
[b]5 to 9 years: χ^2=81.581, df=18, p<0.001; 10 to 14 years: χ^2=239.155, df=18, p<0.001; 15 to 19 years: χ^2=106.196, df=18, p<0.001.

Table 3.82. Gender-Specific Enrollment of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR in Different Types of Outpatient Mental Health Services from 1998 to 2001[a,b]

Gender	Type of Outpatient Service	1998	1999	2000	2001
Male	Assessment services	46.4	42.0	36.4	39.8
	Counseling and psychotherapy	37.5	33.0	29.0	32.6
	Crisis intervention	16.0	12.8	8.9	8.4
	Medication-related services	81.4	82.7	84.2	83.8
	Service coordination	60.0	73.6	66.8	67.8
	Skills training	49.9	51.3	53.9	52.5
	Supportive services	8.0	5.4	1.7	1.6
Female	Assessment services	48.1	49.4	35.2	42.3
	Counseling and psychotherapy	37.6	36.9	33.6	36.3
	Crisis intervention	19.8	15.3	11.8	8.4
	Medication-related services	75.3	77.6	80.0	79.3
	Service coordination	58.8	71.2	67.1	66.2
	Skills training	45.8	47.0	51.7	47.5
	Supportive services	6.6	5.6	1.7	1.5

[a]All values reported as percentages.
[b]Male: χ^2=81.581, df=18, p<0.001; Female: χ^2=239.155, df=18, p<0.001.

Table 3.83. Diagnosis-Specific Enrollment of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR in Different Types of Outpatient Mental Health Services from 1998 to 2001[a,b]

Diagnostic Group	Type of Outpatient Service	1998	1999	2000	2001
Anxiety	Assessment services	47.0	41.0	36.1	49.2
	Counseling and psychotherapy	48.5	37.7	25.0	42.4
	Crisis intervention	15.2	14.8	4.2	3.4
	Medication-related services	72.7	72.1	76.4	88.1
	Service coordination	59.1	72.1	70.8	86.4
	Skills training	54.5	39.3	54.2	62.7
	Supportive services	3.0	0.0	5.6	3.4
Bipolar	Assessment services	41.7	34.9	36.5	44.6
	Counseling and psychotherapy	43.4	37.6	34.4	41.7
	Crisis intervention	21.7	13.5	8.9	9.7
	Medication-related services	81.1	81.2	86.9	90.0
	Service coordination	57.1	75.1	70.6	78.5
	Skills training	56.0	54.1	60.3	66.1
	Supportive services	7.4	3.1	1.4	3.4
Depressive	Assessment services	55.6	51.4	38.9	50.5
	Counseling and psychotherapy	36.6	40.4	34.2	48.2
	Crisis intervention	17.6	14.6	13.5	13.2
	Medication-related services	78.6	80.2	85.9	88.2
	Service coordination	54.0	71.6	72.4	75.7
	Skills training	46.3	48.6	51.9	57.9
	Supportive services	6.4	5.2	1.1	2.1

[a]All values reported as percentages.
[b]Anxiety: χ^2=21.834, df=18, p=0.239; Bipolar: χ^2=42.759, df=18, p<0.001; Depressive: χ^2=66.089, df=18, p<0.001.

Table 3.83. Diagnosis-Specific Enrollment of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR in Different Types of Outpatient Mental Health Services from 1998 to 2001[c,d] (Cont.)

Diagnostic Group	Type of Outpatient Service	1998	1999	2000	2001
Disruptive	Assessment services	44.5	43.2	30.4	39.1
	Counseling and psychotherapy	37.0	30.8	30.9	40.2
	Crisis intervention	13.3	10.4	7.2	7.6
	Medication-related services	76.5	79.5	83.0	87.3
	Service coordination	64.0	73.0	69.8	75.5
	Skills training	50.1	51.1	59.2	63.0
	Supportive services	7.2	5.5	2.0	1.7
Psychotic	Assessment services	48.8	41.6	32.1	45.1
	Counseling and psychotherapy	25.9	36.9	31.0	30.6
	Crisis intervention	16.3	14.0	9.6	11.4
	Medication-related services	81.3	86.0	90.4	91.2
	Service coordination	61.4	70.6	73.8	77.7
	Skills training	47.6	49.1	49.7	62.2
	Supportive services	8.4	6.5	1.6	3.6
MR/Developmental	Assessment services	24.6	26.7	21.1	34.1
	Counseling and psychotherapy	21.9	16.8	10.9	31.9
	Crisis intervention	8.8	8.4	6.8	5.9
	Medication-related services	86.0	86.3	83.7	85.2
	Service coordination	36.0	42.7	36.1	45.9
	Skills training	25.4	24.4	31.3	35.6
	Supportive services	6.1	1.5	1.4	1.5

[c]All values reported as percentages.
[d]Disruptive: χ^2=132.853, df=18, p<0.001; Psychotic: χ^2=29.83, df=18, p=0.039; MR/Developmental: χ^2=27.475, df=18, p=0.071.

Table 3.83. Diagnosis-Specific Enrollment of Texas Medicaid Youths Receiving an Antipsychotic and Mental Health Services from TDMHMR in Different Types of Outpatient Mental Health Services from 1998 to 2001[e,f] (Cont.)

Diagnostic Group	Type of Outpatient Service	1998	1999	2000	2001
Other psychiatric	Assessment services	50.8	43.7	29.4	49.2
	Counseling and psychotherapy	38.5	25.8	22.4	37.9
	Crisis intervention	18.5	6.6	5.6	9.7
	Medication-related services	65.4	66.2	77.6	75.0
	Service coordination	57.7	75.5	67.1	71.8
	Skills training	36.9	49.0	53.8	62.9
	Supportive services	3.1	4.6	2.1	0.8
Comorbid psychiatric	Assessment services	54.5	51.8	47.0	62.4
	Counseling and psychotherapy	45.7	40.7	37.6	47.5
	Crisis intervention	26.5	21.9	14.6	17.7
	Medication-related services	89.8	89.2	91.6	88.7
	Service coordination	67.2	82.8	80.2	79.4
	Skills training	60.1	59.6	66.9	69.5
	Supportive services	13.1	8.8	3.2	2.8

[e]All values reported as percentages.
[f]Other psychiatric: $\chi^2=45.353$, df=18, $p<0.001$; Comorbid psychiatric: $\chi^2=69.457$, df=18, $p<0.001$.

H_{29}: The mean duration of enrollment in outpatient services for assessment services, crisis intervention, medication-based services, and service coordination increases among children and adolescents receiving an antipsychotic from 1998 to 2001. The mean duration of enrollment in outpatient services for counseling and psychotherapy, skills training, and supportive mental health services decreases among children and adolescents receiving an antipsychotic from 1998 to 2001.

Assessment services

The duration of enrollment in assessment services decreased from 1998 to 2001 (Table 3.84, page 349; Figure 3.59, page 350; $p<0.001$ for ANOVA and Kruskal Wallis test). In 1998, the mean (±SD) duration of enrollment in assessment services was 5.01±13.99 days. Enrollment in assessment services continually declined over the four-year period. In 2001, the mean (±SD) duration of enrollment in assessment services was 2.29±4.20 days. Post hoc analyses revealed significant differences in mean duration of enrollment in assessment services between 1998 and 1999, 2000, and 2001 ($p<0.001$). Additionally, the mean duration of enrollment in assessment services in 1999 was significantly higher than those in 2000 ($p=0.001$) and 2001 ($p<0.001$). The median duration of enrollment in assessment services for all four years was one day.

In five- to nine-year olds, the duration of enrollment in assessment services decreased from 1998 to 2001 ($p<0.001$ for ANOVA and Kruskal Wallis

test). Mean durations of enrollment in assessment services in 1998 and 1999 were significantly higher than in 2000 and 2001 ($p \leq 0.001$). The median duration of enrollment in assessment services for the five- to nine-year age group for all four years was one day. In ten- to 14-year olds, a trend of decreased duration of enrollment in assessment services existed over the four-year period ($p < 0.001$ for ANOVA and Kruskal Wallis test). Post hoc analyses revealed significant differences in mean duration of enrollment in assessment services between 1998 and 1999, 2000, and 2001 ($p \leq 0.003$). Additionally, the mean duration of enrollment in assessment services was significantly higher in 1999 compared to 2001 ($p < 0.001$). The median duration of enrollment in assessment services for the ten- to 14-year age group for all four years was one day. In 15- to 19-year olds, the duration of enrollment in assessment services decreased from 1998 to 2000, and then increased slightly in 2001 ($p < 0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in assessment services for the 15- to 19-year age group was significantly higher in 1999 compared to 2000 ($p = 0.008$). The median duration of enrollment in assessment services for 15- to 19-year olds for all four years was one day. In two- to four-year olds, no significant year effect existed in the duration of enrollment in assessment services.

In both males and females, the duration of enrollment in assessment services decreased from 1998 to 2001 ($p < 0.001$ for ANOVA and Kruskal Wallis test). In males, the mean duration of enrollment in assessment services in 1998 was significantly higher compared to those in 1999, 2000, and 2001 ($p \leq 0.003$). Additionally, a significant difference in mean duration of enrollment in

assessment services existed between 1999 and 2000, and 1999 and 2001 ($p<0.001$). In females, mean durations of enrollment in assessment services in 1998 and 1999 were significantly higher than that in 2001 ($p=0.004$ and $p=0.001$, respectively). Also, a significant difference in mean duration of enrollment in assessment services in females existed between 1998 and 2000 ($p=0.009$). The median duration of enrollment in assessment services for both males and females for all four years was one day.

A significant year effect on the duration of enrollment in assessment services existed for children and adolescents with bipolar disorders, depressive disorders, disruptive behavioral disorders, psychotic disorders, other psychiatric disorders, comorbid psychiatric disorders, and no psychiatric disorder. In the bipolar disorder group, the duration of enrollment in assessment services decreased over the four-year period ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in assessment services for bipolar youths was significantly higher in 1999 compared to 2001 ($p<0.001$). The median duration of enrollment in assessment services for the bipolar group was one day for all four years. In youths with depressive disorders, the duration of enrollment in assessment services decreased. ANOVA did not show a significant year effect, but the Kruskal Wallis test did ($p<0.001$). The median duration of enrollment for all four years in this diagnostic group was one day. In the disruptive behavioral disorder group, the duration of enrollment in assessment services decreased from 1998 to 2000, and then increased slightly in 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). Post hoc analyses revealed significant differences in the

mean duration of enrollment in assessment services for the following: 1998 and 2000 ($p<0.001$); 1998 and 2001 ($p<0.001$); and, 1999 and 2000 ($p=0.005$). The median duration of enrollment for each year was one day in the disruptive behavioral disorder group. In youths with psychotic disorders, the duration of enrollment in assessment services decreased from 1998 to 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in assessment services for the psychotic disorder group was significantly higher in 1998 compared to 2001 ($p<0.001$), and the median duration of enrollment was one day for all four years. In the other psychiatric disorder group, the duration of enrollment in assessment services decreased from 1998 to 2000, and then increased in 2001 ($p=0.008$ for ANOVA and $p<0.001$ for Kruskal Wallis test). A significant difference in the mean duration of enrollment for youths with other psychiatric disorders existed between 1998 and 2000 ($p<0.001$). The median duration of enrollment in assessment services for this diagnostic group was one day for all years. In children and adolescents with comorbid psychiatric diagnoses, the duration of enrollment in assessment services decreased for the first three years, and then increased slightly ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment for the comorbid psychiatric group in 1998 was significantly higher than those in 1999 ($p=0.003$), 2000 ($p<0.001$), and 2001 ($p=0.001$). The median duration of enrollment in assessment services for all four years was one day. In youths with no psychiatric disorder, the duration of enrollment decreased from 1998 to 2000, and increased thereafter ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment

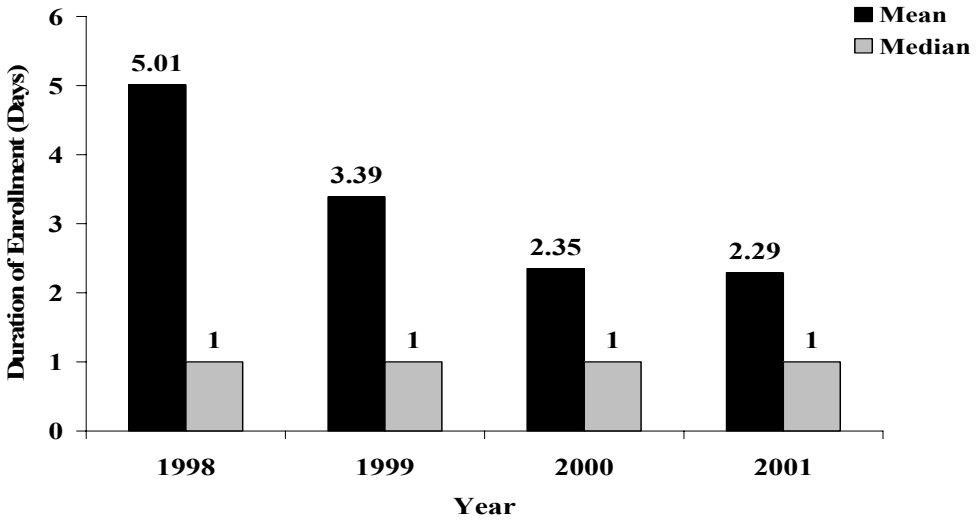
in assessment services for this group was significantly higher in 1998 than in 2000 (p=0.005). The median duration of enrollment in 1998 was 15 days, and one day for the other years. No significant year effect on the duration of enrollment in assessment services existed for children and adolescents with anxiety disorders or mental retardation/developmental disorders.

Table 3.84. Duration of Enrollment (Days) in Assessment Services Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Assessment services	1998	1557	5.01±13.99	4.31 – 5.70	1.0	<0.001*
	1999	2013	3.39±7.25	3.07 – 3.71	1.0	
	2000	1825	2.35±5.43	2.10 – 2.60	1.0	
	2001	2322	2.29±4.20	2.12 – 2.47	1.0	

*p-value for both ANOVA and Kruskal-Wallis test.

Figure 3.59. Mean and Median Duration of Enrollment (Days) in Assessment Services Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



Counseling and psychotherapy

The duration of enrollment in counseling and psychotherapy decreased from 1998 to 1999, but then remained steady for the following three years (Table 3.85, page 352; Figure 3.60, page 353). ANOVA did not show a significant year effect, but the Kruskal Wallis test did (p=0.001). Median durations of enrollment in counseling and psychotherapy for 1998, 1999, 2000, and 2001 were 31, 29, 31, and 26 days, respectively.

In five- to nine-year olds, the duration of enrollment in counseling and psychotherapy decreased from 1998 to 1999, and remained steady thereafter (p=0.004 for ANOVA and p=0.01 for Kruskal Wallis test). Post hoc analyses did not reveal any significant differences between years. Median durations of

enrollment in counseling and psychotherapy for five- to nine-year olds for 1998, 1999, 2000, and 2001 were 31, 26, 31, and 27 days, respectively. Age-specific analyses of the duration of enrollment in counseling and psychotherapy revealed no significant year effect for the two- to four-year, ten- to 14-year, and 15- to 19-year age groups.

In males, the mean duration of enrollment in counseling and psychotherapy decreased from 1998 to 2001 ($p=0.006$ for ANOVA and $p=0.002$ for Kruskal Wallis test). The mean duration of enrollment in counseling and psychotherapy for males was significantly higher in 1998 compared to 2001 ($p=0.006$). Median durations of enrollment in counseling and psychotherapy for males in 1998, 1999, 2000, and 2001 were 31, 27, 31, and 24 days, respectively. No significant year effect on duration of enrollment in counseling and psychotherapy in females was present.

The duration of enrollment in counseling and psychotherapy for children and adolescents with disruptive behavioral disorders decreased over the four-year period. The Kruskal Wallis test revealed a significant year effect ($p=0.003$), but ANOVA did not. The median duration of enrollment in counseling and psychotherapy was 31 days for 1998, 1999, and 2000; the median duration in 2001 was 22.5 days. Similarly, the Kruskal Wallis test detected a significant year effect on duration of enrollment in counseling and psychotherapy for youths with comorbid psychiatric disorders ($p=0.005$). In this diagnostic group, median durations of enrollment in 1998, 1999, 2000, and 2001 were 31, 26, 29, and 12 days, respectively. No significant year effect on the duration of enrollment in

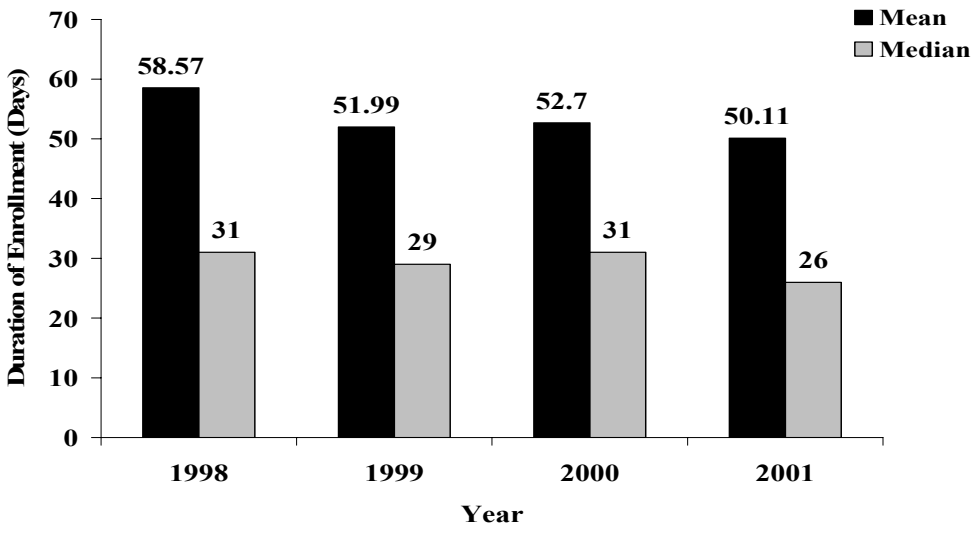
counseling and psychotherapy existed for children and adolescents with anxiety disorders, bipolar disorders, depressive disorders, psychotic disorders, mental retardation/developmental disorders, other psychiatric disorders, and no psychiatric disorder.

Table 3.85. Duration of Enrollment (Days) in Counseling and Psychotherapy Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Counseling and psychotherapy	1998	1294	58.57±78.48	54.29 – 62.85	31.0	0.012* 0.001†
	1999	1515	51.99±73.40	48.29 – 55.69	29.0	
	2000	1377	52.70±68.39	49.08 – 56.31	31.0	
	2001	1892	50.11±70.59	46.92 – 53.29	26.0	

*p-value for ANOVA.
†p-value for Kruskal-Wallis test.

Figure 3.60. Mean and Median Duration of Enrollment (Days) in Counseling and Psychotherapy Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



Crisis Intervention

The duration of enrollment in crisis intervention decreased slightly from 1998 to 1999, and then increased thereafter (Table 3.86, page 355; Figure 3.61, page 356; p=0.002 for ANOVA and p=0.001 for Kruskal Wallis test). In 1998, the mean (±SD) duration of enrollment in crisis intervention was 37.93±63.67 days. In 2001, the mean (±SD) duration of enrollment in crisis intervention was 50.20±79.27 days. Post hoc analyses did not reveal significant differences in mean duration of enrollment in crisis intervention between years. Median durations of enrollment in crisis intervention for 1998, 1999, 2000, and 2001 were 12, 9, 13, and 10 days, respectively.

In ten- to 14-year olds, ANOVA showed a significant year effect on the mean duration of enrollment in crisis intervention, as duration increased from 1998 to 2001 ($p<0.001$). Mean durations of enrollment in crisis intervention were significantly lower in 1998 and 1999 compared to 2001 ($p=0.006$ and $p=0.01$, respectively). No significant year effect on duration of enrollment in crisis intervention for this age group was detected using the Kruskal Wallis test. No significant year effect existed in the duration of enrollment in crisis intervention for the following age groups: two- to four-years, five- to nine-years, and 15- to 19-years.

In males, the mean duration of enrollment in crisis intervention increased in 2000 and 2001, after remaining steady for 1998 and 1999 ($p=0.002$). The mean duration of enrollment in crisis intervention in 1998 was significantly lower than that in 2001 ($p=0.01$). No significant year effect on duration of enrollment in crisis intervention for males was detected using the Kruskal Wallis test. In females, no significant year effect on duration of enrollment in crisis intervention existed.

The duration of enrollment in crisis intervention in youths with disruptive behavioral disorders increased from 1998 to 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in crisis intervention for this diagnostic group was significantly lower in 1998 and 1999 compared to 2001 ($p=0.002$ and $p=0.004$, respectively). The median duration of enrollment also increased after 1999 (1998: 14 days; 1999: 10 days; 2000: 30 days; and, 2001: 52.5 days). In youths with comorbid psychiatric disorders, a significant year

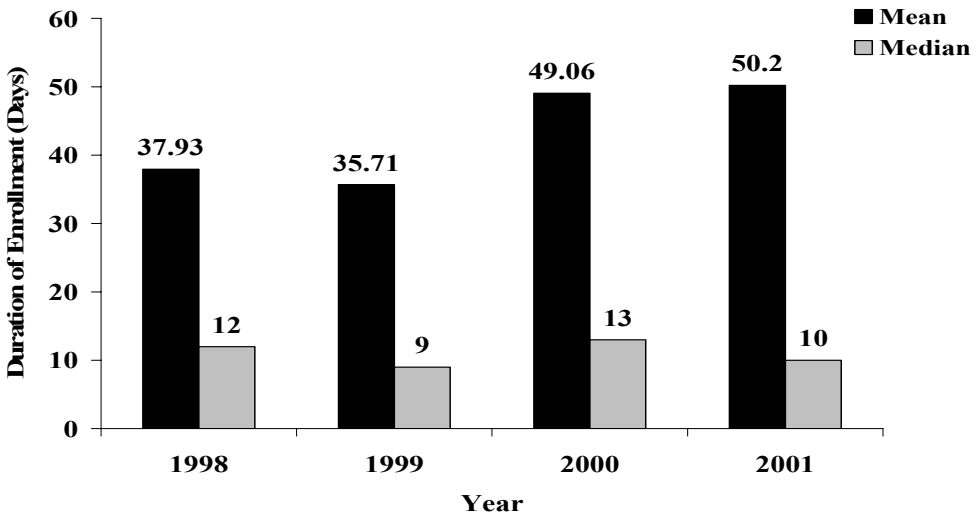
effect on the duration of enrollment in crisis intervention existed (p=0.007 for ANOVA and p<0.001 for Kruskal Wallis test). Post hoc analyses revealed no significant differences between years. The median duration of enrollment did not show any definitive trend as well (1998: 11 days; 1999: 9 days; 2000: 16 days; and, 2001: 6 days). No significant year effect on the duration of enrollment in crisis intervention existed for children and adolescents with anxiety disorders, bipolar disorders, depressive disorders, psychotic disorders, mental retardation/developmental disorders, other psychiatric disorders, and no psychiatric disorder.

Table 3.86. Duration of Enrollment (Days) in Crisis Intervention Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Crisis intervention	1998	532	37.93±63.67	32.51 – 43.35	12.0	0.002*
	1999	543	35.71±65.59	30.18 – 41.24	9.0	0.001†
	2000	387	49.06±78.39	41.23 – 56.89	13.0	
	2001	420	50.20±79.27	42.60 -57.80	10.0	

*p-value for ANOVA.
†p-value for Kruskal-Wallis test.

Figure 3.61. Mean and Median Duration of Enrollment (Days) in Crisis Intervention Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



Medication-related services

The duration of enrollment in medication-related services initially remained stable in 1998 and 1999, and declined for 2000 and 2001 (Table 3.87, page 358; Figure 3.62, page 359; $p<0.001$ for ANOVA and $p=0.004$ for Kruskal Wallis test). In 1998, the mean (±SD) duration of enrollment in medication-related services was 148.42±118.61 days. In 2001, the mean (±SD) duration of enrollment in medication-related services was 139.21±116.85 days. Mean durations of enrollment in medication-related services were significantly higher in 1998 and 1999 compared to that in 2000 ($p=0.002$ and $p=0.001$, respectively). Furthermore, a significant difference in the mean duration of enrollment in

medication-related services existed between 1999 and 2001 (p=0.005). Median durations of enrollment in medication-related services for 1998, 1999, 2000, and 2001 was 119, 110, 100, and 102 days, respectively.

In ten- to 14-year olds, ANOVA showed a significant year effect on the mean duration of enrollment in medication-related services, but no definitive pattern was observed over time (p<0.001). The mean duration of enrollment in medication-related services was significantly higher in 1999 compared to 2000 (p<0.001). No significant year effect on median duration of enrollment in medication-related services in ten- to 14-year olds was detected using the Kruskal Wallis test. In 15- to 19-year olds, a significant year effect on median duration of enrollment in medication-related services existed over the four-year period (p=0.001). No significant year effect on mean duration of enrollment in medication-related services in this age group was detected using ANOVA. No significant year effect on the duration of enrollment in medication-related services existed for the following age groups: two- to four-years and five- to nine-years.

Males showed a significant year effect, as the duration of enrollment in medication-related services decreased from 1998 to 2001 (p<0.001 for ANOVA and p=0.001 for Kruskal Wallis test). The mean duration of enrollment in medication-related services for males in 1998 was significantly higher than those in 2000 (p=0.009) and 2001 (p=0.001). In addition, a significant difference in the mean duration of enrollment in medication-related services existed between 1999 and 2001 (p=0.001). Median durations of enrollment in medication-related services for males in 1998, 1999, 2000, and 2001 were 122, 113, 105, and 102

days. In females, no significant year effect on the duration of enrollment in medication-related services existed.

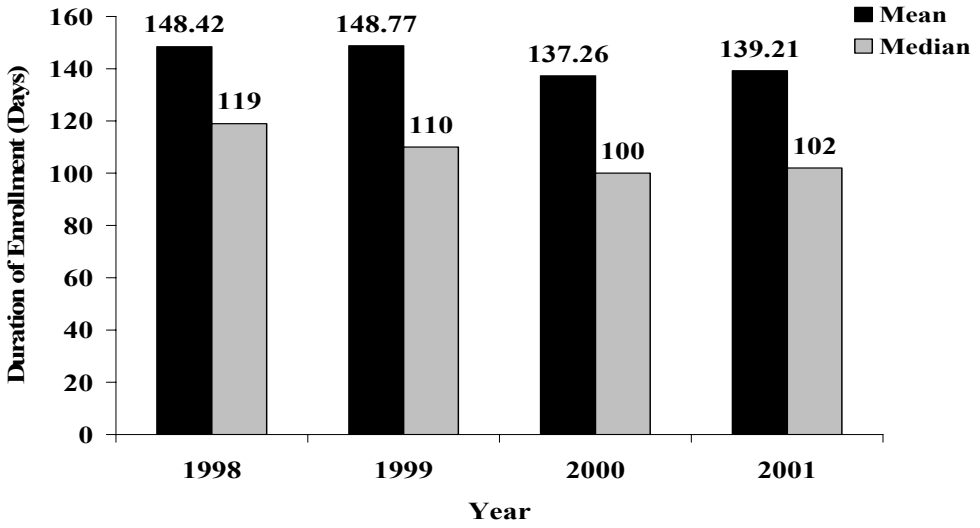
As detected by the Kruskal Wallis test, a significant year effect on the duration of enrollment in medication-related services existed in youths with comorbid psychiatric disorders (p=0.002). Over time, the median duration of enrollment in medication-related services in the comorbid psychiatric disorder group did not show any definitive trend (1998: 113 days; 1999: 92 days; 2000: 110 days; and, 2001: 91 days). No significant year effect on the duration of enrollment in medication-related services existed for children and adolescents with anxiety disorders, bipolar disorders, depressive disorders, disruptive behavioral disorders, psychotic disorders, mental retardation/developmental disorders, other psychiatric disorders, and no psychiatric disorder.

Table 3.87. Duration of Enrollment (Days) in Medication-related Services Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Medication-related services	1998	2314	148.42±118.61	143.58 – 153.25	119.0	<0.001* 0.004†
	1999	3011	148.77±125.47	144.29 – 153.26	110.0	
	2000	3609	137.26±115.68	133.48 – 141.03	100.0	
	2001	4559	139.21±116.85	135.82 – 142.60	102.0	

*p-value for ANOVA.
†p-value for Kruskal-Wallis test.

Figure 3.62. Mean and Median Duration of Enrollment (Days) in Medication-related Services Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



Service coordination

The duration of enrollment in service coordination increased from 1998 to 2001 (Table 3.88, page 363; Figure 3.63, page 364; $p<0.001$ for ANOVA and Kruskal Wallis test). In 1998, the mean (±SD) duration of enrollment in service coordination was 82.23±97.35 days. Enrollment in service coordination continually increased over the four-year period. In 2001, the mean (±SD) duration of enrollment in service coordination was 118.43±111.84 days. Post hoc analyses revealed significant differences in mean duration of enrollment in service coordination between 1998 and 1999 ($p=0.009$), 2000, and 2001 ($p<0.001$). Additionally, the mean duration of enrollment in service coordination in 1999 was

significantly lower than those in 2000 and 2001 ($p<0.001$). Median durations of enrollment in service coordination for 1998, 1999, 2000, and 2001 were 45, 58, 81, and 91 days, respectively.

In five- to nine-year olds, the duration of enrollment in service coordination increased from 1998 to 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). Mean durations of enrollment in service coordination in 1998 and 1999 were significantly lower than in 2000 and 2001 ($p<0.001$). Median durations of enrollment in service coordination for 1998, 1999, 2000, and 2001 in the five- to nine-year age group were 50, 64, 83.5, and 92 days, respectively. In ten- to 14-year olds, a trend of increased duration of enrollment in service coordination existed over the four-year period ($p<0.001$ for ANOVA and Kruskal Wallis test). Post hoc analyses revealed significant differences in mean duration of enrollment in service coordination between 1998 and 1999, 2000, and 2001 ($p\leq0.002$). Additionally, the mean duration of enrollment in service coordination was significantly lower in 1999 compared to 2000 and 2001 ($p<0.001$). The median duration of enrollment in service coordination for the ten- to 14-year age group also increased (1998: 40 days; 1999: 57 days; 2000: 82 days; and, 2001: 89 days). In 15- to 19-year olds, the duration of enrollment in service coordination decreased from 1998 to 1999, and increased thereafter ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in service coordination for the 15- to 19-year age group was significantly lower in 1999 compared to 2000 and 2001 ($p<0.001$). Median durations of enrollment in service coordination for 1998, 1999, 2000, and 2001 for 15- to 19-year olds were 53, 53, 75.5, and 71

days, respectively. In two- to four-year olds, no significant year effect existed in the duration of enrollment in service coordination.

A significant year effect on duration of enrollment in service coordination existed in both males and females. In males, a trend of increased durations of enrollment in service coordination existed from 1998 to 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). Mean durations of enrollment in service coordination in 1998 and 1999 were significantly lower than those in 2000 and 2001 ($p<0.001$). The median duration of enrollment in service coordination for males also increased (1998: 47 days; 1999: 59 days; 2000: 84 days; and, 2001: 91 days). In females, the same trend over time existed ($p<0.001$ for ANOVA and Kruskal Wallis test). Post hoc analyses revealed significant differences in the mean duration of enrollment in service coordination for females between the following years: 1998 and 2000; 1998 and 2001; 1999 and 2000; and, 1999 and 2001 ($p<0.001$). Median durations of enrollment in service coordination for females in 1998, 1999, 2000, and 2001 were 38, 54, 74, and 85 days, respectively.

The duration of enrollment in service coordination for youths with anxiety disorders increased from 1998 to 2000, and then decreased in 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in the anxiety disorder group was significantly lower in 1998 compared to 2000 ($p<0.001$). Median durations of enrollment in service coordination in 1998, 1999, 2000, and 2001 were 31, 59, 81.5, and 37.5 days. In youths with bipolar disorder, a significant year effect on the duration of enrollment in service coordination existed ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of

enrollment in this diagnostic group was significantly lower in 1998 and 1999 compared to 2000 and 2001 ($p \leq 0.003$). The median duration of enrollment in service coordination for bipolar youths decreased initially, and then increased (1998: 67 days; 1999: 53.5 days; 2000: 85 days; and, 2001: 91 days). In the depressive disorder group, the duration of enrollment in service coordination increased from 1998 to 2000, and then decreased in 2001 ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in youths with depressive disorders was significantly lower in 1998 and 1999 compared to 2000 and 2001 ($p \leq 0.001$). Median durations of enrollment in service coordination for this diagnostic group in 1998, 1999, 2000, and 2001 were 40.5, 59, 90, and 81 days. A significant year effect on the duration of enrollment in service coordination existed for youths with disruptive behavioral disorders, showing a trend of increasing duration ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in this diagnostic group was significantly lower in 1998 and 1999 compared to 2000 and 2001 ($p<0.001$). The median duration of enrollment in service coordination for disruptive behavioral youths steadily increased (1998: 44 days; 1999: 57 days; 2000: 88 days; and, 2001: 96 days). Similarly, the duration of enrollment in service coordination increased from 1998 to 2001 for children and adolescents with mental retardation/developmental disorders ($p=0.001$ for ANOVA and Kruskal Wallis test). Compared to 2001, the mean duration of enrollment in 1998 was significantly lower for this diagnostic group ($p=0.004$). The median duration of enrollment in service coordination also increased from 31 days in 1998 to 108 days in 2001. In youths with comorbid

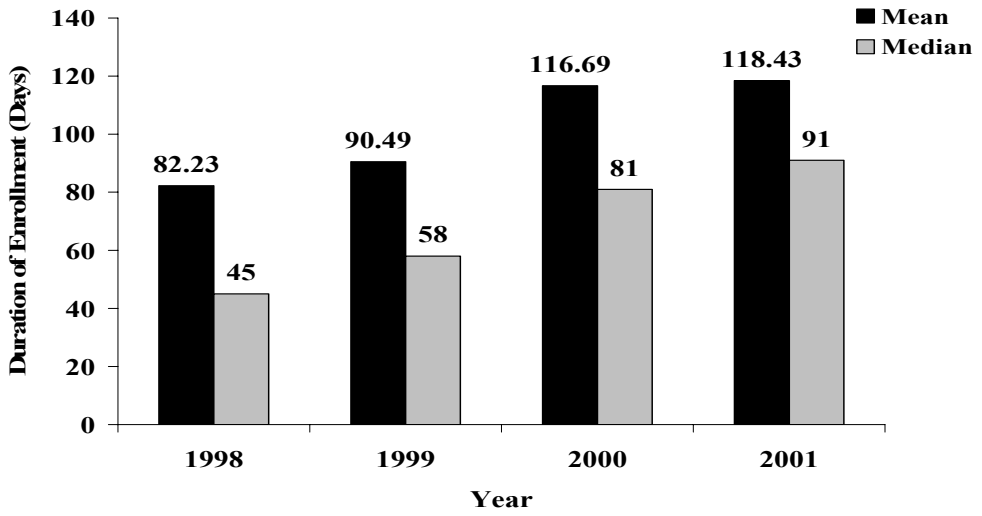
psychiatric disorders, a significant year effect on duration of enrollment in service coordination existed ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment for the comorbid psychiatric disorder group in 1998 was significantly lower than those in 2000 ($p<0.001$) and 2001 ($p=0.009$). Additionally, the mean duration of enrollment in 1999 was significantly lower than that in 2000 ($p<0.001$). The median duration of enrollment in service coordination for youths with comorbid psychiatric disorders increased over time (1998: 43 days; 1999: 57 days; 2000: 81 days; and, 2001: 86 days). No significant year effect on duration of enrollment in service coordination existed for children and adolescents with psychotic disorders, other psychiatric disorders, and no psychiatric disorder.

Table 3.88. Duration of Enrollment (Days) in Service Coordination Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Service coordination	1998	2355	82.23±97.35	78.29 – 86.16	45.0	<0.001*
	1999	3300	90.49±97.41	87.17 – 93.82	58.0	
	2000	3073	116.69±109.41	112.82 – 120.56	81.0	
	2001	3964	118.43±111.84	114.95 – 121.91	91.0	

*p-value for both ANOVA and Kruskal-Wallis test.

Figure 3.63. Mean and Median Duration of Enrollment (Days) in Service Coordination Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



Skills training

The mean duration of enrollment in skills training initially remained stable from 1998 to 2000, and declined in 2001 (Table 3.89, page 366; Figure 3.64, page 367; $p<0.001$ for ANOVA and Kruskal Wallis test). In 1998, the mean (±SD) duration of enrollment in skills training was 66.55±78.65 days. In 2001, the mean (±SD) duration of enrollment in skills training was 59.44±78.13 days. The mean duration of enrollment in skills training was significantly higher in 1999 compared to that in 2001 ($p=0.006$). Median durations of enrollment in skills training for 1998, 1999, 2000, and 2001 were 38, 35, 34, and 31 days, respectively.

In ten- to 14-year olds, the duration of enrollment in skills training increased slightly between 1998 and 2000, and then decreased in 2001 ($p=0.001$ for ANOVA and $p<0.001$ for Kruskal Wallis test). Mean durations of enrollment in skills training in 1999 and 2000 in ten- to 14-year olds were significantly greater than that in 2001 ($p=0.004$). The median duration of enrollment in skills training for 1998 was 36 days; for 1999, 36 days; for 2000, 37 days; and, for 2001, 30 days. In 15- to 19-year olds, the median duration of enrollment in skills training decreased from 1998 to 2001 (31 days and 28 days, respectively; $p=0.005$). No significant year effect on mean duration of enrollment in skills training in this age group was detected using ANOVA. No significant year effect on the duration of enrollment in skills training existed for two- to four-year olds and five- to nine-year olds.

A significant year effect on the duration of enrollment in skills training existed for males ($p<0.001$ for ANOVA and Kruskal Wallis test). The mean duration of enrollment in skills training for males gradually declined over the four-year period, with significant differences between 1998 and 2001 ($p=0.001$), and 2000 and 2001 ($p=0.007$). The median duration of enrollment in skills training also decreased for males (1998: 39 days; 1999: 32 days; 2000: 35 days; and, 2001: 30 days). No significant year effect on the duration of enrollment in skills training existed for females.

As detected by the Kruskal Wallis test, a significant year effect on the duration of enrollment in skills training existed in youths with disruptive behavioral disorders ($p=0.009$). Over time, the median duration of enrollment in

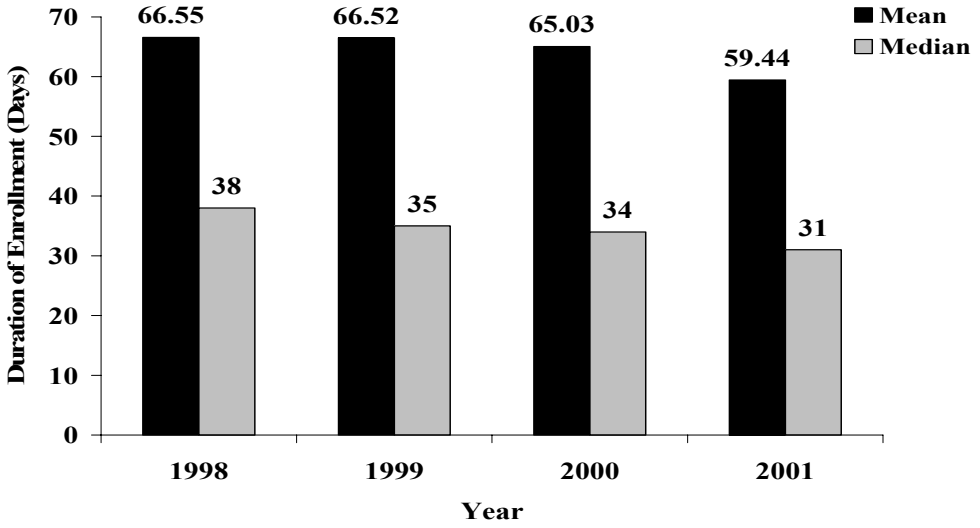
skills training in this diagnostic group did not show any definitive trend (1998: 39 days; 1999: 36.5 days; 2000: 39 days; and, 2001: 31 days). Similarly, the median duration of enrollment in skills training decreased over time for youths with comorbid psychiatric disorders ($p<0.001$ for Kruskal Wallis test). Median durations of enrollment in this diagnostic group for 1998, 1999, 2000, and 2001 were 41, 31, 33, and 22 days, respectively. No significant year effect on the duration of enrollment in skills training existed for children and adolescents with anxiety disorders, bipolar disorders, depressive disorders, psychotic disorders, mental retardation/developmental disorders, other psychiatric disorders, and no psychiatric disorder.

Table 3.89. Duration of Enrollment (Days) in Skills Training Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Skills training	1998	1885	66.55±78.65	63.00 – 70.10	38.0	<0.001*
	1999	2587	66.52±82.64	63.33 – 69.70	35.0	
	2000	3294	65.03±79.51	62.32 – 67.75	34.0	
	2001	4180	59.44±78.13	57.07 – 61.81	31.0	

*p-value for both ANOVA and Kruskal-Wallis test.

Figure 3.64. Mean and Median Duration of Enrollment (Days) in Skills Training Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



Supportive services

The mean duration of enrollment in supportive services decreased initially from 1998 to 1999, but then increased over 2000 and 2001 (Table 3.90, page 368; Figure 3.65, page 369). ANOVA did not show a significant year effect, but the Kruskal Wallis test did (p=0.008). Median durations of enrollment in counseling and psychotherapy for 1998, 1999, 2000, and 2001 were 17, 8, 11, and 27 days, respectively.

Age-specific analyses of the duration of enrollment in supportive services showed no significant year effect in the following age groups: two- to four-years, five- to nine-years, ten- to 14-years, and 15- to 19-years.

Gender-specific analyses of the duration of enrollment in supportive services showed no significant year effect in males and females.

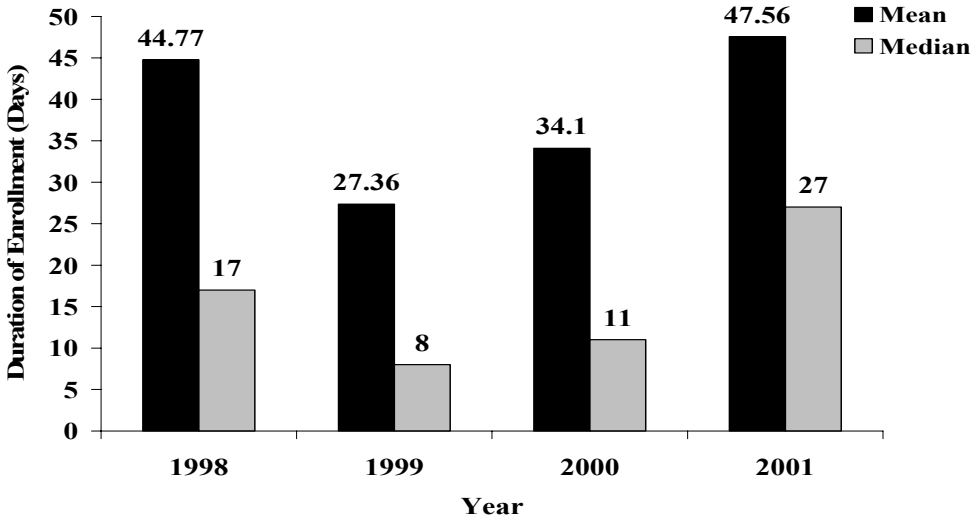
Diagnosis-specific analyses of the duration of enrollment in supportive services showed no significant year effect in the following diagnostic groups: anxiety disorders, bipolar disorders, depressive disorders, disruptive behavioral disorders, psychotic disorders, mental retardation/developmental disorders, other psychiatric disorders, and comorbid psychiatric disorders. No child or adolescent without a psychiatric disorder received supportive services during the four-year period.

Table 3.90. Duration of Enrollment (Days) in Supportive Services Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001

Outpatient Service	Year	N	Mean (±SD)	95% CI	Median	p-value
Supportive services	1998	217	44.77±68.82	35.56 – 53.98	17.0	0.022*
	1999	196	27.36±51.72	20.08 – 34.65	8.0	0.008†
	2000	72	34.10±53.58	21.51 – 46.69	11.0	
	2001	72	47.56±85.14	27.55 – 67.56	27.0	

*p-value for ANOVA.
†p-value for Kruskal-Wallis test.

Figure 3.65. Mean and Median Duration of Enrollment (Days) in Supportive Services Per Child or Adolescent Receiving an Antipsychotic and Mental Health Care Services from TDMHMR from 1998 to 2001



H_{29}: Rejected.

CHAPTER FOUR

Discussion

CHAPTER OVERVIEW

Chapter Four provides a thorough discussion of the study results describing the current trends of antipsychotic use in children and adolescents from 1996 to 2001. The results are reviewed according to the phases: (1) trends in antipsychotic use in children and adolescents; (2) prescribing practices for antipsychotic agents; and, (3) relationships of antipsychotic use to service utilization and associated costs. Possible explanations of the findings are proposed, and the potential implications of the study are reported. Following a discussion of the limitations of the study, directions for future research are suggested.

Reviews of the Study Results

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (1996 to 2001)

Children and adolescents above the age of five years represented the majority of those receiving treatment with an antipsychotic. In 1996, 15- to 19-year olds in California Medi-Cal, Ohio Medicaid, and the Managed Care Organization represented the largest percentage of youths receiving an antipsychotic. In Texas Medicaid, youths aged ten to 14 years represented the largest age group treated with antipsychotics. Over the study period, a trend

towards younger-aged children and adolescents receiving an antipsychotic was present across all four insurance programs. In 2001, ten- to 14-year olds represented the largest proportion of youths receiving an antipsychotic. Males constituted a majority in each of the four programs during the entire study period, and a trend towards increased number of males receiving an antipsychotic existed in California Medi-Cal, Ohio Medicaid, and the Managed Care Organization.

Prevalence of antipsychotic use

From 1996 to 2001, the prevalence of total antipsychotic use in children and adolescents increased two- to three-fold in the insurance programs under study. In Ohio and Texas Medicaid, there was a continual growth in antipsychotic use during the six-year period. In California Medi-Cal and the Managed Care Organization, much of the growth occurred after 1997. Youths enrolled in Ohio Medicaid and the Managed Care Organization were more likely to receive an antipsychotic with each additional study year, compared to youths in California Medi-Cal and Texas Medicaid.

A pronounced increase in the prevalence of atypical antipsychotic use occurred across all programs, as increases ranged from six- to 20-fold. Over the six-year period, an additional 12 children and adolescents per 1,000 Texas Medicaid and Ohio Medicaid enrollees received an atypical antipsychotic, followed by California Medi-Cal (+6), and the Managed Care Organization (+2). Youths in California Medi-Cal had significantly higher odds of receiving an atypical antipsychotic with each additional year, compared to youths enrolled in the other programs.

With the exception of clozapine, the prevalence of specific atypical antipsychotics (olanzapine, quetiapine, and risperidone) increased from 1996 to 2001 in each health insurance program. The rank order of specific atypical antipsychotic prevalence in 2001 for Texas Medicaid showed risperidone to be the most frequently used agent, followed by olanzapine and quetiapine. This finding was consistent from 1996 to 2000, as well as with the other three programs.

The rate of typical antipsychotic prescribing for children and adolescents decreased across the four systems, with the largest decreases in use occurring in the state Medicaid programs. There was a continual decrease in the prevalence of typical antipsychotic use in the Medicaid programs over the study period. In the Managed Care Organization, there was a gradual increase in the prevalence of typical antipsychotic use in Managed Care Organization youths from 1998 to 2000, before a decrease in 2001. Children and adolescents in California Medi-Cal were less likely to receive a typical antipsychotic with each additional year, compared to the other three programs.

Age-specific prevalence of antipsychotic use

Antipsychotic use according to age stratifications was most prominent in children and adolescents between the ages of ten and 19 years across the four programs. The prevalence of total antipsychotic use in the ten- to 14-year age group roughly doubled for California Medi-Cal, Texas Medicaid, and the Managed Care Organization, and tripled for Ohio Medicaid. For youths aged 15 to 19 years, the prevalence of total antipsychotic use increased approximately 1.5-

fold. The growth in prevalence of total antipsychotic use in these particular age groups was attributed to the increased use of atypical antipsychotics. In California Medi-Cal ten- to 14-year olds and 15- to 19-years olds, the use of atypical antipsychotics increased 25- and 11-fold, respectively, over the six-year period. Although less dramatic, similar increases in atypical antipsychotic use occurred in these age groups in the other three programs. The trend toward increased use of atypical antipsychotics in youths aged ten to 19 years enrolled in the Medicaid programs was steady from 1996 to 2001, whereas much of the growth in atypical antipsychotic use in Managed Care Organization youths occurred after 1998.

Children between the ages of five and nine years experienced the largest increase in the overall use of antipsychotic agents. Like their older counterparts, this age group experienced an increase in the use of atypical antipsychotics. Over the six-year period, an additional 17 five- to nine-year olds per 1,000 Texas Medicaid enrollees received an atypical antipsychotic, followed by Ohio Medicaid (+13), California Medi-Cal (+5), and the Managed Care Organization (+2).

In children between the ages of two and four years, the prevalence of total and atypical antipsychotic use increased in Ohio Medicaid, Texas Medicaid, and the Managed Care Organization. In California Medi-Cal, the overall use of antipsychotics decreased in these youths, while atypical antipsychotic use increased 40-fold.

In all age groups across all four health programs, the use of typical antipsychotics either remained steady or continually declined during the study period.

Gender-specific prevalence of antipsychotic use

Female and male prevalence rates of total and atypical antipsychotic use increased from 1996 to 2001 in each program. A greater percent increase in the use of antipsychotics was observed in males compared to females in Ohio Medicaid, California Medi-Cal, and the Managed Care Organization. In Texas Medicaid, the six-year growth in antipsychotic use was greater in females than in males.

While the prevalence of typical antipsychotics decreased for both gender groups, increases in the use of atypical antipsychotics were seen. Prevalence rates of atypical antipsychotic use in California Medi-Cal females and males increased 18- and 21-fold, respectively. An additional four females and eight males per 1,000 enrollees received an atypical antipsychotic in 2001 compared to 1996. Similar, but less dramatic increases in female and male prevalence rates of atypical antipsychotic use were evident in Ohio Medicaid (+7 females, +17 males), California Medi-Cal (+8 females, +17 males), and the Managed Care Organization (+2 females, +3 males).

Geographic and payer system variations in the prevalence of antipsychotic use

Antipsychotic prescribing in Medicaid children and adolescents was strongly associated with geographic region, as Texas Medicaid youths consistently had the highest prevalence rates of total antipsychotic use, followed

by Ohio Medicaid and California Medi-Cal. In 2001, prevalence rates of total antipsychotic use in Ohio and Texas Medicaid youths were more than double that of California Medi-Cal youths. The same geographic variation was found in prevalence rates of atypical antipsychotic use, as rank order showed that Texas Medicaid youths had the highest utilization per 1,000 enrollees, followed by Ohio Medicaid and California Medi-Cal. With regard to typical antipsychotic use in 2001, prevalence rates were highest in Ohio Medicaid and lowest in California Medi-Cal.

Antipsychotic prescribing was also related to type of payer system, as prevalence rates of total antipsychotic use in Medicaid programs significantly exceeded those in the Managed Care Organization. In 2001, total antipsychotic use in Medicaid youths doubled that of Managed Care Organization youths. Atypical antipsychotic prevalence was two- to six-times greater in Medicaid programs, and typical antipsychotic prevalence was approximately two-times greater.

Mean daily doses of specific atypical antipsychotics

A trend toward lower mean daily risperidone doses over time existed in California Medi-Cal, Texas Medicaid, and the Managed Care Organization. In these three programs, the trend of lower risperidone doses over time was apparent in youths greater than five years of age. In Ohio Medicaid youths, no distinct trend in risperidone dosing existed over the six-year period. With regard to mean daily olanzapine doses, no definitive trend over time existed in any of the four

programs under study. Similarly, no consistent trend in quetiapine dosing was observed across age categories in the four health insurance programs.

Antipsychotic switch rates

Antipsychotic switch rates increased from 1996 to 2001 in all programs. Youths enrolled in California Medi-Cal and Ohio Medicaid had higher odds of switching antipsychotic treatment regimens, compared to Texas Medicaid and Managed Care Organization youths. Atypical to atypical antipsychotic switches increased over time, while typical to typical antipsychotic switches decreased. Typical to atypical and atypical to typical antipsychotic switches either remained fairly constant, or declined over the study period.

Concomitant psychotropic medications

The use of concomitant psychotropic medications increased substantially from 1996 to 2001 in the four programs. Children and adolescents in Texas Medicaid were more likely to receive concomitant treatment with another psychotropic medication during antipsychotic treatment, followed by youths in Ohio Medicaid, California Medi-Cal, and the Managed Care Organization. Antidepressants were the most commonly used concomitant psychotropic medication. Antimanic/bipolar agents and psychostimulants were also frequently used as concomitant agents in youths receiving an antipsychotic.

Prevalence rates of antipsychotic polypharmacy increased as well over the six-year period in three of the four programs. Youths enrolled in California Medi-Cal had higher odds of receiving two different antipsychotics for a minimum of 30 days, compared to Texas Medicaid and Managed Care Organization youths.

From 1996 to 2001, the use of two atypical antipsychotics increased, while the use of two typical antipsychotics decreased. The concomitant use of an atypical antipsychotic and a typical antipsychotic remained fairly steady.

Cost of antipsychotic prescriptions

In all four programs, the cost of all antipsychotics increased dramatically from 1996 to 2001. This was directly attributed to the increased use of atypical antipsychotics, which are associated with increased medication cost. Cost associated with typical antipsychotic use decreased over time, as these agents were being less utilized.

Table 4.1 (pages 378-380) summarizes the results of Phase I hypothesis testing, which includes the comparative hypotheses.

Table 4.1. Summary of Hypothesis Testing for Phase I and Comparative Analyses[a]

Hypothesis	CA	OH	TX	MCO
Phase I: Trends in the prevalence of antipsychotic use				
H_1: The prevalence rate of total antipsychotic use in children and adolescents increases from 1996 to 2001.	Accepted	Accepted	Accepted	Accepted
H_2: The prevalence rate of atypical antipsychotic use in children and adolescents increases from 1996 to 2001.	Accepted	Accepted	Accepted	Accepted
H_3: The prevalence rate of typical antipsychotic use in children and adolescents decreases from 1996 to 2001.	Accepted	Accepted	Accepted	Accepted
H_4: During each study year (1996-2001), risperidone is the most commonly used atypical antipsychotic in children and adolescents.	Accepted	Accepted	Accepted	Accepted
H_5: Prevalence rates of total antipsychotic use from 1996 to 2001 increase across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).	Rejected	Accepted	Accepted	Accepted
H_6: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increase across age categories greater than two years of age (2-4, 5-9, 10-14, and 15-19 years).	Accepted	Accepted	Accepted	Accepted
H_7: Prevalence rates of typical antipsychotic use from 1996 to 2001 decrease across all age categories (<2, 2-4, 5-9, 10-14, and 15-19 years).	Accepted	Accepted	Accepted	Rejected
H_8: Prevalence rates of total antipsychotic use from 1996 to 2001 increase across gender groups: male and female.	Accepted	Accepted	Accepted	Accepted
H_9: Prevalence rates of atypical antipsychotic use from 1996 to 2001 increase across gender groups: male and female.	Accepted	Accepted	Accepted	Accepted

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid; MCO=Managed Care Organization.

Table 4.1. Summary of Hypothesis Testing for Phase I and Comparative Analyses (Cont.)[a]

Hypothesis	CA	OH	TX	MCO
Phase I: Trends in the prevalence of antipsychotic use (Cont.)				
H_{10}: Prevalence rates of typical antipsychotic use from 1996 to 2001 decrease across gender groups: male and female.	Accepted	Accepted	Accepted	Accepted
H_{11}: The mean daily dose of risperidone treatment in age-specific groups of children and adolescents decreases from 1996 to 2001.	Rejected	Rejected	Rejected	Rejected
H_{12}: The mean daily dose of olanzapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.	Rejected	Rejected	Rejected	Rejected
H_{13}: The mean daily dose of quetiapine treatment in age-specific groups of children and adolescents increases from 1996 to 2001.	Rejected	Rejected	Rejected	Rejected
H_{14}: Antipsychotic switch rates in children and adolescents increase from 1996 to 2001.	Accepted	Accepted	Accepted	Accepted
H_{15}: The prevalence of concomitant psychotropic medication use, including multiple antipsychotics, in children and adolescents receiving antipsychotic medications increases from 1996 to 2001.	Accepted	Accepted	Accepted	Accepted
H_{16}: Total cost for antipsychotic prescriptions for children and adolescents increases from 1996 to 2001.	Accepted	Accepted	Accepted	Accepted
Comparative hypotheses				**Result**
H_{17}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of total antipsychotic use, followed by Ohio and California.				Accepted
H_{18}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of atypical antipsychotic use, followed by Ohio and California.				Accepted

[a]Abbreviations: CA=California Medi-Cal; OH=Ohio Medicaid; TX=Texas Medicaid; MCO=Managed Care Organization.

Table 4.1. Summary of Hypothesis Testing for Phase I and Comparative Analyses (Cont.)

Hypothesis	Result
Comparative hypotheses (Cont.)	
H_{19}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between states exists. Texas Medicaid has the highest rates of typical antipsychotic use, followed by Ohio and California.	Rejected
H_{20}: For each study year, a significant difference in the prevalence rate of total antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of total antipsychotic use compared to the Managed Care Organization.	Accepted
H_{21}: For each study year, a significant difference in the prevalence rate of atypical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of atypical antipsychotic use compared to the Managed Care Organization.	Rejected
H_{22}: For each study year, a significant difference in the prevalence rate of typical antipsychotic use in children and adolescents from 1996 to 2001 between public and private insurance systems exists. Medicaid states have higher rates of typical antipsychotic use compared to the Managed Care Organization.	Accepted

Phase II: Prescribing practices for antipsychotic agents

Prescriber type of antipsychotic prescriptions

In Texas Medicaid, psychiatrists, including child and adolescent psychiatrists, had the greatest number of prescriptions for any antipsychotic during each calendar year, followed by primary care physicians and unspecified physicians. More antipsychotic prescriptions originated from psychiatrists than child and adolescent psychiatrists during each year. Within primary care, pediatricians had a larger number of antipsychotic prescriptions than family/general practice physicians. Neurologists had the lowest number of prescriptions for antipsychotics, compared to the other prescriber groups. In all groups, there was an increase in the number of antipsychotic prescriptions over the six-year period.

There was an increase in the number of atypical antipsychotic prescriptions and a decrease in the number of typical antipsychotic prescriptions over time in all prescriber groups. Among psychiatry specialists, psychiatrists had more atypical and typical antipsychotic prescriptions compared to child and adolescent psychiatrists. Within primary care, the number of atypical and typical antipsychotic prescriptions from pediatricians exceeded that of family/general practice physicians.

Diagnoses associated with antipsychotic prescribing

Disruptive behavioral disorders were the most common diagnoses associated with children and adolescents receiving antipsychotic treatment and mental health care services from the Texas Department of Mental Health and

Mental Retardation (TDMHMR). This diagnostic category accounted for approximately one-third of all diagnoses associated with these youths. Within the disruptive behavioral disorder category, attention-deficit hyperactivity disorder accounted for the highest percentage of diagnoses, followed by conduct disorder and oppositional defiant disorder. Depressive disorders were the second most common diagnoses, followed by bipolar disorders. Among children and adolescents with a thought disorder, a diagnosis of a psychotic disorder represented the majority each year. A small percentage of youths receiving antipsychotic treatment and mental health care services from TDMHMR had a diagnosis of mental retardation or a pervasive developmental disorder. Three percent of youths did not have a psychiatric diagnosis.

Table 4.2 (page 383) summarizes the results of Phase II hypothesis testing.

Table 4.2. Summary of Hypothesis Testing for Phase II

Hypothesis	Result
Phase II: Prescribing practices for antipsychotic agents	
H_{23}: The number of prescriptions for an antipsychotic for a child or adolescent from primary care physicians (family practice physicians, general practice physicians, and pediatricians) increases from 1996 to 2001.	Accepted
H_{24}: The number of prescriptions for an antipsychotic for a child or adolescent from psychiatrists, including child and adolescent psychiatrists, increases from 1996 to 2001.	Accepted
H_{25}: From 1998 to 2001, antipsychotics are most prescribed for disruptive behavioral disorders, such as oppositional defiant disorder, conduct disorder, intermittent explosive disorder, and attention-deficit hyperactivity disorders.	Accepted

Phase III: Relationships of antipsychotic use with patient health care service utilization

Inpatient psychiatric hospitalizations

From 1998 to 2001, the mean number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment and mental health care services from TDMHMR increased. Among those youths who were hospitalized, no significant year effect existed regarding the mean number of inpatient psychiatric hospitalizations. The mean number of hospital days per hospitalized child or adolescent decreased over the four-year period. Similarly, the median number of hospital days per hospitalized youth decreased.

Outpatient mental health care services

From 1998 to 2001, the number of children and adolescents receiving assessment services, counseling and psychotherapy, medication-related services, service coordination, and skills training increased. The number of youths receiving crisis intervention and supportive services decreased. Medication-related services accounted for the highest percentage of outpatient mental health care service use, followed by service coordination and skills training. The percentage of children and adolescents using these types of outpatient services increased over time.

The mean duration of enrollment in assessment services, medication-related services, and skills training decreased over the four-year period, while the mean duration of enrollment in crisis intervention and service coordination increased. No significant year effect on the mean duration of enrollment existed

in counseling and psychotherapy, and supportive services. Significant year effects on the median duration of enrollment existed across all types of outpatient mental health services.

Table 4.3 (page 386) summarizes the results of Phase III hypothesis testing.

Table 4.3. Summary of Hypothesis Testing for Phase III

Hypothesis	Result
Phase III: Relationships of antipsychotic use with patient health care service utilization	
H_{26}: The mean number of inpatient psychiatric hospitalizations per child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.	Rejected
H_{27}: The mean number of hospital days per each hospitalized child or adolescent receiving antipsychotic treatment decreases from 1998 to 2001.	Accepted
H_{28}: The number of children and adolescents receiving assessment services, crisis intervention, medication-based services, and service coordination increases from 1998 to 2001, while the number of children and adolescents receiving counseling and psychotherapy, skills training, and supportive mental health services decreases from 1998 to 2001.	Rejected
H_{29}: The mean duration of enrollment of outpatient services for assessment services, crisis intervention, medication-based services, and service coordination increases among children and adolescents receiving an antipsychotic from 1998 to 2001. The mean duration of enrollment of outpatient services for counseling and psychotherapy, skills training, and supportive mental health services decreases among children and adolescents receiving an antipsychotic from 1998 to 2001.	Rejected

Discussion of the Study Results

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (1996 to 2001)

Antipsychotic prevalence rates

Previous pharmacoepidemiological studies of psychotropic medication use in children and adolescents have suggested increased prevalence of antipsychotic use during the 1990s.[1-3] The findings from this study not only corroborate the increased use of antipsychotics in children and adolescents, but also further demonstrate that this trend is occurring across various geographic and payer systems.

The increased use of antipsychotics in four health insurance programs is directly associated with the use of atypical antipsychotics. As olanzapine, quetiapine, and risperidone were introduced to the market in the 1990s, the trend of total antipsychotic use paralleled the increased use of this subclass of antipsychotic medications. Although risperidone was the most commonly used atypical antipsychotic, the prevalence of olanzapine and quetiapine use increased with time.

There are ample data supporting the safety and efficacy of atypical antipsychotics in adult psychiatric disorders, such as schizophrenia and bipolar disorder. However, the use of these medications in children and adolescents is off-label and remains divisive. Clinicians may be inclined to use atypical antipsychotics over typical antipsychotics because of their decreased propensity to cause extrapyramidal symptoms and tardive dyskinesia.[4] Emergence of

antipsychotic-induced movement disorders may severely affect the course of treatment in a child and adolescent, as these symptoms may lead to decreased medication adherence, decreased patient self-esteem, and poor patient prognosis.[5]

Moreover, a growing body of evidence supports the safety and efficacy of atypical antipsychotics, especially risperidone, for the treatment of aggression, the most common use for antipsychotics among youths.[6-11] In the Texas Medicaid program, disruptive behavioral disorders, such as attention-deficit hyperactivity disorder, conduct disorder, and oppositional defiant disorder, were the most common diagnoses in children and adolescents receiving antipsychotic treatment and mental health care services from TDMHMR. These diagnoses often present concurrently and are associated with aggressive behaviors, possibly warranting treatment with an antipsychotic.[12] In a recent international consensus statement on disruptive behavioral disorders, experts recommend the use of risperidone as a first-line agent in the treatment of aggression and impulsivity in children and adolescents.[12]

Children and adolescents in most age groups, specifically older than five years of age, are increasingly being prescribed atypical antipsychotics. Although more youths between the ages of ten and 19 years received treatment with atypical antipsychotics, children aged five to nine years had the most significant gains in prevalence of use. While psychotic disorders were diagnosed in younger aged children, the most likely explanation for this particular trend may be related to the use of atypical antipsychotics for the treatment of aggressive behaviors occurring in the context of neuropsychiatric disorders. Disruptive behavioral

disorders accounted for nearly half of the psychiatric diagnoses in this age group in the Texas Medicaid and TDMHMR sample, thus reflecting the growing use of atypical antipsychotics. In children and adolescents of increasing age, the use of atypical antipsychotics may have shifted toward the treatment of thought disorders, such as schizophrenia, bipolar disorder with psychosis, and depression with psychosis. Late adolescence marks the time period when symptoms related to psychosis usually emerge, indicating the onset of the illness and necessitating treatment with antipsychotic medications.[13,14]

With regard to trends in gender-specific atypical antipsychotic use, the higher use of atypical antipsychotics in males is most likely explained by the fact that males are more likely to be physically aggressive compared to girls.[15] Aggressive behaviors in males tend to correlate more with hyperactivity and impulsivity, which may respond better with pharmacological interventions.[16] Girls tend to exhibit relational and verbal aggression, which may not require pharmacological treatment and may be better suited for psychosocial interventions.[15,17] In this study, disruptive behavioral disorders accounted for a higher percentage of the diagnoses in Texas Medicaid males receiving antipsychotic treatment and services from TDMHMR, compared to females. As mentioned previously, these disorders are often associated with aggression, which is commonly treated with antipsychotics.[18]

Mean daily doses of specific atypical antipsychotics

From 1996 to 2001, the mean daily dose of risperidone decreased in children and adolescents aged five years or older in all four insurance programs.

The decrease in mean daily risperidone dose may be explained by time on market and the growing body of evidence supporting the safety and efficacy of risperidone in childhood and adolescent psychiatric and behavioral disorders, namely aggression. Risperidone was introduced to the market in 1993, thus allowing three years for clinicians to become familiar with dosing strategies for specific psychiatric and behavioral disorders. Clinicians not only are able to recognize dosing ranges that tend to produce response for symptomatology, but also recognize dosing ranges that are associated with a lower occurrence of risperidone-related adverse effects. A study by Lane and colleagues evaluating risperidone dosing in adult patients with acutely exacerbated schizophrenia showed that lower daily risperidone doses (mean ± standard deviation: 3.4 ± 0.9 milligrams) were as effective as higher doses (6 milligrams), and were associated with a lower incidence of adverse effects.[19] Although no such study has been conducted in children and adolescents, it is possible that clinicians have become accustomed to using lower risperidone doses without compromise of response and with low rates of adverse effects.

Six randomized, controlled trials evaluating risperidone for the treatment of aggressive behaviors across a variety of psychiatric and behavioral conditions in children and adolescents demonstrated large effect sizes with relatively low doses of risperidone.[6-11] In five of the six randomized, controlled trials, the mean daily dose of risperidone was less than two milligrams.[6,7,9-11] In the study by Buitelaar and colleagues, the mean daily dose of risperidone was 2.9 milligrams.[8] These studies collectively suggest that aggressive behaviors in children and

adolescents may be successfully treated with low doses of risperidone. These dosing data are also reflected in the international consensus statement on attention-deficit hyperactivity disorder and disruptive behavioral disorders.[12] The recommended maximum daily doses of risperidone for children and adolescents are 0.75 milligrams per day (<50 kilograms body weight) and 1.5 milligrams per day (≥50 kilograms body weight).[12] It is possible that the availability of these data may have influenced risperidone dosing over time.

No definitive trends in olanzapine or quetiapine dosing existed across age groups and insurance programs. These agents have been studied in children and adolescents, but not to the extent of risperidone.[20,21] Much of the available olanzapine and quetiapine dosing data have been related to the treatment of psychotic disorders and mood disorders. Treatment of these types of psychiatric disorders usually requires higher doses than does treatment of aggression.[22,23] As additional dosing data for olanzapine and quetiapine use in children and adolescents become available, it is likely that a more distinct trend in dosing will become apparent.

Antipsychotic switch rates

The escalation of switch rates corresponds to several time-dependent trends in the use of antipsychotics in children and adolescents: number of atypical antipsychotics available, increased utilization of atypical antipsychotics, and decreased utilization of typical antipsychotics. It should be noted, however, that the mean number of antipsychotic switches per youth per year did not increase over time. This particular finding is encouraging because antipsychotic switching

is generally associated with lack of efficacy, potentially manifested as relapse, or the presence of adverse events.[24]

During the 1990s, the newer atypical antipsychotics were introduced to the market (risperidone in 1993, olanzapine in 1996, and quetiapine in 1997). With the availability of these agents, the likelihood of switching from a typical antipsychotic was high due to the favorable side effect profiles and comparable efficacy.[4] During the study period in all four programs, there was a brief increase in the number of typical to atypical antipsychotic switches, followed by a gradual decline. This indicates that youths receiving typical antipsychotics were being switched to atypical agents during the early study years. Studies have shown that switching from a typical antipsychotic to an atypical antipsychotic may result in improved medication adherence and better patient outcomes.[25-27] Since fewer children and adolescents were receiving typical antipsychotics over time, the rate of switching from a typical to an atypical antipsychotic decreased.

In all four insurance programs, atypical to atypical antipsychotic switching increased from 1996 to 2001. This trend is most likely attributed to the increased number of atypical antipsychotics available on the market. Other potential explanations include medication-related adverse effects and switching behavior. Although the atypical antipsychotics are associated with a low incidence of extrapyramidal symptoms and tardive dyskinesia, these agents are not free from side effects that can be debilitating to a child or adolescent. Most notable is the associated weight gain.[28-30] Weight gain can lead to other immediate and long-term health risks, such as obesity, glucose dysregulation, and dyslipidemia.[29,30]

Perhaps equally as important in children and adolescents is the impact of weight gain on the patient's self-esteem and quality of life.[31] Recent data suggest that patients receiving atypical antipsychotics may be more likely to switch. In a study by Rothbard and colleagues, the highest switching behavior was found in users of atypical antipsychotics compared to those using typical antipsychotics.[32] Similarly, in a Veterans Affairs study of schizophrenia, patients receiving olanzapine, quetiapine, or risperidone were equally or more likely to switch antipsychotic medications compared to those patients receiving typical antipsychotics.[33] This notion contradicts other published studies reporting higher switch rates and shorter treatment durations for patients receiving typical antipsychotics compared to those receiving atypical antipsychotics.[34,35] Differences in patterns of antipsychotic switching may be explained by several factors, such as time/date of study and the type of health care system evaluated.

Rates of switching from an atypical antipsychotic to a typical antipsychotic showed varying patterns across insurance programs. A reduction in this type of antipsychotic switching was seen in Ohio Medicaid, Texas Medicaid, and the Managed Care Organization over time, and is most likely explained by the decreased utilization of typical antipsychotics. The increase of atypical to typical antipsychotic switching seen in California Medi-Cal over time may be explained by exacerbations of psychiatric symptoms while on an atypical agent. It is possible that a child or adolescent was stable on a typical antipsychotic, switched to an atypical agent, experienced relapse, and then was switched to the original typical antipsychotic. In a Veterans Affairs study of patients with schizophrenia,

most patients with stable antipsychotic therapy who switched antipsychotics ultimately switched back to their original antipsychotic.[33] Alternatively, cost-related issues may be related to switches from an atypical to a typical antipsychotic.

Concomitant psychotropic medications

In all four insurance programs, the prevalence of concomitant psychotropic medication use in children and adolescents receiving antipsychotic treatment increased over time. The highest prevalence rate of concomitant psychotropic medication use was seen in Texas Medicaid. Although other studies have shown an increase in the rate of concomitant psychotropic medication use in children and adolescents over time, the prevalence of such use in this study's samples were relatively higher.[36,37] This may be explained by the intrinsic nature of the population under study. Inclusion criteria required children and adolescents to have at least one prescription claim record for an antipsychotic. This may have resulted in selection bias, as children and adolescents receiving antipsychotic treatment may represent a more severely ill population compared to those evaluated in other studies, and this may be associated with more psychotropic polypharmacy. Another potential reason for the high prevalence rates of concomitant psychotropic medication use in this study may be the liberal definition used to determine concurrent use of two agents. Other psychotropic medications were considered concomitant if their administration overlapped by at least one day with the antipsychotic treatment period. This definition of concomitant use of psychotropic agents was chosen because certain psychotropic

agents, such as sedative-hypnotics, are commonly used short-term. If a longer period of time was used to determine concurrent use, all concomitant psychotropic medication use would not have been captured and prevalence rates would have been underestimated.

Among the psychotropic drug classes, antidepressants, antimanic/bipolar agents, and psychostimulants were the most commonly used concomitant psychotropic agents with antipsychotics. Antipsychotic plus antidepressant combination treatment occurred in 26 to 38 percent of youths; antipsychotic plus antimanic/bipolar agent treatment occurred in 15 to 24 percent; and, antipsychotic plus psychostimulant treatment occurred in seven to 28 percent. These findings are consistent with a recent study by Martin and colleagues that examined multiple psychotropic pharmacotherapy among youths enrolled in Connecticut Medicaid Managed Care.[38] The most common drug combination in Connecticut children and adolescents was an antipsychotic plus an antidepressant, which occurred in 22 percent of the participants. Eight percent received an antipsychotic plus a mood stabilizer, and six percent received an antipsychotic plus a psychostimulant.

The high prevalence rates of concomitant psychotropic medication may be best explained by the estimated distribution of specific psychiatric and behavioral disorders. In the sample of youths receiving antipsychotics and mental health care services from TDMHMR, disruptive behavioral disorders were the most frequent diagnoses assigned by clinicians. Concomitant use of antipsychotics and other psychotropic agents has been found to be widespread in youths with

aggression.[39-41] Antimanic/bipolar agents, such as lithium and divalproex, have been shown to be effective in reducing aggression and may have been used primarily for this reason.[42-44] Other uses of concomitant antimanic/bipolar agents in this study may have included augmentation in depressive disorders and mood stabilization in bipolar disorders.[45-47] Concomitant use of psychostimulants may also have been used to reduce aggressive behaviors, but a more probable explanation lies with the high percentage of youths with a diagnosis of attention-deficit hyperactivity disorder.[48-50] The use of psychostimulants for the treatment of attention-deficit hyperactivity disorder is well-documented, as this class of psychotropic medications is considered first-line.[51,52]

The use of antidepressants has increased dramatically in children and adolescents since the introduction of selective serotonin reuptake inhibitors (SSRIs).[2,53,54] SSRIs are considered first-line treatment for childhood depression, primarily due to their established safety and efficacy in adults. Fluoxetine is the only SSRI indicated for adolescent depression.[55] Clinicians, including those in the primary care setting, may be inclined to pharmacologically treat youths with depressive symptoms. The proportion of youths with a depressive disorder was fairly significant, thus possibly explaining the high rate of concomitant use of an antidepressant with an antipsychotic. Other potential uses for concomitant antidepressant and antipsychotic use may include bipolar depression and aggression.[17,56-58]

Of the three insurance programs that were evaluated for prevalence rates of antipsychotic polypharmacy, all showed a trend of increasing use among

children and adolescents. From 1996 to 2001, the percentage of youths receiving treatment with two atypical antipsychotics increased, while those receiving treatment with two typical antipsychotics decreased. The prevalence of combination treatment with an atypical and typical antipsychotic did not show definitive trends over the six-year period. The increased utilization and availability of atypical antipsychotics, coupled with the decreased use of typical antipsychotics, help to explain these trends in antipsychotic polypharmacy. The 30-day interval used to define antipsychotic polypharmacy in this study may have produced more false positives, as clinicians may have used longer titration and tapering schedules for antipsychotics in children and adolescents.[12,22,59]

To date, no study evaluating antipsychotic polypharmacy in children and adolescents has been published. Numerous recent studies of adults with psychiatric disorders treated in inpatient and outpatient settings have documented the increased use of multiple antipsychotic agents.[60-65] However, most data supporting the safety and efficacy of antipsychotic polypharmacy in adults are limited to case reports, case series, and one randomized, controlled trial of two atypical agents.[66] In an Israeli trial of 28 patients with schizophrenia, the addition of sulpiride to clozapine resulted in greater reduction of positive and negative symptoms compared to clozapine plus placebo.[67] Preliminary data from case reports and case series of combination treatment with atypical antipsychotics available in the United States suggest that atypical antipsychotic polypharmacy may reduce symptoms of schizophrenia without an increase in significant adverse effects compared with monotherapy.[66] The increased use of antipsychotic

polypharmacy in children and adolescents causes significant concern, as a paucity of safety and efficacy data support atypical antipsychotic monotherapy in this population, and virtually no systematic data in any population support polypharmacy with multiple antipsychotics.

Cost of antipsychotic prescriptions

The increased cost of antipsychotic treatment in all four insurance programs was driven by increased cost and utilization of atypical antipsychotics. Compared to typical antipsychotics which are available in generic formulations, treatment with atypical antipsychotics incurs significantly greater costs. For example, based upon 2003 average wholesale prices (AWP), treatment with risperidone two milligrams per day results in monthly prescription costs of $152.10, and annual costs of $1,825.20. Treatment with haloperidol five milligrams per day costs $21.00 each month, and $252.00 each year.[68] Higher prescription costs coupled with increases in utilization of atypical antipsychotics led to significant growth in antipsychotic prescription expenditures. These findings are similar to those recently reported in a nationwide study of psychotropic medication costs for privately insured children and adolescents by Martin and Leslie.[69] From 1997 to 2000, the largest increases in utilization were seen with the atypical antipsychotics. Olanzapine, quetiapine, and risperidone accounted for approximately 21 percent of an additional $2.7 million spent in 2000 for psychotropic medications in children and adolescents by private insurance companies.[69] Typical antipsychotics accounted for less than one

percent of the additional psychotropic drug expenditures in children and adolescents in 2000.[69]

Geographic and Payer System Variation Findings

Geographic variations in antipsychotic prescribing have been demonstrated in a previous study of National Ambulatory Medical Care Survey data.[70] Nonfederal office-based physicians in the Northeast and South had higher rates of antipsychotic prescribing to patients of all ages than physicians in the Midwest and West. Additionally, anecdotal reports of antipsychotic use in nursing homes have suggested higher rates of use in Texas compared with California. The present study demonstrates similar geographic variations in antipsychotic prescribing to children and adolescents, as youths enrolled in Texas Medicaid had higher rates of antipsychotic utilization compared to Ohio Medicaid and California Medi-Cal youths.

Philosophical differences in treatment approaches related to physician training backgrounds and regional culture, and state-specific policies on antipsychotic medication usage may explain at least some of these geographic variations in antipsychotic prescribing.[71-74] Clinicians receiving training from newly established medical schools or those graduating recently are more inclined to use newer medications available on the market, such as the atypical antipsychotics.[71] State-based policies may differ in terms of applied restrictions on the use of psychotropic medications for the treatment of psychiatric and behavioral disorders in children and adolescents. Regional culture may be reflected in clinicians' attitudes toward the use of psychotropic medications in

youths, and possibly in clinical practice facilities. Geographic differences in provider availability and provider access to information about advances in pharmacological treatments may also be reflected in differences in prevalence rates of antipsychotic use in these three Medicaid systems.[75,76]

Antipsychotic prescribing in the 3 Medicaid state programs was substantially greater than that in the Managed Care Organization. Medicaid state programs may have a greater number of children and adolescents with mental and behavioral disorders, as the Medicaid population is of lower socioeconomic status and includes those with more severe mental disorders.[77] More specifically, lower socioeconomic status has been shown to be a predictor of aggression.[78] It is also possible that Medicaid-enrolled youths may be treated more aggressively than youths enrolled in private insurance programs.[79] This difference in treatment approach may be associated with more severe psychopathology or psychosocial adversity in Medicaid-enrolled children and adolescents.[77,79] Insurance system-specific factors (i.e., referral systems and criteria for services) may also contribute to these differences, and require further evaluation.[79] It is important to note the decrease in prevalence of antipsychotic use in the Managed Care Organization in 2001, compared to 2000. Changes in policy regarding antipsychotic utilization within the Managed Care Organization may have resulted in the decreased prevalence. Attempts to obtain further information about potential explanations for this finding were unsuccessful.

In all four insurance programs, managed behavioral health care may have influenced antipsychotic prescribing practices. The use of medications has

increased with the emerging presence of managed behavioral health care, and incentives for clinicians to treat with medications rather than psychotherapy.[80] The use of psychotherapy is restricted in many managed care plans, primarily by required authorizations or a limited number of therapists. The use of pharmacotherapy is encouraged, as less clinical time is needed for a medication visit that is reimbursed at twice or more the rate per minute than psychotherapy.[80] Furthermore, parents of affected children and adolescents may seek initial mental health care through a primary care physician.[81] In 1995, 75.4 percent of office-based visits for attention-deficit hyperactivity disorder were to primary care physicians; 12.4 percent were to psychiatrists.[82] This phenomenon may not be applicable to all psychiatric and behavioral disorders, as patients who are more complex and more severely ill may need to seek treatment from psychiatrists.[83] Primary care physicians may be more likely to treat children or adolescents with pharmacotherapy, compared to psychiatrists. This may be an artifact of the large volume of visits to primary care physicians by children and adolescents needing mental health care.[84] Eighty-five percent of office-based visits resulting in a prescription for a psychotropic medication for a child and adolescent below the age of 19 years were to general practitioners or pediatricians. Similarly, of all office-based visits during which an antipsychotic was prescribed to a youth, 85 percent of these visits were to primary care physicians.[84]

Phase II: Prescribing practices for antipsychotic agents

Prescriber type of antipsychotic prescriptions

The majority of antipsychotic prescribing to youths in the Texas Medicaid program is associated with psychiatrists and child and adolescent psychiatrists. Published studies examining prescribing trends of psychotropic medication use have shown that psychiatrists are more likely to prescribe antipsychotics compared to other physician specialities.[70,85,86] In a recent study by Van Brunt and colleagues examining outpatient use of antipsychotic medications in ambulatory care settings from 1997 to 2000, psychiatrists accounted for 70 percent of prescribing.[86] In this study, the percent of antipsychotics prescribed by psychiatrists was slightly higher, at approximately 75 percent. This may be explained by the nature of study population, as Texas Medicaid youths receiving antipsychotic treatment may represent a select population who are more ill and require health care from a specialist.

As psychiatrists' training includes diagnosis and management of psychiatric and behavioral problems in children and adolescents, these findings are encouraging. However, this does not necessarily imply that these agents, namely atypical antipsychotics, are being used either appropriately or inappropriately. Most of the prescribing was associated with psychiatrists, who may be initiating treatment with antipsychotics based upon adult efficacy and safety data for certain disorders that occur during childhood and adolescence. Without additional information, it is premature to draw conclusions about the

appropriateness of treatment, or whether pharmacological intervention is the most optimal treatment modality.

Primary care physicians accounted for roughly one-tenth of the total number of antipsychotic prescriptions, which suggests that children and adolescents may often receive treatment within this practice setting. Similar findings have been reported regarding antipsychotic prescribing in ambulatory settings across age groups, and antidepressant prescribing by primary care physicians for children and adolescents.[53,86] It has been estimated that 13 percent of children and adolescents who use mental health services seek care through the general medicine sector.[87] It is also possible that youths are initially evaluated by a psychiatrist, and then referred to a primary care physician for follow-up treatment when the child or adolescent is stabilized. In addition to the emphasis on managed care, reluctance of parents to seek psychiatric help, stigma related to psychiatric disorders, and systemic barriers to access, may affect the decision to obtain mental health care from a specialized physician.[88-90]

Given the expanding role of primary care physicians into the realm of mental health care for children and adolescents, it is important to highlight the need for specialized training in this area because without it, the ability to improve patient outcomes may become relatively poor.[84,91] Accuracy of diagnosis or symptom identification is imperative in determining, providing, and managing clinical treatment. Efforts to train primary care physicians in these aspects, particularly with regard to pharmacological treatments, are necessary to improve the psychological well-being and psychosocial functioning of youths affected

with mental illnesses.[91] In addition, systematic evaluation of patient outcomes are needed to ascertain whether mental health care provided by primary care physicians is adequate, and to determine areas in which further training may improve patient outcomes.

Diagnoses associated with antipsychotic prescribing

In children and adolescents receiving antipsychotic treatment and mental health care services, disruptive behavioral disorders were the most common diagnoses, followed by depressive disorders. Pappadopulos and colleagues reported comparable proportions of diagnoses in their analysis of "real-world" atypical antipsychotic use in inpatient children and adolescents.[92]

Disruptive behavioral disorders are often associated with aggressive behaviors, the most frequent reason for using antipsychotic treatment.[18] Data from six randomized, controlled trials suggest that risperidone is effective in reducing aggression in children and adolescents with a variety of psychiatric disorders.[6-11] Expert consensus statements on the treatment of disruptive behavioral disorders and aggression in youths recommend the use of antipsychotics.[12,22,59] Although the use of atypical antipsychotics for disruptive behavioral disorders and aggression remains off-label, the availability of supporting data represents an evidence-based treatment approach.

Depressive disorders were the second most frequent diagnoses in children and adolescents receiving antipsychotics. No systematic study examining the use of atypical antipsychotics in childhood or adolescent depression exists. However, the Texas Children's Medication Algorithm Project algorithm for the treatment of

childhood major depressive disorder recommends the use of a SSRI for youths with depression, with the addition of an antipsychotic medication for those with psychotic features.[55] The choice of antipsychotic medication is that of the clinicians, but the expert consensus panel recommended the use of an atypical antipsychotic. While the diagnosis of major depressive disorder with psychotic features was common in the study sample, it is unlikely that this diagnostic subtype accounted for all the use of atypical antipsychotics for children and adolescents with depressive disorders.

Depressive disorders in children and adolescents often coincide with comorbid disruptive behavioral disorders.[93,94] The presence of both disorders in a child or adolescent leads to serious maladjustment, and subsequently poorer prognosis.[95] Additionally, symptoms associated with a disruptive behavioral disorder in a child or adolescent with depression often results in psychiatric hospitalization.[94,96] Treatment of comorbid depressive and disruptive behavioral disorders may require the use of atypical antipsychotics. This may be especially true in those youths who are aggressive, and treatment with antidepressants or psychosocial intervention have been unsuccessful in reducing these behaviors.

The proportion of children and adolescents with a diagnosis of bipolar disorder and receiving antipsychotic treatment increased from 1998 to 2001. Although controversial, it has been suggested that the prevalence of bipolar disorder in children has increased. The prevalence of bipolar disorder in adolescence has also increased, and currently is approximately one percent.[97,98] Recent advances in the treatment of bipolar disorder have focused on the atypical

antipsychotics. Aripiprazole, olanzapine, quetiapine, risperidone, and ziprasidone have been assessed as treatments for acute mania in randomized, double-blind, placebo-controlled trials.[99-108] Both olanzapine and quetiapine have received indications for the treatment of acute mania in adults. In adolescents, only quetiapine has been studied in a randomized, controlled trial as adjunctive treatment for mania.[20] Over a six-week period, quetiapine plus divalproex significantly reduced manic symptoms compared to divalproex plus placebo.

Although data for atypical antipsychotics in the treatment of childhood or adolescent bipolar disorder are limited, clinicians are most likely using these agents based upon the availability of adult safety and efficacy data and few other treatment options for pediatric and adolescent bipolar disorder that have been extensively and systematically studied. Although this practice approach may be of concern, atypical antipsychotics do provide clinicians with additional treatment options in circumstances where the benefits of initiating antipsychotic treatment appear to outweigh the potential risks.[97] For example, the use of an atypical antipsychotic is appropriate in a child or adolescent with bipolar disorder with psychotic features, as both manic and psychotic symptoms may be reduced with one agent.

Similar to depressive disorders in youths, bipolar disorder in children and adolescents often co-occurs with disruptive behavioral disorders. The comorbidity between pediatric bipolar disorder and attention-deficit hyperactivity disorder has been estimated to range from 60 to 90 percent.[109-112] Symptoms commonly associated with both disorders include psychomotor agitation,

distractibility, restless sleep, poor school performance, and aggression.[113,114] Similarly, bipolar disorder and conduct disorder often present concurrently in youths, with the prevalence ranging from 17 to 64 percent.[115,116] Comorbidity of bipolar disorder with a disruptive behavioral disorder may warrant treatment with an antipsychotic, especially if severe aggressive behavior is present. The use of an atypical antipsychotic in such patients may be appropriate, as symptoms associated with both bipolar disorder and a disruptive behavioral disorder may be reduced.

Phase III: Relationships of antipsychotic use with patient health care service utilization

Inpatient psychiatric hospitalizations

The number of inpatient hospitalizations per child or adolescent receiving antipsychotic treatment and mental health care services from TDMHMR increased from 1998 to 2001. Among those who were hospitalized, the number of psychiatric hospitalizations per youth per year did not increase, suggesting that recidivism rates did not increase. The number of hospital days per hospitalized child or adolescent decreased significantly from 1998 to 2001.

In the literature, studies examining trends in psychiatric inpatient hospitalizations of children and adolescents are conflicting. In a study by Pottick and colleagues, a 4-fold increase in child and adolescent admissions for psychiatric and behavioral problems to the Menninger Clinic was reported.[117] Similarly, an increase of children and adolescents requiring inpatient psychiatric admissions was reported in an urban general hospital from 1998 to 2002.[118] On

the contrary, Martin and Leslie reported a decrease in the use of inpatient psychiatric hospitalizations among privately insured children and adolescents.[119]

Differences in the populations under study may explain the conflicting results, as certain risk factors have been identified as strong predictors of inpatient psychiatric hospitalization. Children and adolescents from a lower socioeconomic status are at a higher risk for inpatient psychiatric hospitalizations, particularly given the severity of psychopathology.[120,121] Youths with a history of any mental health care services, including prior hospitalizations, are likely to be admitted to an inpatient psychiatric facility.[122] A diagnosis of a disruptive behavioral disorder has also been associated with high use of inpatient psychiatric services.[123] Children and adolescents under examination in this particular study had each of the risk factors for psychiatric hospitalization discussed above. The nature of the population may best explain the trend of an increased number of hospitalizations over time. It must be noted, though, that diagnostic-specific analyses of inpatient psychiatric hospitalization data did not reveal any significant findings. Other demographic and clinical variables, such as adolescence (13 to 18 years), male gender, and prior psychiatric hospitalizations, have been identified as potential risk factors for psychiatric hospitalization.[120,122] Age- and gender-specific analyses of the number of inpatient psychiatric hospitalizations did not show any significant results. Inpatient psychiatric hospitalization data prior to 1998 were not available to evaluate the influence of prior psychiatric hospitalizations.

The number of inpatient psychiatric hospitalizations per hospitalized youth per year remained fairly steady over time. This finding is interesting, given that

the youths receiving antipsychotic treatment and mental health care services from TDMHMR had diagnostic predictors of rehospitalization. Children and adolescents with affective disorders or comorbid psychiatric disorders have been shown to have high rehospitalization rates.[124] A large percentage of youths under study had bipolar disorder or depression, or comorbid psychiatric disorders. Children and adolescents with comorbid psychiatric disorders were often diagnosed with a disruptive behavioral disorder, which has been shown to be a predictor of rehospitalization.[123]

A potential explanation for this result may be that reduced rehospitalization rates are associated with the increased use of atypical antipsychotics. In adults, newer atypical antipsychotics have been associated with decreased rehospitalization rates in schizophrenia. Several studies have demonstrated lower one-year rehospitalization rates in patients with schizophrenia receiving clozapine, olanzapine, or risperidone in comparison to those receiving typical antipsychotics.[125-128] It is possible that the use of atypical antipsychotics in hospitalized children and adolescents reduced subsequent rehospitalizations.

The number of hospital days per hospitalized child or adolescent decreased from 1998 to 2001. Recent studies of child and adolescent inpatient service utilization have shown a trend of decreased number of bed days over time.[119,129] Pottick and colleagues reported a 44 percent decline in the mean length of stay over an eight-year period, translating to a 23 percent decrease in number of bed-days.[129] In a trend analysis of four-year service data of privately insured children and adolescents, the mean length of inpatient mental health care

decreased 20 percent from 14.4 days in 1997 to 11.5 in 2000.[119] The trend of decreased hospital days may be explained by the influence of managed care, as well as the beneficial effects of atypical antipsychotics.

As a mechanism to contain health care costs, managed care organizations may substitute more costly services, such as inpatient psychiatric hospital days, with less costly alternatives.[130] Decreased number of hospital days per hospitalized youth may represent the penetration of managed care policies into the public mental health care system. Another possible explanation is the increased use of atypical antipsychotics. Although no published study has examined the effects of treatment with atypical antipsychotics on hospital days in children and adolescents, data from adult and geriatric populations have suggested that treatment with atypical antipsychotics is associated with reductions in hospital days.[131-133] It is possible that such reductions in the number of hospital days due to treatment with atypical antipsychotics may be seen in the child and adolescent population.

Other factors, such as severity of illness and environmental factors, may influence length of stay. Greater severity of psychopathology and specific diagnoses, such as post-traumatic stress disorder, have been associated with longer lengths of stay. Living arrangement stability, region of hospitalization, and severity of psychosocial stressors also affect psychiatric hospitalization length of stay in children and adolescents.[134-136] These types of data were not available for analysis of inpatient hospital days.

Outpatient mental health care services

Medication-related services, service coordination, and skills training constituted a significant percentage of outpatient mental health care services in children and adolescents receiving antipsychotic treatment. With regard to enrollment, a trend of more youths receiving these services, in addition to assessment services and counseling and psychotherapy, existed. The number of youths receiving crisis intervention and supportive services decreased over the four-year period. These findings are consistent with a recent study by Saunders and Heflinger which showed an increase in the use of medication-related services and case management by children and adolescents in TennCare.[137] Martin and Leslie reported an increase in the use of psychotherapy among privately insured children and adolescents.[119]

The increased use of medication-related services is expected given the nature of the study population and the rising prevalence of psychotropic medication use in children and adolescents. Youths under study were required to have received antipsychotic treatment, and therefore, were highly likely to receive medication-related services. The increased use of psychotropic medications in children and adolescents has been well-documented.[2,3,53] As more and more youths are treated pharmacologically, the need for medication-related services becomes greater. Medication-related services are essential for the improvement of patient outcomes, as these services are designed to facilitate medication adherence and evaluate drug response and side effects.[138] Approximately 80 percent of youths receiving pharmacological treatment were enrolled in

medication-related services. Children and adolescents receiving antipsychotic treatment may be receiving similar medication-related services outside the TDMHMR system, perhaps from a local psychiatrist, other specialist, or primary care physician.

Interestingly, the duration of enrollment in medication-related services decreased by nine days from 1998 to 2001. The increase in the number of youths receiving medication-related services may have affected duration of enrollment, as the amount of resources and staff to provide these services may not have been sufficient. It is also possible that once the youth is stabilized on his or her medications, he or she is referred to a primary care physician outside the TDMHMR system who then manages the youth's medications. Adherence to psychotropic medication regimens and its relationship to duration of enrollment in medication-related services were not assessed. It is possible that poor medication adherence led to the decrease in duration of enrollment in these services, or vice versa. In addition, it is unclear what effects the nine-day decrease in duration has on clinical outcomes.

Increased enrollment in service coordination may be best explained by the study population itself as well as the initiatives to contain mental health care costs. Youths receiving antipsychotic treatment and mental health care services from TDMHMR may be severely ill, thus requiring intensive service coordination. As integration of these children and adolescents into the community is a central goal to service coordination in the TDMHMR system, the need for service coordination for the severely mentally ill is great. In addition,

service coordination is a mechanism by which mental health care costs can be reduced by decreasing inpatient hospitalizations. The impact of intensive service coordination on patient outcomes in psychiatry has been examined. In New York State, enrollment in the Children and Youth Intensive Case Management resulted in decreased symptomatology, improved psychosocial functioning, and reductions in inpatient admissions.[139] Although costs associated with inpatient psychiatric hospitalizations may decrease, the cost-effectiveness of intensive case management has yet to be determined.[140,141] The duration of enrollment in service coordination increased by 36 days over the four-year period. This finding may be associated with the goal of cost containment, as monies spent to provide service coordination are intended to produce cost offsets via decreased inpatient psychiatric hospitalizations. It is also possible that children and adolescents receiving antipsychotic treatment and mental health care services from TDMHMR represent a population with more intensive needs. For example, children with disruptive behavioral disorders are perceived by parents as having a greater need for mental health care services, and in fact, these children are associated with higher rates of service utilization.[142,143]

Skills training is designed to improve a child or adolescent's skills necessary to function in society independently, and thus, to maintain or improve one's quality of life.[138] The increased use of skills training may be a reflection of the growing emphasis on improved patient outcomes and psychosocial functioning. Furthermore, increased enrollment in skills training may be related to the diagnostic profile of the population under study. Skills training has been

shown to be effective in reducing symptoms associated with disruptive behavioral disorders.[144-150] The duration of enrollment in skills training remained stable from 1998 to 2000, and then declined in 2001. Similar to medication-related services, the duration of enrollment in skills training may have been affected by the increased number of youths requiring this type of service, compounded by deficiencies in staff and resources. Furthermore, clinicians may be more inclined to use pharmacological interventions, as reimbursement rates for medication-related visits are higher compared to psychosocial interventions.[80] The recommended duration of skills training for children and adolescents with disruptive behavioral disorders has not been established. In the case of youths with "pure" conduct disorder, experts suggest that the duration of the psychosocial intervention be at least eight to ten weeks before response is assessed.[12] In children and adolescents receiving pharmacological treatment along with psychosocial interventions, symptoms should be assessed as early as two weeks.[12] In this study, the average duration of enrollment in skills training was approximately nine weeks, which may have been sufficient. However, the median duration of enrollment was approximately five weeks, which may not have been sufficient. Visit level data were not available, and therefore, the frequency or intensity of visits for skills training was not evaluated.

The number of children and adolescents enrolled in assessment services increased over the four-year period, while the duration of enrollment in these services decreased. Assessment services serve as the first step into TDMHMR mental health care services, during which eligibility for services is determined.[138]

The prevalence of psychiatric and behavioral disorders in children and adolescents has increased during the past few decades.[151] As more youths are affected with mental disorders, the need for mental health care services has increased correspondingly. It is possible that the increased demand for mental health care services has resulted in decreased time spent to assess children and adolescents for psychiatric or behavioral symptomatolgy, functional status, and school-related performance.

The number of youths enrolled in counseling and psychotherapy increased, and the duration of enrollment decreased from 1998 to 2001. With the increase in prevalence of psychiatric and behavioral disorders in children and adolescents, the need for counseling and psychotherapy to resolve issues resulting from the child or adolescent's mental illness most likely has also increased. Given limited resources for counseling and psychotherapy, these services may be focused on more severely ill youths and included as part of their treatment plans. Psychotherapy, including behavioral management interventions, has been shown to be effective for childhood disorders, including disruptive behaviors.[145] The duration of enrollment in counseling and psychotherapy may have been affected by the increased number of youths requiring this type of service, deficiencies in staff and resources, and incentives for clinicians to use pharmacological interventions.[80]

Frequency of enrollment in crisis intervention and supportive services decreased, while duration of enrollment in these services increased after an initial decrease. Increased use of other types of outpatient mental health care services,

namely medication-related services and service coordination, may have resulted in a reduction in use of crisis intervention and supportive services. With medication-related services, children and adolescents receiving antipsychotic treatment may have been routinely monitored by mental health care professionals. Timely detection of treatment failure and subsequent adjustments in medication regimens may have limited symptom exacerbations, and the need for crisis intervention. Similarly, intense service coordination may have resulted in symptom reduction and improved functioning. This, in turn, may have reduced the need for crisis intervention. It is also possible that the use of newer atypical antipsychotics may have led to a decreased need for these types of services.[152] The finding of increased duration of enrollment in crisis intervention and supportive services may be related to severity of psychopathology. As the number of enrolled youths decreased over time, those youths who received crisis intervention or supportive may have been more severely ill. They may have been more difficult to treat, thus requiring additional services to prevent inpatient psychiatric hospitalizations and maintain psychosocial functioning. Alternatively, the increased duration of enrollment may be an artifact of sample size. With the substantial decrease in the number of youths receiving these services, variability in the data may have resulted in inaccurate estimates of the mean and median duration of enrollment in crisis intervention and supportive services.

Study Limitations

The findings from this study should be viewed in the context of its limitations.

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (1996 to 2001)

Several limitations to Phase I exist. First, the generalizability of prevalence findings may be limited to other comparable state Medicaid programs and private managed care organizations. It is unknown whether similar trends in antipsychotic use are occurring in other insurance programs, such as private fee-for-service programs. Second, the study analyzed annual cross-sectional data, which does not allow for an evaluation of an individual's course of treatment over the six-year period. Third, the integrity of the pharmacy database from Ohio Medicaid was compromised with regard to the 'days supply' field. Due to a large percentage of prescription records in which the 'days supply' field equaled the 'quantity dispensed' field, a proxy of 30 days was used as 'days supply'. Fourth, physician specialty and diagnostic data associated with antipsychotic prescribing were not available for three of the four programs. Physician specialty and diagnostic data were available for Texas Medicaid and a subset of youths receiving mental health care services from TDMHMR, respectively. To determine the appropriateness of use, it is important to discern the treatment setting and the diagnosis for which antipsychotics are being prescribed. Although the geographic variation in antipsychotic prescribing raises important questions, it does not indicate whether or not this variance is appropriate. Fifth, service utilization data were not available for California Medi-Cal, Ohio Medicaid, and

the Managed Care Organization to determine the percentage of antipsychotic-treated youths who were receiving psychosocial services, possibly prior to the initiation of an antipsychotic. Service utilization data were available for a subset of Texas Medicaid youths receiving mental health care services from TDMHMR. Sixth, since this study was based upon administrative data, it cannot be assured that each child or adolescent prescribed an antipsychotic actually took the medication. Finally, the absence of clinical outcomes data does not allow one to determine the extent to which these children and adolescents benefited from antipsychotic treatment.

Phase II: Prescribing practices for antipsychotic agents

Prescriber data were collected only from Texas Medicaid. The generalizability of results pertaining to physician specialty may be limited as other regions or states may not have similar specialty distributions as Texas. For example, it is possible that the number of practicing psychiatrists, including child and adolescent specialists, is greater in other states compared to Texas. Initiation and continuity of care with the same prescriber was not assessed in this phase. It is important to examine which type of physician started a child or adolescent on antipsychotic treatment, and whether care is continued with that type of prescriber or a referral to different type of specialist is made. Prescriber data may not have been totally reliable, as specialities not likely to be associated with antipsychotic prescribing were identified. Diagnostic data were limited to a subset of Texas Medicaid youths receiving antipsychotics and mental health care services from TDMHMR. Results pertaining to diagnosis associated with antipsychotic use

may not be generalizable to all Texas Medicaid youths, as well as other children and adolescents in other states. Diagnostic data may not have been reliable as in some circumstances, "qualified mental health professionals" are the source of diagnostic information. These individuals may not have adequate training to appropriately diagnose psychiatric or behavioral disorders in children and adolescents.

Phase III: Relationships of antipsychotic use with patient health care service utilization

Similar to the limitation of diagnostic analyses in Phase II, service utilization data were limited to a subset of Texas Medicaid youths receiving antipsychotics and mental health care services from TDMHMR. Results pertaining to service utilization may not be generalizable to all Texas Medicaid youths, as well as other children and adolescents in other states. Service utilization data did not include visit level data. Thus, the frequency, intensity, and specifics (e.g., type of therapy) of outpatient mental health care services were not evaluated.

Despite these limitations, this study provides a snapshot of the trends in antipsychotic use among children and adolescents since the introduction of atypical antipsychotics, prescriber types and diagnoses associated with antipsychotic prescribing, and trends in service utilization among youths receiving antipsychotic treatment.

Study Implications and Future Research

Phase I: Trends in the prevalence of antipsychotic use in children and adolescents (1996 to 2001)

The increased use of atypical antipsychotics further validates the growing trend of increased use of psychotropic medications in children and adolescents. Although limited systematic data supporting the safety and efficacy of atypical antipsychotics in this population exist, these agents may represent advances in the treatment of childhood and adolescent psychiatric and behavioral disorders that necessitate antipsychotic treatment. The role of atypical antipsychotics in child and adolescent psychiatry is expanding, given their favorable side effect profiles compared to typical antipsychotics. The use of atypical antipsychotics is also expanding toward younger aged children. Early identification and treatment of certain psychiatric and behavioral disorders, such as early-onset schizophrenia, pediatric bipolar disorder, and disruptive behavioral disorders, may result in better long-term prognoses for afflicted children.

Most published data examining the safety and efficacy of atypical antipsychotics in children and adolescents come from anecdotal case reports and small open-label trials. Evidence from controlled clinical trials supporting the efficacy of risperidone is available, specifically for the treatment of disruptive behavioral disorders and aggression. More controlled clinical studies in children and adolescents are needed to evaluate the short-term and long-term safety and efficacy of atypical antipsychotics. Much attention has been given to the atypical antipsychotics and their propensity to induce weight gain, glucose dysregulation, lipid abnormalities, and cardiovascular effects.[59,153] However, most of these data

have been limited to the adult population. Systematic studies of these metabolic and cardiovascular effects in children and adolescents have yet to be conducted. Additionally, the long-term safety profiles of atypical antipsychotics have yet to be fully determined. Preliminary evidence on risperidone suggests that the effects on cognitive development and physical growth may be negligible, but additional data are needed to further validate risperidone's effects and examine the long-term effects of the other atypical antipsychotics.[154,155]

Future research of child and adolescent aggression should aim to compare the relative efficacies of atypical antipsychotic treatment with nonpharmacological treatment methods, such as behavioral therapy and psychoeducation. A study with a design similar to that of the National Institute of Mental Health Collaborative Multimodal Treatment Study of Children with Attention-Deficit Hyperactivity Disorder would provide valuable information about short-term and long-term treatment effect sizes associated with the different modalities of treatment, mediators and moderators of treatment, and which treatment modality is the most cost-effective.[156-160]

All these data should be used in turn, to establish evidence-based recommendations or guidelines for appropriate use. For example, Treatment Recommendations for the Use of Antipsychotics for Aggressive Youths (TRAAY) were developed to provide practicing clinicians evidence-based and consensus-based (in areas where evidence was lacking) recommendations for the treatment of aggression in youths in inpatient and day treatment settings.[22,59] It is important to note that TRAAY are recommendations and not guidelines, because

data were thought to be inadequate to develop evidence-based guidelines. Similar recommendations or guidelines are needed for general outpatient management, as well as recommendations or guidelines explaining the role of combined pharmacologic and psychosocial interventions.

Phase II: Prescribing practices for antipsychotic agents

Although psychiatrists account for the majority of antipsychotic prescriptions for children and adolescents, the primary care setting plays a major role in the identification and treatment of mental health problems. Given this, pediatricians, general practice physicians, and family physicians need sufficient training to adequately assess and treat children and adolescents presenting with psychiatric and behavioral symptomatology.[91] Adequate clinic time is also necessary, which may require changes in current reimbursement rates. Additional training in child and adolescent psychiatry and clinic time will be even more imperative with the ongoing integration of nonphysician prescribing, such as mental health nurse practitioners and physician assistants. Future studies of provider specialty associated with antipsychotic medications need to examine differences in patient outcomes, as well as costs associated with specific provider types. Policy makers, in turn, need to use these data to develop health care systems in which children and adolescents needing mental health treatment do not face access to care issues and are provided the most optimal treatments to reduce debilitating symptoms and to improve psychosocial functioning.

Aggressive behaviors, particularly those associated with disruptive behavioral disorders, remain the main reason for antipsychotic use in children and

adolescents. Although risperidone has been systematically evaluated for the treatment of aggression and shows reasonable effect sizes, other atypical antipsychotics have yet to be studied as such.[6-11] Future research studies are needed to determine the relative safety and efficacy of other atypical agents with different pharmacological profiles compared to risperidone. Adult data supporting the safety and efficacy of atypical antipsychotics are available for other psychiatric disorders, such as schizophrenia and bipolar disorder. However, it is unclear how these data are generalizable to the child and adolescent population. The assumption that adult safety and efficacy data are applicable to children and adolescents is not sufficient, as seen recently with the controversy surrounding SSRIs.[161] Researchers from academia, the federal government, and the pharmaceutical industry need to collaborate to bridge the widening gap between science and clinical practice. As mentioned previously, studies such as the National Institute of Mental Health Collaborative Multimodal Treatment Study of Children with Attention-Deficit Hyperactivity Disorder would provide valuable information regarding the treatment of childhood and adolescent psychiatric and behavioral disorders.

Phase III: Relationships of antipsychotic use with patient health care service utilization

With the increased use of atypical antipsychotics in children and adolescents, the use of inpatient mental health care services has declined and the use of outpatient services has increased. Pharmacological treatment interventions have not only become commonplace in child and adolescent psychiatry, but in psychiatry as a whole. Services to promote and maintain children and adolescents

on appropriate and beneficial medication regimens are likely to be encouraged. This paradigm shift in treatment may be attributed primarily to the emphasis on reducing health care costs. Other reasons for this shift may include a lack of resources and qualified staff.

One should remember that nonpharmacological interventions, such as psychotherapy and skills training, are effective treatment modalities that are recommended by experts.[12] The role of nonpharmacological treatments in aggressive children and adolescents has yet to be established, as no evidence is available to suggest whether pharmacological treatment or nonpharmacological treatment is superior with this population. It is unclear whether youths with aggression will benefit from a combination of both treatment modalities.

Head-to-head comparisons, using the same inclusion/exclusion criteria and standardized measures across both types of interventions, are vital in defining the role of both pharmacological and nonpharmacological interventions. Additionally, long-term studies are needed to evaluate whether or not the effects of pharmacological versus nonpharmacological treatments are sustained. Researchers need to evaluate the effects of "real-world" psychosocial interventions on psychiatric and behavioral symptoms in children and adolescents. The quality of psychosocial interventions in a naturalistic setting may not be adequate to produce similar effect sizes as randomized, controlled trials.

As the focus of mental health care service utilization has turned toward the outpatient sector, it is imperative that future studies address which specific types of services, alone or in combination, result in high symptom response rates and

improved psychosocial functioning. Policy makers, in turn, should use this evidence to create cost-effective treatment plans that produce significant improvement and re-integrate afflicted children and adolescents into society as independent, productive members.

Conclusions

The pressures of the health care system may be reflected in the increased use of antipsychotics for the treatment of children and adolescents. The appropriateness of atypical antipsychotic use should be evaluated as limited data supporting safety and efficacy are available in children and adolescents. The growing body of evidence supporting the safety and efficacy of atypical antipsychotics for the treatment of aggressive behaviors is encouraging. However, more controlled, clinical studies and long-term effectiveness studies in several childhood and adolescent psychiatric and behavioral disorders are necessary to fully determine the role of these agents in the treatment of mental and behavioral disorders in youths. Head-to-head comparisons between antipsychotic medications, psychosocial treatments, or a combination of both treatment modalities are warranted. Additional treatment guidelines based on these studies are needed.

Physicians of all specialties, perhaps especially primary care, should carefully evaluate the patient and his or her surroundings to determine the potential benefits and harms of treatment with an antipsychotic. Routine diagnostic assessments with reliable and valid instruments are necessary to ensure

that accurate diagnoses have been made and the appropriate pharmacotherapy regimen has been initiated. Scheduled assessments of symptoms and medication side effects are also required during the clinical management of these youths. Future research should address effectivness of antipsychotic medications across treatment settings, which may provide valuable information as to which setting provides the best possible improvement in patient outcomes.

Mental health care services play an important role in the treatment plan of a child or adolescent with psychiatric or behavioral problems. Current studies of mental health care service utilization among youths have primarily examined patterns of use. It is important not only to evaluate what different types of services are being utilized, but also how these services affect patient outcomes. Furthermore, future studies need to examine the quality of services provided to children and adolescents, especially those tailored to improving psychosocial function.

As the prevalence of psychiatric and behavioral disorders in children and adolescents continues to grow, the need for effective models of psychiatric treatment in all sectors will undoubtedly increase. However, the reality is that research efforts in child and adolescent psychiatry lag well behind the current and projected needs. Researchers from academia, government, and the pharmaceutical industry need to collaborate and begin gaining ground. Studies should be conducted to determine what types of treatments, pharmacological and nonpharmacological, are safe and effective in this population, and how these treatments can best be delivered. These types of data should help decrease the

current gap that exists between science and clinical practice, and hopefully improve treatment outcomes and psychosocial functioning for children and adolescents with mental illness.

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APPENDICES

APPENDIX A

Descriptions of Outpatient Mental Health Services Provided by the Texas Department of Mental Health and Mental Retardation

The following descriptions of outpatient mental health services provided by the Texas Department of Mental Health and Mental Retardation are available at http://www.mhmr.state.tx.us/MentalHealthServices/MHChildrensServices.html.

Assessment Services (TC08)

There are several steps to completing an assessment. The first part is to determine whether or not your child is eligible for services from the local mental health authority. In order to be eligible, your child must meet the definition of "priority population." To be in the priority population, your child must be between the ages of three and 17 with a diagnosis of mental illness who exhibit serious emotional, behavioral or mental disorders and who:

- Have a serious functional impairment;
- Are at risk of disruption of a preferred living or child care environment due to psychiatric symptoms; or
- Are enrolled in a school system's special education program because of a serious emotional disturbance.

A licensed professional will meet with you and your child face-to-face to ask you questions about your child's mental health, emotional and behavioral issues, their

relationships at home and with friends, their health, their development, their schoolwork, and other information needed to complete the assessment.

Counseling and Psychotherapy (TC13)

Individual, group and/or family counseling designed to resolve problems that result from the child's mental, emotional or behavioral disorder. An appropriately licensed professional will provide this service.

Crisis Intervention (TC01, TC07, TC09, TC17, and TC20)

In-Home Crisis (TC01)

Crisis intervention and supports provided in the home to assist children and their families manage an identified crisis and keep the child with the family or primary caregiver. This service is provided to a child who is at risk of being placed outside the home. In-home crisis intervention may also be provided in other community settings.

Inpatient Services (TC07)

Hospital services provide 24-hour care to children who cannot be stabilized in a less restrictive environment. Services are designed to provide safety and security during an acute psychiatric crisis. The staff provides intensive interventions designed to relieve the child's acute symptoms so that the child can return to their community.

Therapeutic Foster Care (TC09)

Therapeutic Foster Care is when trained foster parents provide 24-hour care in their home for children who are temporarily unable to live with their parents or primary caregivers. Services and supports include family skills training for the natural parents/primary caregivers; training and support for the foster parents; crisis management; skills training and individual, group and family counseling.

Other Residential Services (TC17)

If a child is experiencing a psychiatric crisis that cannot be stabilized in a community setting, then short-term (usually 24 hours) residential services are provided. Intensive crisis residential services may be located in a variety of settings, including hospitals, therapeutic foster care homes, group homes, and crisis stabilization units or crisis beds in residential treatment centers.

Acute Day Treatment (TC20)

An intensive, short-term program provided during the day for children who need a team of professionals to help stabilize their acute and severe psychiatric symptoms. The environment is highly structured and provides constant supervision. Services and supports may include medication-related services, individual, group and family counseling, skills training, family training, and crisis management.

Medication-Related Services (TC04)

If your child is prescribed medication, there are several services that are provided as a part of your child's care:

- If he or she takes the medicine at the community center, a licensed nurse or other qualified and trained staff supervised by a doctor or registered nurse will provide or administer it.
- This person will also be responsible for monitoring your child's medication, by assessing the impact of the medicine, including how well the medicine is working, if there are any side effects or adverse effects or if your child is experiencing any possible toxic reactions to the medicine.
- Appropriately trained staff will also teach your child and/or family member the knowledge and skills needed to be able to administer and monitor the medication at home.
- The doctor will be responsible for managing your child's medication to determine if his/her symptoms are staying the same, getting worse, getting better or clearing up completely. The doctor will evaluate the effectiveness of the prescribed medication, the dose (how much), the frequency (how often) and whether or not a different medication should be tried, and when.
- Your local mental health authority is responsible for ensuring that your child receives his/her prescribed psychoactive medication, under

certain circumstances. Your child's medication will be provided to you if:

- You have no other means of paying for this medicine;
- The medicine has been determined to be medically necessary;
- It is prescribed by an authorized representative of the local mental health authority; and,
- Your child is receiving services and registered in the Texas Department of Mental Health and Mental Retardation's management information system, called the Client Assignment and Registration system.

Service Coordination (TC06)

Your local mental health authority provides services that help your child access needed resources and services. For children with less intensive needs, this service is called case coordination. The case coordinator will also coordinate your child's treatment, provide continuity of services, and plan for the services needed by your child when he/she completes their treatment.

For children with more intensive needs, the local mental health authority/community mental health center provides service coordination to help your child access needed medical, social, educational and other appropriate services that will help your child achieve a quality of life and community

participation acceptable to you and your child. Service coordinators also coordinate your child's treatment, provide continuity of care and develop a plan for the services needed by your child when he/she completes his/her treatment.

Your service coordinator also:

- Helps you when there is a need for crisis prevention and management, by locating and coordinating emergency services in order to prevent the crisis from getting worse.
- Is responsible for monitoring the services your child receives to see if the services are effective, or if your child needs additional or different services.
- Is responsible for identifying and arranging for the delivery of the services and supports that you have discussed with them and that you believe will address the child's needs and desires.

Skills Training (TC03, TC10, and TC19)

Rehabilitative Day Treatment (TC03)

A community-based program that operates during the daytime and provides an integrated set of services and supports that focuses on improving the functioning and behavior of the child. Day treatment may include counseling, family training, skills training, and crisis management.

Individual Skills Training (TC10)

Skills training provides your child the opportunity to learn and improve the skills that they need to function as appropriately and independently as possible in the community. Skills training is designed to maintain the child's quality of life. This service includes, but is not limited to activities and training to address their mental illness or the problems that result when their symptoms interfere with functioning in their living and learning environment. As much as possible, skills training should be done within a natural setting, such as home or school, rather than in the center's offices.

Family Skills Training (TC19)

Families may also receive skills training. Family training is provided face-to-face to the family of a child to help the family understand the effects and treatment of emotional, behavioral and mental disorders. The training is designed to improve the symptoms of the child's disorder.

Supportive Services (TC05, TC23, and TC24)

Respite (TC05)

Respite care is designed to provide a break from the stress that results when families are taking care of a child with mental illness every day. Respite care can be either provided in the home by respite staff (called community-based respite care) or it can be provided at a temporary residential placement outside the child's

usual living situation (called program-based respite care). Respite services can be planned ahead of time or provided in a crisis.

Family-Focused Services (TC23)

No description of family-focused services was provided by the Texas Department of Mental Health and Mental Retardation website.

Flexible Community Support (TC24)

Supports provided to assist a family and their child to:

- Identify and use non-clinical/non-professional community resources;
- Reduce the symptoms of the child's disorder(s);
- Maintain the quality of life; and,
- Promote family integration.

These flexible community supports must be based on the preferences of the child and family and focus on the outcomes that you have chosen. They must also be included as strategies in your individualized family plan of care for you and your child. The supports must be unavailable through other Texas Department of Mental Health and Mental Retardation funding and not readily available through other social services resources, other agencies, natural community supports, volunteers or charitable contributions. Flexible community supports may include: mentors; tutors; family aides; specialized camps; temporary child-care; initial job development and placement activities; and transportation services.

APPENDIX B

Logistic Regression Analyses of Prevalence Data Regarding Antipsychotic Use

CHILDREN AND ADOLESCENTS ENROLLED IN MEDI-CAL (CA)

1. Prevalence of Total Antipsychotic Use (H_1).
2. Prevalence of Atypical Antipsychotic Use (H_2).
3. Prevalence of Typical Antipsychotic Use (H_3).
4. Age-Specific Prevalence of Total Antipsychotic Use (H_5).
5. Age-Specific Prevalence of Atypical Antipsychotic Use (H_6).
6. Age-Specific Prevalence of Typical Antipsychotic Use (H_7).
7. Gender-Specific Prevalence of Total Antipsychotic Use (H_8).
8. Gender-Specific Prevalence of Atypical Antipsychotic Use (H_9).
9. Gender-Specific Prevalence of Typical Antipsychotic Use (H_{10}).

TOTAL

16201023 cases have Y=0; 84702 cases have Y=1.

Variable Avg SD
1 1998.4378 1.7167

Iteration History...
-2 Log Likelihood = 59842.2458 (Null Model)
-2 Log Likelihood = 57663.3097
-2 Log Likelihood = 57649.2918
-2 Log Likelihood = 57649.2912
-2 Log Likelihood = 57649.2912 (Converged)

Overall Model Fit...
Chi Square= 2192.9546; df=1; p= 0.0000

Coefficients and Standard Errors...
Variable Coeff. StdErr p
1 0.0941 0.0020 0.0000
Intercept -193.4005

Odds Ratios and 95% Confidence Intervals...
Variable O.R. Low -- High
1 1.0987 1.0944 1.1031

X1	n0	n1	Calc Prob
1996.0000	2882068	13090	0.0041
1997.0000	2833837	11710	0.0045
1998.0000	2624306	13017	0.0049
1999.0000	2638634	13349	0.0054
2000.0000	2637448	15652	0.0059
2001.0000	2584730	17884	0.0065

ATYPICAL

16236647 cases have Y=0; 49078 cases have Y=1.

Variable Avg SD
1 1998.4378 1.7167

Iteration History...
-2 Log Likelihood = 67767.5445 (Null Model)
-2 Log Likelihood = 46365.9052
-2 Log Likelihood = 43496.3872
-2 Log Likelihood = 43456.8771
-2 Log Likelihood = 43456.8614
-2 Log Likelihood = 43456.8614 (Converged)

Overall Model Fit...
Chi Square=24310.6831; df=1; p= 0.0000

Coefficients and Standard Errors...
Variable Coeff. StdErr p
1 0.4423 0.0031 0.0000
Intercept -889.9510

Odds Ratios and 95% Confidence Intervals...
Variable O.R. Low -- High
1 1.5563 1.5469 1.5657

X1	n0	n1	Calc Prob
1996.0000	2894253	905	0.0008
1997.0000	2842898	2649	0.0012
1998.0000	2630534	6789	0.0019
1999.0000	2642328	9655	0.0029
2000.0000	2640071	13029	0.0046
2001.0000	2586563	16051	0.0071

TYPICAL

16241589 cases have Y=0; 44136 cases have Y=1.

Variable Avg SD
1 1998.4378 1.7167

Iteration History...
-2 Log Likelihood = 09907.6322 (Null Model)
-2 Log Likelihood = 02719.4450
-2 Log Likelihood = 02410.5321
-2 Log Likelihood = 02409.9529
-2 Log Likelihood = 02409.9529
-2 Log Likelihood = 02409.9529 (Converged)

Overall Model Fit...
Chi Square= 7497.6793; df=1; p= 0.0000

Coefficients and Standard Errors...
Variable Coeff. StdErr p
1 -0.2489 0.0030 0.0000
Intercept 491.3288

Odds Ratios and 95% Confidence Intervals...
Variable O.R. Low -- High
1 0.7797 0.7752 0.7842

X1	n0	n1	Calc Prob
1996.0000	2882473	12685	0.0045
1997.0000	2835379	10168	0.0035
1998.0000	2629210	8113	0.0028
1999.0000	2646439	5544	0.0022
2000.0000	2648737	4363	0.0017
2001.0000	2599351	3263	0.0013

<2 YEARS-TOTAL

1306600 cases have Y=0; 1398 cases have Y=1.

Variable	Avg	SD
1	1998.3722	1.7383

Iteration History...
-2 Log Likelihood = 21922.5294 (Null Model)
-2 Log Likelihood = 21333.3773
-2 Log Likelihood = 21260.7309
-2 Log Likelihood = 21259.5255
-2 Log Likelihood = 21259.5248
-2 Log Likelihood = 21259.5248 (Converged)

Overall Model Fit...
Chi Square= 663.0047; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.4429	0.0190	0.0000
Intercept	877.8926		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.6422	0.6188	0.6665

X1	n0	n1	Calc Prob
1996.0000	252631	549	0.0023
1997.0000	236494	320	0.0015
1998.0000	206052	343	0.0010
1999.0000	201670	82	0.0006
2000.0000	201226	64	0.0004
2001.0000	208527	40	0.0003

<2 YEARS-ATYPICAL

1307840 cases have Y=0; 158 cases have Y=1.

Variable	Avg	SD
1	1998.3722	1.7383

Iteration History...
-2 Log Likelihood = 3166.7475 (Null Model)
-2 Log Likelihood = 3131.9840
-2 Log Likelihood = 3129.8009
-2 Log Likelihood = 3129.7940
-2 Log Likelihood = 3129.7940 (Converged)

Overall Model Fit...
Chi Square= 36.9535; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2847	0.0483	0.0000
Intercept	-578.0098		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3293	1.2092	1.4613

X1	n0	n1	Calc Prob
1996.0000	253178	2	0.0001
1997.0000	236803	11	0.0001
1998.0000	206361	34	0.0001
1999.0000	201707	45	0.0001
2000.0000	201253	37	0.0002
2001.0000	208538	29	0.0002

<2 YEARS-TYPICAL

1306741 cases have Y=0; 1257 cases have Y=1.

Variable	Avg	SD
1	1998.3722	1.7383

Iteration History...
-2 Log Likelihood = 19978.8697 (Null Model)
-2 Log Likelihood = 19234.0566
-2 Log Likelihood = 19095.4326
-2 Log Likelihood = 19090.3625
-2 Log Likelihood = 19090.3448
-2 Log Likelihood = 19090.3448
-2 Log Likelihood = 19090.3448 (Converged)

Overall Model Fit...
Chi Square= 888.5248; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.5711	0.0222	0.0000
Intercept	1133.8294		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.5649	0.5408	0.5901

X1	n0	n1	Calc Prob
1996.0000	252632	548	0.0024
1997.0000	236503	311	0.0014
1998.0000	206081	314	0.0008
1999.0000	201710	42	0.0004
2000.0000	201261	29	0.0002
2001.0000	208554	13	0.0001

2-4 YRS-TOTAL

3288997 cases have Y=0; 3810 cases have Y=1.

Variable	Avg	SD
1	1998.3137	1.7143

Iteration History...
-2 Log Likelihood = 59141.0125 (Null Model)
-2 Log Likelihood = 58714.8428
-2 Log Likelihood = 58702.4165
-2 Log Likelihood = 58702.4039
-2 Log Likelihood = 58702.4039 (Converged)

Overall Model Fit...
Chi Square= 438.6085; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2052	0.0101	0.0000
Intercept	403.2020		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8145	0.7986	0.8307

X1	n0	n1	Calc Prob
1996.0000	647145	1186	0.0018
1997.0000	611209	808	0.0014
1998.0000	540478	731	0.0012
1999.0000	517174	350	0.0009
2000.0000	496668	363	0.0008
2001.0000	476323	372	0.0006

2-4 YRS-ATYPICAL

3291807 cases have Y=0; 1000 cases have Y=1.

Variable	Avg	SD
1	1998.3137	1.7143

Iteration History...
-2 Log Likelihood = 18198.6876 (Null Model)
-2 Log Likelihood = 17722.1362
-2 Log Likelihood = 17644.3670
-2 Log Likelihood = 17643.1403
-2 Log Likelihood = 17643.1398
-2 Log Likelihood = 17643.1398 (Converged)

Overall Model Fit...
Chi Square= 555.5478; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4612	0.0211	0.0000
Intercept	-930.0537		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5860	1.5217	1.6531

X1	n0	n1	Calc Prob
1996.0000	648321	10	0.0001
1997.0000	611962	55	0.0001
1998.0000	541051	158	0.0002
1999.0000	517319	205	0.0003
2000.0000	496760	271	0.0005
2001.0000	476394	301	0.0008

2-4 YRS-TYPICAL

3289873 cases have Y=0; 2934 cases have Y=1.

Variable	Avg	SD
1	1998.3137	1.7143

Iteration History...
-2 Log Likelihood = 47077.1059 (Null Model)
-2 Log Likelihood = 45786.2711
-2 Log Likelihood = 45619.6148
-2 Log Likelihood = 45616.3628
-2 Log Likelihood = 45616.3600
-2 Log Likelihood = 45616.3600 (Converged)

Overall Model Fit...
Chi Square= 1460.7459; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.4666	0.0136	0.0000
Intercept	925.1485		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.6271	0.6106	0.6440

X1	n0	n1	Calc Prob
1996.0000	647148	1183	0.0020
1997.0000	611250	767	0.0012
1998.0000	540602	607	0.0008
1999.0000	517347	177	0.0005
2000.0000	496917	114	0.0003
2001.0000	476609	86	0.0002

5-9 YRS-TOTAL

4977097 cases have Y=0; 19149 cases have Y=1.

Variable	Avg	SD
1	1998.4174	1.7047

Iteration History...
-2 Log Likelihood = 51321.9246 (Null Model)
-2 Log Likelihood = 50466.1538
-2 Log Likelihood = 50456.4303
-2 Log Likelihood = 50456.4291
-2 Log Likelihood = 50456.4291 (Converged)

Overall Model Fit...
Chi Square= 865.4955; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1253	0.0043	0.0000
Intercept	-256.0317		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1335	1.1240	1.1431

X1	n0	n1	Calc Prob
1996.0000	883204	2812	0.0028
1997.0000	882210	2605	0.0031
1998.0000	822946	2879	0.0036
1999.0000	820499	2889	0.0040
2000.0000	805951	3634	0.0046
2001.0000	762287	4330	0.0052

5-9 YRS-ATYPICAL

4985409 cases have Y=0; 10837 cases have Y=1.

Variable	Avg	SD
1	1998.4174	1.7047

Iteration History...
-2 Log Likelihood = 54587.4340 (Null Model)
-2 Log Likelihood = 48103.9978
-2 Log Likelihood = 46777.5504
-2 Log Likelihood = 46740.6117
-2 Log Likelihood = 46740.5409
-2 Log Likelihood = 46740.5409
-2 Log Likelihood = 46740.5409 (Converged)

Overall Model Fit...
Chi Square= 7846.8931; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.5575	0.0071	0.0000
Intercept	-1120.6160		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.7463	1.7222	1.7706

X1	n0	n1	Calc Prob
1996.0000	885921	95	0.0004
1997.0000	884448	367	0.0006
1998.0000	824599	1226	0.0011
1999.0000	821361	2027	0.0020
2000.0000	806490	3095	0.0034
2001.0000	762590	4027	0.0060

5-9 YRS-TYPICAL

4986717 cases have Y=0; 9529 cases have Y=1.

Variable	Avg	SD
1	1998.4174	1.7047

Iteration History...
-2 Log Likelihood = 38382.9606 (Null Model)
-2 Log Likelihood = 36326.4317
-2 Log Likelihood = 36206.6867
-2 Log Likelihood = 36206.2706
-2 Log Likelihood = 36206.2706
-2 Log Likelihood = 36206.2706 (Converged)

Overall Model Fit...
Chi Square= 2176.6900; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2943	0.0066	0.0000
Intercept	581.7806		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.7450	0.7355	0.7547

X1	n0	n1	Calc Prob
1996.0000	883249	2767	0.0034
1997.0000	882443	2372	0.0026
1998.0000	823894	1931	0.0019
1999.0000	822243	1145	0.0014
2000.0000	808757	828	0.0011
2001.0000	766131	486	0.0008

10-14 YRS-TOTAL

3749789 cases have Y=0; 31163 cases have Y=1.

Variable	Avg	SD
1	1998.5312	1.7181

Iteration History...
-2 Log Likelihood = 61139.7297 (Null Model)
-2 Log Likelihood = 59637.0349
-2 Log Likelihood = 59619.0506
-2 Log Likelihood = 59619.0480
-2 Log Likelihood = 59619.0480 (Converged)

Overall Model Fit...
Chi Square= 1520.6818; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1304	0.0034	0.0000
Intercept	-265.3895		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1393	1.1318	1.1468

X1	n0	n1	Calc Prob
1996.0000	620249	4055	0.0058
1997.0000	622217	3735	0.0066
1998.0000	599672	4475	0.0075
1999.0000	618823	5113	0.0085
2000.0000	642316	6332	0.0097
2001.0000	646512	7453	0.0111

10-14 YRS-ATYPICAL

3761205 cases have Y=0; 19747 cases have Y=1.

Variable	Avg	SD
1	1998.5312	1.7181

Iteration History...
-2 Log Likelihood = 46920.9741 (Null Model)
-2 Log Likelihood = 38103.7612
-2 Log Likelihood = 36937.3633
-2 Log Likelihood = 36918.7852
-2 Log Likelihood = 36918.7744
-2 Log Likelihood = 36918.7744 (Converged)

Overall Model Fit...
Chi Square=10002.1998; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4568	0.0050	0.0000
Intercept	-918.3964		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5790	1.5636	1.5945

X1	n0	n1	Calc Prob
1996.0000	624036	268	0.0012
1997.0000	625066	886	0.0020
1998.0000	601648	2499	0.0031
1999.0000	620106	3830	0.0049
2000.0000	643278	5370	0.0077
2001.0000	647071	6894	0.0120

10-14 YRS-TYPICAL

3766706 cases have Y=0; 14246 cases have Y=1.

Variable	Avg	SD
1	1998.5312	1.7181

Iteration History...
-2 Log Likelihood = 87459.3717 (Null Model)
-2 Log Likelihood = 84892.0463
-2 Log Likelihood = 84767.7947
-2 Log Likelihood = 84767.5318
-2 Log Likelihood = 84767.5318
-2 Log Likelihood = 84767.5318 (Converged)

Overall Model Fit...
Chi Square= 2691.8400; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2605	0.0052	0.0000
Intercept	514.9740		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.7707	0.7629	0.7785

X1	n0	n1	Calc Prob
1996.0000	620379	3925	0.0066
1997.0000	622757	3195	0.0051
1998.0000	601527	2620	0.0039
1999.0000	621999	1937	0.0030
2000.0000	647086	1562	0.0023
2001.0000	652958	1007	0.0018

15-19 YRS-TOTAL

2873715 cases have Y=0; 34007 cases have Y=1.

Variable	Avg	SD
1	1998.5214	1.7169

Iteration History...
-2 Log Likelihood = 70178.9962 (Null Model)
-2 Log Likelihood = 69648.2878
-2 Log Likelihood = 69646.2786
-2 Log Likelihood = 69646.2785
-2 Log Likelihood = 69646.2785 (Converged)

Overall Model Fit...
Chi Square= 532.7176; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.0736	0.0032	0.0000
Intercept	-151.4871		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.0763	1.0696	1.0831

X1	n0	n1	Calc Prob
1996.0000	478421	4906	0.0097
1997.0000	481230	4719	0.0104
1998.0000	454477	5270	0.0112
1999.0000	479625	5758	0.0120
2000.0000	490245	6301	0.0129
2001.0000	489717	7053	0.0139

15-19 YRS-ATYPICAL

2887182 cases have Y=0; 20540 cases have Y=1.

Variable	Avg	SD
1	1998.5214	1.7169

Iteration History...
-2 Log Likelihood = 44393.5760 (Null Model)
-2 Log Likelihood = 38372.0567
-2 Log Likelihood = 37885.7290
-2 Log Likelihood = 37882.7250
-2 Log Likelihood = 37882.7247
-2 Log Likelihood = 37882.7247 (Converged)

Overall Model Fit...
Chi Square= 6510.8513; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3486	0.0046	0.0000
Intercept	-701.7050		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4170	1.4044	1.4298

X1	n0	n1	Calc Prob
1996.0000	482773	554	0.0025
1997.0000	484539	1410	0.0035
1998.0000	456532	3215	0.0050
1999.0000	481219	4164	0.0070
2000.0000	491426	5120	0.0100
2001.0000	490693	6077	0.0140

15-19 YRS-TYPICAL

2889921 cases have Y=0; 17801 cases have Y=1.

Variable	Avg	SD
1	1998.5214	1.7169

Iteration History...
-2 Log Likelihood = 16915.9848 (Null Model)
-2 Log Likelihood = 14781.8467
-2 Log Likelihood = 14715.5925
-2 Log Likelihood = 14715.5326
-2 Log Likelihood = 14715.5326 (Converged)

Overall Model Fit...
Chi Square= 2200.4522; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2091	0.0045	0.0000
Intercept	412.7283		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8113	0.8041	0.8186

X1	n0	n1	Calc Prob
1996.0000	478676	4651	0.0097
1997.0000	482053	3896	0.0079
1998.0000	456762	2985	0.0064
1999.0000	482898	2485	0.0052
2000.0000	494535	2011	0.0042
2001.0000	494997	1773	0.0034

MALE-TOTAL

8156575 cases have Y=0; 50898 cases have Y=1.

Variable	Avg	SD
1	1998.4403	1.7166

Iteration History...
-2 Log Likelihood = 18906.4047 (Null Model)
-2 Log Likelihood = 16837.4820
-2 Log Likelihood = 16816.3744
-2 Log Likelihood = 16816.3723
-2 Log Likelihood = 16816.3723 (Converged)

Overall Model Fit...
Chi Square= 2090.0324; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1189	0.0026	0.0000
Intercept	-242.6147		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1262	1.1204	1.1320

X1	n0	n1	Calc Prob
1996.0000	1448506	7232	0.0046
1997.0000	1425437	6721	0.0051
1998.0000	1321623	7789	0.0058
1999.0000	1328940	8240	0.0065
2000.0000	1328614	9753	0.0073
2001.0000	1303455	11163	0.0082

MALE-ATYPICAL

8176651 cases have Y=0; 30822 cases have Y=1.

Variable	Avg	SD
1	1998.4403	1.7166

Iteration History...
-2 Log Likelihood = 05783.4413 (Null Model)
-2 Log Likelihood = 91724.1351
-2 Log Likelihood = 89740.1103
-2 Log Likelihood = 89709.9578
-2 Log Likelihood = 89709.9427
-2 Log Likelihood = 89709.9427 (Converged)

Overall Model Fit...
Chi Square=16073.4986; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4563	0.0039	0.0000
Intercept	-917.6868		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5782	1.5661	1.5903

X1	n0	n1	Calc Prob
1996.0000	1455206	532	0.0009
1997.0000	1430590	1568	0.0015
1998.0000	1325320	4092	0.0023
1999.0000	1331103	6077	0.0036
2000.0000	1330085	8282	0.0057
2001.0000	1304347	10271	0.0090

MALE-TYPICAL

8182297 cases have Y=0; 25176 cases have Y=1.

Variable	Avg	SD
1	1998.4403	1.7166

Iteration History...
-2 Log Likelihood = 41657.1469 (Null Model)
-2 Log Likelihood = 37727.3039
-2 Log Likelihood = 37566.0370
-2 Log Likelihood = 37565.7616
-2 Log Likelihood = 37565.7616
-2 Log Likelihood = 37565.7616 (Converged)

Overall Model Fit...
Chi Square= 4091.3852; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2430	0.0039	0.0000
Intercept	479.8448		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.7842	0.7782	0.7903

X1	n0	n1	Calc Prob
1996.0000	1448746	6992	0.0051
1997.0000	1426391	5767	0.0040
1998.0000	1324597	4815	0.0031
1999.0000	1333869	3311	0.0025
2000.0000	1335828	2539	0.0019
2001.0000	1312866	1752	0.0015

FEMALE-TOTAL

8049388 cases have Y=0; 28859 cases have Y=1.

Variable	Avg	SD
1	1998.4352	1.7167

Iteration History...
-2 Log Likelihood = 82827.3285 (Null Model)
-2 Log Likelihood = 82648.8438
-2 Log Likelihood = 82648.5690
-2 Log Likelihood = 82648.5690
-2 Log Likelihood = 82648.5690 (Converged)

Overall Model Fit...
Chi Square= 178.7595; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.0459	0.0034	0.0000
Intercept	-97.3976		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.0470	1.0400	1.0541

X1	n0	n1	Calc Prob
1996.0000	1434147	5271	0.0032
1997.0000	1409092	4296	0.0033
1998.0000	1303510	4401	0.0035
1999.0000	1310564	4239	0.0037
2000.0000	1309830	4903	0.0038
2001.0000	1282245	5749	0.0040

FEMALE-ATYPICAL

8063251 cases have Y=0; 14996 cases have Y=1.

Variable	Avg	SD
1	1998.4352	1.7167

Iteration History...
-2 Log Likelihood = 18588.2321 (Null Model)
-2 Log Likelihood = 12355.7155
-2 Log Likelihood = 11562.9381
-2 Log Likelihood = 11553.0854
-2 Log Likelihood = 11553.0823
-2 Log Likelihood = 11553.0823 (Converged)

Overall Model Fit...
Chi Square= 7035.1498; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4280	0.0055	0.0000
Intercept	-861.9570		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5342	1.5178	1.5509

X1	n0	n1	Calc Prob
1996.0000	1439118	300	0.0005
1997.0000	1412521	867	0.0008
1998.0000	1305719	2192	0.0012
1999.0000	1311912	2891	0.0018
2000.0000	1310858	3875	0.0028
2001.0000	1283123	4871	0.0043

FEMALE-TYPICAL

8061811 cases have Y=0; 16436 cases have Y=1.

Variable	Avg	SD
1	1998.4352	1.7167

Iteration History...
-2 Log Likelihood = 36561.3142 (Null Model)
-2 Log Likelihood = 33495.2411
-2 Log Likelihood = 33342.5575
-2 Log Likelihood = 33342.1742
-2 Log Likelihood = 33342.1742
-2 Log Likelihood = 33342.1742 (Converged)

Overall Model Fit...
Chi Square= 3219.1400; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2685	0.0049	0.0000
Intercept	530.3227		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.7645	0.7572	0.7719

X1	n0	n1	Calc Prob
1996.0000	1434289	5129	0.0035
1997.0000	1409587	3801	0.0027
1998.0000	1305135	2776	0.0021
1999.0000	1312939	1864	0.0016
2000.0000	1313185	1548	0.0012
2001.0000	1286676	1318	0.0009

CHILDREN AND ADOLESCENTS ENROLLED IN OHIO MEDICAID (OH)

1. Prevalence of Total Antipsychotic Use (H_1).
2. Prevalence of Atypical Antipsychotic Use (H_2).
3. Prevalence of Typical Antipsychotic Use (H_3).
4. Age-Specific Prevalence of Total Antipsychotic Use (H_5).
5. Age-Specific Prevalence of Atypical Antipsychotic Use (H_6).
6. Age-Specific Prevalence of Typical Antipsychotic Use (H_7).
7. Gender-Specific Prevalence of Total Antipsychotic Use (H_8).
8. Gender-Specific Prevalence of Atypical Antipsychotic Use (H_9).
9. Gender-Specific Prevalence of Typical Antipsychotic Use (H_{10}).

TOTAL

4359045 cases have Y=0; 42670 cases have Y=1.

Variable	Avg	SD
1	1998.5641	1.7494

Iteration History...
-2 Log Likelihood = 80582.8829 (Null Model)
-2 Log Likelihood = 75007.0010
-2 Log Likelihood = 74821.3550
-2 Log Likelihood = 74821.1431
-2 Log Likelihood = 74821.1431
-2 Log Likelihood = 74821.1431 (Converged)

Overall Model Fit...
Chi Square= 5761.7398; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2170	0.0029	0.0000
Intercept	-438.4729		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2424	1.2353	1.2496

X1	n0	n1	Calc Prob
1996.0000	741391	3515	0.0052
1997.0000	699670	4430	0.0065
1998.0000	681864	5865	0.0080
1999.0000	689623	7265	0.0099
2000.0000	714861	9496	0.0123
2001.0000	831636	12099	0.0153

ATYPICAL

4369156 cases have Y=0; 32559 cases have Y=1.

Variable	Avg	SD
1	1998.5641	1.7494

Iteration History...
-2 Log Likelihood = 84390.7785 (Null Model)
-2 Log Likelihood = 74112.9002
-2 Log Likelihood = 73215.6991
-2 Log Likelihood = 73208.8778
-2 Log Likelihood = 73208.8770
-2 Log Likelihood = 73208.8770 (Converged)

Overall Model Fit...
Chi Square=11181.9015; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3601	0.0036	0.0000
Intercept	-724.7961		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4335	1.4233	1.4437

X1	n0	n1	Calc Prob
1996.0000	743839	1067	0.0025
1997.0000	701703	2397	0.0035
1998.0000	683675	4054	0.0050
1999.0000	691140	5748	0.0072
2000.0000	716111	8246	0.0103
2001.0000	832688	11047	0.0147

TYPICAL

4388384 cases have Y=0; 13331 cases have Y=1.

Variable	Avg	SD
1	1998.5641	1.7494

Iteration History...
-2 Log Likelihood = 81252.0497 (Null Model)
-2 Log Likelihood = 80729.2023
-2 Log Likelihood = 80724.0104
-2 Log Likelihood = 80724.0099
-2 Log Likelihood = 80724.0099 (Converged)

Overall Model Fit...
Chi Square= 528.0398; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1144	0.0050	0.0000
Intercept	222.7670		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8919	0.8832	0.9007

X1	n0	n1	Calc Prob
1996.0000	742158	2748	0.0040
1997.0000	701583	2517	0.0035
1998.0000	685347	2382	0.0032
1999.0000	694768	2120	0.0028
2000.0000	722447	1910	0.0025
2001.0000	842081	1654	0.0022

<2 YEARS-TOTAL

697607 cases have Y=0; 242 cases have Y=1.

Variable	Avg	SD
1	1998.5432	1.7412

Iteration History...
-2 Log Likelihood = 4339.8571 (Null Model)
-2 Log Likelihood = 4330.2053
-2 Log Likelihood = 4330.1071
-2 Log Likelihood = 4330.1071
-2 Log Likelihood = 4330.1071 (Converged)

Overall Model Fit...
Chi Square= 9.7500; df=1; p= 0.0018

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1158	0.0373	0.0019
Intercept	223.5401		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8906	0.8278	0.9582

X1	n0	n1	Calc Prob
1996.0000	118410	56	0.0005
1997.0000	113299	58	0.0004
1998.0000	110518	24	0.0004
1999.0000	110180	25	0.0003
2000.0000	116634	45	0.0003
2001.0000	128566	34	0.0003

<2 YEARS-ATYPICAL

697725 cases have Y=0; 124 cases have Y=1.

Variable	Avg	SD
1	1998.5432	1.7412

Iteration History...
-2 Log Likelihood = 2389.5761 (Null Model)
-2 Log Likelihood = 2386.2678
-2 Log Likelihood = 2386.2454
-2 Log Likelihood = 2386.2454
-2 Log Likelihood = 2386.2454 (Converged)

Overall Model Fit...
Chi Square= 3.3307; df=1; p= 0.0680

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0944	0.0519	0.0690
Intercept	180.0270		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9099	0.8219	1.0074

X1	n0	n1	Calc Prob
1996.0000	118443	23	0.0002
1997.0000	113320	37	0.0002
1998.0000	110533	9	0.0002
1999.0000	110193	12	0.0002
2000.0000	116653	26	0.0002
2001.0000	128583	17	0.0001

<2 YEARS-TYPICAL

697691 cases have Y=0; 158 cases have Y=1.

Variable	Avg	SD
1	1998.5432	1.7412

Iteration History...
-2 Log Likelihood = 2968.2037 (Null Model)
-2 Log Likelihood = 2952.7314
-2 Log Likelihood = 2952.3347
-2 Log Likelihood = 2952.3344
-2 Log Likelihood = 2952.3344 (Converged)

Overall Model Fit...
Chi Square= 15.8693; df=1; p= 0.0001

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1845	0.0470	0.0001
Intercept	360.3777		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8315	0.7583	0.9118

X1	n0	n1	Calc Prob
1996.0000	118421	45	0.0003
1997.0000	113321	36	0.0003
1998.0000	110526	16	0.0002
1999.0000	110188	17	0.0002
2000.0000	116655	24	0.0002
2001.0000	128580	20	0.0001

2-4 YRS-TOTAL

838642 cases have Y=0; 1285 cases have Y=1.

Variable	Avg	SD
1	1998.4660	1.7672

Iteration History...
-2 Log Likelihood = 19228.2027 (Null Model)
-2 Log Likelihood = 19042.6967
-2 Log Likelihood = 19035.5565
-2 Log Likelihood = 19035.5469
-2 Log Likelihood = 19035.5469 (Converged)

Overall Model Fit...
Chi Square= 192.6558; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2240	0.0165	0.0000
Intercept	-454.1513		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2510	1.2112	1.2922

X1	n0	n1	Calc Prob
1996.0000	157658	121	0.0008
1997.0000	141946	107	0.0010
1998.0000	128864	198	0.0013
1999.0000	126375	231	0.0016
2000.0000	130554	294	0.0020
2001.0000	153245	334	0.0025

2-4 YRS-ATYPICAL

839149 cases have Y=0; 778 cases have Y=1.

Variable	Avg	SD
1	1998.4660	1.7672

Iteration History...
-2 Log Likelihood = 12422.9180 (Null Model)
-2 Log Likelihood = 12000.0473
-2 Log Likelihood = 11925.2271
-2 Log Likelihood = 11923.4312
-2 Log Likelihood = 11923.4286
-2 Log Likelihood = 11923.4286 (Converged)

Overall Model Fit...
Chi Square= 499.4894; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.5065	0.0254	0.0000
Intercept	-1019.4962		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.6594	1.5788	1.7442

X1	n0	n1	Calc Prob
1996.0000	157771	8	0.0002
1997.0000	142036	17	0.0003
1998.0000	128969	93	0.0005
1999.0000	126461	145	0.0008
2000.0000	130619	229	0.0014
2001.0000	153293	286	0.0023

2-4 YRS-TYPICAL

839348 cases have Y=0; 579 cases have Y=1.

Variable	Avg	SD
1	1998.4660	1.7672

Iteration History...
-2 Log Likelihood = 9587.5719 (Null Model)
-2 Log Likelihood = 9575.6540
-2 Log Likelihood = 9575.5923
-2 Log Likelihood = 9575.5923
-2 Log Likelihood = 9575.5923 (Converged)

Overall Model Fit...
Chi Square= 11.9795; df=1; p= 0.0005

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0818	0.0238	0.0006
Intercept	156.2813		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9214	0.8795	0.9653

X1	n0	n1	Calc Prob
1996.0000	157664	115	0.0008
1997.0000	141961	92	0.0008
1998.0000	128937	125	0.0007
1999.0000	126500	106	0.0007
2000.0000	130764	84	0.0006
2001.0000	153522	57	0.0006

5-9 YRS-TOTAL

1223859 cases have Y=0; 10278 cases have Y=1.

Variable	Avg	SD
1	1998.5026	1.7434

Iteration History...
-2 Log Likelihood = 18894.7915 (Null Model)
-2 Log Likelihood = 16413.9218
-2 Log Likelihood = 16252.2326
-2 Log Likelihood = 16251.5985
-2 Log Likelihood = 16251.5984
-2 Log Likelihood = 16251.5984 (Converged)

Overall Model Fit...
Chi Square= 2643.1931; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3048	0.0062	0.0000
Intercept	-614.0860		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3564	1.3400	1.3729

X1	n0	n1	Calc Prob
1996.0000	215829	660	0.0034
1997.0000	204459	875	0.0046
1998.0000	195612	1294	0.0063
1999.0000	193647	1814	0.0085
2000.0000	194248	2432	0.0114
2001.0000	220064	3203	0.0155

5-9 YRS-ATYPICAL

1225814 cases have Y=0; 8323 cases have Y=1.

Variable	Avg	SD
1	1998.5026	1.7434

Iteration History...
-2 Log Likelihood = 99804.8359 (Null Model)
-2 Log Likelihood = 95938.3122
-2 Log Likelihood = 95398.2895
-2 Log Likelihood = 95389.3072
-2 Log Likelihood = 95389.3014
-2 Log Likelihood = 95389.3014 (Converged)

Overall Model Fit...
Chi Square= 4415.5346; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4601	0.0076	0.0000
Intercept	-924.7633		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5842	1.5608	1.6080

X1	n0	n1	Calc Prob
1996.0000	216347	142	0.0016
1997.0000	204881	453	0.0025
1998.0000	195977	929	0.0040
1999.0000	193948	1513	0.0063
2000.0000	194459	2221	0.0099
2001.0000	220202	3065	0.0156

5-9 YRS-TYPICAL

1231649 cases have Y=0; 2488 cases have Y=1.

Variable	Avg	SD
1	1998.5026	1.7434

Iteration History...
-2 Log Likelihood = 35855.2615 (Null Model)
-2 Log Likelihood = 35697.5533
-2 Log Likelihood = 35695.0043
-2 Log Likelihood = 35695.0036
-2 Log Likelihood = 35695.0036 (Converged)

Overall Model Fit...
Chi Square= 160.2579; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1474	0.0118	0.0000
Intercept	288.2918		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8630	0.8433	0.8831

X1	n0	n1	Calc Prob
1996.0000	215938	551	0.0028
1997.0000	204838	496	0.0024
1998.0000	196436	470	0.0021
1999.0000	195039	422	0.0018
2000.0000	196364	316	0.0016
2001.0000	223034	233	0.0014

10-14 YRS-TOTAL

907806 cases have Y=0; 17415 cases have Y=1.

Variable	Avg	SD
1	1998.6627	1.7478

Iteration History...
-2 Log Likelihood = 72869.2956 (Null Model)
-2 Log Likelihood = 70535.8623
-2 Log Likelihood = 70458.3477
-2 Log Likelihood = 70458.2472
-2 Log Likelihood = 70458.2472
-2 Log Likelihood = 70458.2472 (Converged)

Overall Model Fit...
Chi Square= 2411.0485; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2231	0.0047	0.0000
Intercept	-450.0240		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2500	1.2386	1.2615

X1	n0	n1	Calc Prob
1996.0000	142799	1227	0.0098
1997.0000	139591	1683	0.0122
1998.0000	138737	2288	0.0152
1999.0000	145237	2948	0.0189
2000.0000	153835	4022	0.0235
2001.0000	187607	5247	0.0292

10-14 YRS-ATYPICAL

911079 cases have Y=0; 14142 cases have Y=1.

Variable	Avg	SD
1	1998.6627	1.7478

Iteration History...
-2 Log Likelihood = 46318.8396 (Null Model)
-2 Log Likelihood = 42190.1141
-2 Log Likelihood = 41870.8485
-2 Log Likelihood = 41868.5823
-2 Log Likelihood = 41868.5821
-2 Log Likelihood = 41868.5821 (Converged)

Overall Model Fit...
Chi Square= 4450.2576; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3494	0.0056	0.0000
Intercept	-702.7286		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4183	1.4028	1.4339

X1	n0	n1	Calc Prob
1996.0000	143619	407	0.0051
1997.0000	140290	984	0.0073
1998.0000	139303	1722	0.0103
1999.0000	145728	2457	0.0145
2000.0000	154227	3630	0.0205
2001.0000	187912	4942	0.0288

10-14 YRS-TYPICAL

920798 cases have Y=0; 4423 cases have Y=1.

Variable	Avg	SD
1	1998.6627	1.7478

Iteration History...
-2 Log Likelihood = 56090.8970 (Null Model)
-2 Log Likelihood = 55770.5971
-2 Log Likelihood = 55764.5435
-2 Log Likelihood = 55764.5416
-2 Log Likelihood = 55764.5416 (Converged)

Overall Model Fit...
Chi Square= 326.3554; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1561	0.0087	0.0000
Intercept	306.6056		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8555	0.8410	0.8702

X1	n0	n1	Calc Prob
1996.0000	143097	929	0.0070
1997.0000	140413	861	0.0060
1998.0000	140259	766	0.0051
1999.0000	147479	706	0.0044
2000.0000	157221	636	0.0037
2001.0000	192329	525	0.0032

15-19 YRS-TOTAL

688623 cases have Y=0; 15958 cases have Y=1.

Variable	Avg	SD
1	1998.6798	1.7361

Iteration History...
-2 Log Likelihood = 52438.2234 (Null Model)
-2 Log Likelihood = 51761.1796
-2 Log Likelihood = 51754.3191
-2 Log Likelihood = 51754.3183
-2 Log Likelihood = 51754.3183 (Converged)

Overall Model Fit...
Chi Square= 683.9051; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1226	0.0047	0.0000
Intercept	-248.7774		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1304	1.1199	1.1410

X1	n0	n1	Calc Prob
1996.0000	106573	1573	0.0161
1997.0000	100141	1941	0.0181
1998.0000	107823	2371	0.0204
1999.0000	113761	2670	0.0230
2000.0000	118980	3313	0.0260
2001.0000	141345	4090	0.0293

15-19 YRS-ATYPICAL

693300 cases have Y=0; 11281 cases have Y=1.

Variable	Avg	SD
1	1998.6798	1.7361

Iteration History...
-2 Log Likelihood = 15662.6235 (Null Model)
-2 Log Likelihood = 13662.2330
-2 Log Likelihood = 13572.0786
-2 Log Likelihood = 13571.8555
-2 Log Likelihood = 13571.8555
-2 Log Likelihood = 13571.8555 (Converged)

Overall Model Fit...
Chi Square= 2090.7680; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2630	0.0060	0.0000
Intercept	-529.9295		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3009	1.2857	1.3162

X1	n0	n1	Calc Prob
1996.0000	107631	515	0.0072
1997.0000	101048	1034	0.0094
1998.0000	108655	1539	0.0122
1999.0000	114454	1977	0.0158
2000.0000	119600	2693	0.0205
2001.0000	141912	3523	0.0265

15-19 YRS-TYPICAL

698475 cases have Y=0; 6106 cases have Y=1.

Variable	Avg	SD
1	1998.6798	1.7361

Iteration History...
-2 Log Likelihood = 70145.5541 (Null Model)
-2 Log Likelihood = 69838.7002
-2 Log Likelihood = 69834.7431
-2 Log Likelihood = 69834.7425
-2 Log Likelihood = 69834.7425 (Converged)

Overall Model Fit...
Chi Square= 310.8116; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1303	0.0074	0.0000
Intercept	255.6573		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8778	0.8652	0.8907

X1	n0	n1	Calc Prob
1996.0000	106947	1199	0.0119
1997.0000	100946	1136	0.0105
1998.0000	109115	1079	0.0092
1999.0000	115497	934	0.0081
2000.0000	121383	910	0.0071
2001.0000	144587	848	0.0063

MALE-TOTAL

2158403 cases have Y=0; 28572 cases have Y=1.

Variable	Avg	SD
1	1998.5706	1.7504

Iteration History...
-2 Log Likelihood = 04651.0316 (Null Model)
-2 Log Likelihood = 00439.7423
-2 Log Likelihood = 00282.3889
-2 Log Likelihood = 00282.1600
-2 Log Likelihood = 00282.1600
-2 Log Likelihood = 00282.1600 (Converged)

Overall Model Fit...
Chi Square= 4368.8716; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2322	0.0036	0.0000
Intercept	-468.4095		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2613	1.2524	1.2703

X1	n0	n1	Calc Prob
1996.0000	366537	2196	0.0067
1997.0000	345807	2827	0.0084
1998.0000	336949	3848	0.0106
1999.0000	340974	4956	0.0133
2000.0000	354154	6463	0.0168
2001.0000	413982	8282	0.0211

MALE-ATYPICAL

2164083 cases have Y=0; 22892 cases have Y=1.

Variable	Avg	SD
1	1998.5706	1.7504

Iteration History...
-2 Log Likelihood = 54295.0959 (Null Model)
-2 Log Likelihood = 46774.0975
-2 Log Likelihood = 46095.4897
-2 Log Likelihood = 46089.8849
-2 Log Likelihood = 46089.8841
-2 Log Likelihood = 46089.8841 (Converged)

Overall Model Fit...
Chi Square= 8205.2118; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3697	0.0044	0.0000
Intercept	-743.6714		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4473	1.4350	1.4598

X1	n0	n1	Calc Prob
1996.0000	368053	680	0.0034
1997.0000	347036	1598	0.0048
1998.0000	337982	2815	0.0070
1999.0000	341813	4117	0.0101
2000.0000	354750	5867	0.0146
2001.0000	414449	7815	0.0209

MALE-TYPICAL

2179124 cases have Y=0; 7851 cases have Y=1.

Variable	Avg	SD
1	1998.5706	1.7504

Iteration History...
-2 Log Likelihood = 04070.2900 (Null Model)
-2 Log Likelihood = 03582.0046
-2 Log Likelihood = 03574.2396
-2 Log Likelihood = 03574.2377
-2 Log Likelihood = 03574.2377 (Converged)

Overall Model Fit...
Chi Square= 496.0522; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1448	0.0066	0.0000
Intercept	283.7808		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8652	0.8541	0.8764

X1	n0	n1	Calc Prob
1996.0000	367029	1704	0.0050
1997.0000	347093	1541	0.0044
1998.0000	339379	1418	0.0038
1999.0000	344665	1265	0.0033
2000.0000	359569	1048	0.0028
2001.0000	421389	875	0.0024

FEMALE-TOTAL

2200663 cases have Y=0; 14077 cases have Y=1.

Variable	Avg	SD
1	1998.5576	1.7484

Iteration History...
-2 Log Likelihood = 70477.0663 (Null Model)
-2 Log Likelihood = 69099.8728
-2 Log Likelihood = 69065.5985
-2 Log Likelihood = 69065.5768
-2 Log Likelihood = 69065.5768 (Converged)

Overall Model Fit...
Chi Square= 1411.4895; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1855	0.0050	0.0000
Intercept	-375.8074		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2038	1.1920	1.2157

X1	n0	n1	Calc Prob
1996.0000	374856	1317	0.0038
1997.0000	353865	1601	0.0045
1998.0000	344917	2015	0.0055
1999.0000	348654	2304	0.0066
2000.0000	360712	3028	0.0079
2001.0000	417659	3812	0.0095

FEMALE-ATYPICAL

2205091 cases have Y=0; 9649 cases have Y=1.

Variable	Avg	SD
1	1998.5576	1.7484

Iteration History...
-2 Log Likelihood = 24160.5238 (Null Model)
-2 Log Likelihood = 21433.6384
-2 Log Likelihood = 21220.9224
-2 Log Likelihood = 21219.6450
-2 Log Likelihood = 21219.6449
-2 Log Likelihood = 21219.6449 (Converged)

Overall Model Fit...
Chi Square= 2940.8789; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3360	0.0066	0.0000
Intercept	-677.1641		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3994	1.3815	1.4175

X1	n0	n1	Calc Prob
1996.0000	375786	387	0.0016
1997.0000	354669	797	0.0022
1998.0000	345695	1237	0.0031
1999.0000	349331	1627	0.0043
2000.0000	361366	2374	0.0060
2001.0000	418244	3227	0.0084

FEMALE-TYPICAL

2209267 cases have Y=0; 5473 cases have Y=1.

Variable	Avg	SD
1	1998.5576	1.7484

Iteration History...
-2 Log Likelihood = 76641.9959 (Null Model)
-2 Log Likelihood = 76555.8959
-2 Log Likelihood = 76555.5564
-2 Log Likelihood = 76555.5564
-2 Log Likelihood = 76555.5564 (Converged)

Overall Model Fit...
Chi Square= 86.4395; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0720	0.0078	0.0000
Intercept	137.9742		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9305	0.9164	0.9448

X1	n0	n1	Calc Prob
1996.0000	375131	1042	0.0029
1997.0000	354491	975	0.0027
1998.0000	345969	963	0.0026
1999.0000	350104	854	0.0024
2000.0000	362879	861	0.0022
2001.0000	420693	778	0.0021

CHILDREN AND ADOLESCENTS ENROLLED IN TEXAS MEDICAID (TX)

1. Prevalence of Total Antipsychotic Use (H_1).
2. Prevalence of Atypical Antipsychotic Use (H_2).
3. Prevalence of Typical Antipsychotic Use (H_3).
4. Age-Specific Prevalence of Total Antipsychotic Use (H_5).
5. Age-Specific Prevalence of Atypical Antipsychotic Use (H_6).
6. Age-Specific Prevalence of Typical Antipsychotic Use (H_7).
7. Gender-Specific Prevalence of Total Antipsychotic Use (H_8).
8. Gender-Specific Prevalence of Atypical Antipsychotic Use (H_9).
9. Gender-Specific Prevalence of Typical Antipsychotic Use (H_{10}).

TOTAL

6233989 cases have Y=0; 72104 cases have Y=1.

Variable	Avg	SD
1	1998.4888	1.7540

Iteration History...
-2 Log Likelihood = 88157.7403 (Null Model)
-2 Log Likelihood = 81933.3365
-2 Log Likelihood = 81798.7392
-2 Log Likelihood = 81798.6785
-2 Log Likelihood = 81798.6785 (Converged)

Overall Model Fit...
Chi Square= 6359.0618; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1726	0.0022	0.0000
Intercept	-349.3582		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1883	1.1832	1.1935

X1	n0	n1	Calc Prob
1996.0000	1135785	7240	0.0071
1997.0000	1037734	8875	0.0085
1998.0000	982365	10656	0.0101
1999.0000	963627	12664	0.0119
2000.0000	987462	14879	0.0142
2001.0000	1127016	17790	0.0168

ATYPICAL

6248581 cases have Y=0; 57512 cases have Y=1.

Variable	Avg	SD
1	1998.4888	1.7540

Iteration History...
-2 Log Likelihood = 54797.5856 (Null Model)
-2 Log Likelihood = 41406.1508
-2 Log Likelihood = 40568.0749
-2 Log Likelihood = 40565.0650
-2 Log Likelihood = 40565.0649
-2 Log Likelihood = 40565.0649 (Converged)

Overall Model Fit...
Chi Square=14232.5206; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2965	0.0026	0.0000
Intercept	-597.4228		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3452	1.3384	1.3520

X1	n0	n1	Calc Prob
1996.0000	1140184	2841	0.0039
1997.0000	1041087	5522	0.0052
1998.0000	984957	8064	0.0069
1999.0000	965733	10558	0.0093
2000.0000	988848	13493	0.0125
2001.0000	1127772	17034	0.0167

TYPICAL

6284348 cases have Y=0; 21745 cases have Y=1.

Variable	Avg	SD
1	1998.4888	1.7540

Iteration History...
-2 Log Likelihood = 89998.3493 (Null Model)
-2 Log Likelihood = 88121.8217
-2 Log Likelihood = 88080.3607
-2 Log Likelihood = 88080.3406
-2 Log Likelihood = 88080.3406 (Converged)

Overall Model Fit...
Chi Square= 1918.0087; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1724	0.0040	0.0000
Intercept	338.8565		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8416	0.8351	0.8483

X1	n0	n1	Calc Prob
1996.0000	1137825	5200	0.0051
1997.0000	1042036	4573	0.0043
1998.0000	989114	3907	0.0036
1999.0000	972767	3524	0.0030
2000.0000	999553	2788	0.0025
2001.0000	1143053	1753	0.0021

<2 YEARS-TOTAL

1349153 cases have Y=0; 491 cases have Y=1.

Variable	Avg	SD
1	1998.5219	1.7463

Iteration History...
-2 Log Likelihood = 8758.1883 (Null Model)
-2 Log Likelihood = 8750.7265
-2 Log Likelihood = 8750.6980
-2 Log Likelihood = 8750.6980
-2 Log Likelihood = 8750.6980 (Converged)

Overall Model Fit...
Chi Square= 7.4903; df=1; p= 0.0062

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.0710	0.0260	0.0064
Intercept	-149.7677		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low	--	High
1	1.0736	1.0202		1.1297

X1	n0	n1	Calc Prob
1996.0000	237152	68	0.0003
1997.0000	218907	66	0.0003
1998.0000	210436	79	0.0003
1999.0000	212185	91	0.0004
2000.0000	226402	88	0.0004
2001.0000	244071	99	0.0004

<2 YEARS-ATYPICAL

1349412 cases have Y=0; 232 cases have Y=1.

Variable	Avg	SD
1	1998.5219	1.7463

Iteration History...
-2 Log Likelihood = 4486.1970 (Null Model)
-2 Log Likelihood = 4438.6439
-2 Log Likelihood = 4435.9934
-2 Log Likelihood = 4435.9855
-2 Log Likelihood = 4435.9855
-2 Log Likelihood = 4435.9855 (Converged)

Overall Model Fit...
Chi Square= 50.2115; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2773	0.0407	0.0000
Intercept	-562.9995		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low	--	High
1	1.3196	1.2185		1.4291

X1	n0	n1	Calc Prob
1996.0000	237208	12	0.0001
1997.0000	218949	24	0.0001
1998.0000	210483	32	0.0001
1999.0000	212234	42	0.0002
2000.0000	226437	53	0.0002
2001.0000	244101	69	0.0003

<2 YEARS-TYPICAL

1349342 cases have Y=0; 302 cases have Y=1.

Variable	Avg	SD
1	1998.5219	1.7463

Iteration History...
-2 Log Likelihood = 5680.5068 (Null Model)
-2 Log Likelihood = 5672.7685
-2 Log Likelihood = 5672.7184
-2 Log Likelihood = 5672.7184
-2 Log Likelihood = 5672.7184 (Converged)

Overall Model Fit...
Chi Square= 7.7884; df=1; p= 0.0053

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0923	0.0332	0.0054
Intercept	175.9830		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low	--	High
1	0.9119	0.8544		0.9731

X1	n0	n1	Calc Prob
1996.0000	237158	62	0.0003
1997.0000	218924	49	0.0003
1998.0000	210461	54	0.0002
1999.0000	212215	61	0.0002
2000.0000	226447	43	0.0002
2001.0000	244137	33	0.0002

2-4 YRS-TOTAL

1330312 cases have Y=0; 5068 cases have Y=1.

Variable	Avg	SD
1	1998.3915	1.7677

Iteration History...
-2 Log Likelihood = 66615.0582 (Null Model)
-2 Log Likelihood = 66196.5731
-2 Log Likelihood = 66187.5552
-2 Log Likelihood = 66187.5514
-2 Log Likelihood = 66187.5514 (Converged)

Overall Model Fit...
Chi Square= 427.5067; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1655	0.0081	0.0000
Intercept	-336.4253		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1800	1.1615	1.1989

X1	n0	n1	Calc Prob
1996.0000	267183	617	0.0025
1997.0000	231425	705	0.0029
1998.0000	205843	709	0.0034
1999.0000	196546	820	0.0040
2000.0000	200492	952	0.0047
2001.0000	228823	1265	0.0056

2-4 YRS-ATYPICAL

1331846 cases have Y=0; 3534 cases have Y=1.

Variable	Avg	SD
1	1998.3915	1.7677

Iteration History...
-2 Log Likelihood = 49003.9736 (Null Model)
-2 Log Likelihood = 47747.6655
-2 Log Likelihood = 47613.0459
-2 Log Likelihood = 47611.8923
-2 Log Likelihood = 47611.8921
-2 Log Likelihood = 47611.8921 (Converged)

Overall Model Fit...
Chi Square= 1392.0815; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3740	0.0106	0.0000
Intercept	-753.4839		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4535	1.4235	1.4841

X1	n0	n1	Calc Prob
1996.0000	267650	150	0.0009
1997.0000	231811	319	0.0013
1998.0000	206119	433	0.0019
1999.0000	196762	604	0.0027
2000.0000	200623	821	0.0039
2001.0000	228881	1207	0.0057

2-4 YRS-TYPICAL

1333470 cases have Y=0; 1910 cases have Y=1.

Variable	Avg	SD
1	1998.3915	1.7677

Iteration History...
-2 Log Likelihood = 28837.7623 (Null Model)
-2 Log Likelihood = 28585.8310
-2 Log Likelihood = 28577.1392
-2 Log Likelihood = 28577.1278
-2 Log Likelihood = 28577.1278 (Converged)

Overall Model Fit...
Chi Square= 260.6345; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2166	0.0138	0.0000
Intercept	426.1952		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8053	0.7838	0.8274

X1	n0	n1	Calc Prob
1996.0000	267287	513	0.0022
1997.0000	231672	458	0.0018
1998.0000	206213	339	0.0014
1999.0000	197068	298	0.0012
2000.0000	201242	202	0.0009
2001.0000	229988	100	0.0008

5-9 YRS-TOTAL

1752123 cases have Y=0; 24878 cases have Y=1.

Variable	Avg	SD
1	1998.3849	1.7452

Iteration History...
-2 Log Likelihood = 61799.4345 (Null Model)
-2 Log Likelihood = 58656.8944
-2 Log Likelihood = 58554.4920
-2 Log Likelihood = 58554.3974
-2 Log Likelihood = 58554.3974 (Converged)

Overall Model Fit...
Chi Square= 3245.0371; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2106	0.0038	0.0000
Intercept	-425.1932		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2344	1.2254	1.2436

X1	n0	n1	Calc Prob
1996.0000	342657	2476	0.0080
1997.0000	310873	3036	0.0098
1998.0000	280420	3665	0.0121
1999.0000	267424	4352	0.0149
2000.0000	264697	5291	0.0183
2001.0000	286052	6058	0.0225

5-9 YRS-ATYPICAL

1757114 cases have Y=0; 19887 cases have Y=1.

Variable	Avg	SD
1	1998.3849	1.7452

Iteration History...
-2 Log Likelihood = 18239.9175 (Null Model)
-2 Log Likelihood = 12230.8364
-2 Log Likelihood = 11715.1906
-2 Log Likelihood = 11712.2582
-2 Log Likelihood = 11712.2581
-2 Log Likelihood = 11712.2581 (Converged)

Overall Model Fit...
Chi Square= 6527.6594; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3429	0.0044	0.0000
Intercept	-689.9538		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4091	1.3968	1.4214

X1	n0	n1	Calc Prob
1996.0000	344204	929	0.0042
1997.0000	312070	1839	0.0059
1998.0000	281329	2756	0.0083
1999.0000	268141	3635	0.0116
2000.0000	265108	4880	0.0163
2001.0000	286262	5848	0.0228

5-9 YRS-TYPICAL

1769979 cases have Y=0; 7022 cases have Y=1.

Variable	Avg	SD
1	1998.3849	1.7452

Iteration History...
-2 Log Likelihood = 91730.5755 (Null Model)
-2 Log Likelihood = 91090.0219
-2 Log Likelihood = 91075.0824
-2 Log Likelihood = 91075.0734
-2 Log Likelihood = 91075.0734 (Converged)

Overall Model Fit...
Chi Square= 655.5021; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1799	0.0072	0.0000
Intercept	354.0170		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8353	0.8237	0.8471

X1	n0	n1	Calc Prob
1996.0000	343365	1768	0.0058
1997.0000	312357	1552	0.0048
1998.0000	282783	1302	0.0040
1999.0000	270617	1159	0.0034
2000.0000	269197	791	0.0028
2001.0000	291660	450	0.0024

10-14 YRS-TOTAL

1075165 cases have Y=0; 31810 cases have Y=1.

Variable	Avg	SD
1	1998.5825	1.7696

Iteration History...
-2 Log Likelihood = 88522.9360 (Null Model)
-2 Log Likelihood = 86144.1299
-2 Log Likelihood = 86102.3963
-2 Log Likelihood = 86102.3830
-2 Log Likelihood = 86102.3830 (Converged)

Overall Model Fit...
Chi Square= 2420.5530; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1607	0.0033	0.0000
Intercept	-324.6371		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1743	1.1667	1.1819

X1	n0	n1	Calc Prob
1996.0000	181224	2928	0.0185
1997.0000	181122	3773	0.0216
1998.0000	166378	4674	0.0253
1999.0000	160328	5639	0.0296
2000.0000	164070	6652	0.0345
2001.0000	222043	8144	0.0403

10-14 YRS-ATYPICAL

1080878 cases have Y=0; 26097 cases have Y=1.

Variable	Avg	SD
1	1998.5825	1.7696

Iteration History...
-2 Log Likelihood = 47174.3281 (Null Model)
-2 Log Likelihood = 42101.9540
-2 Log Likelihood = 41856.1456
-2 Log Likelihood = 41855.5469
-2 Log Likelihood = 41855.5469
-2 Log Likelihood = 41855.5469 (Converged)

Overall Model Fit...
Chi Square= 5318.7812; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2687	0.0038	0.0000
Intercept	-540.8164		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3082	1.2985	1.3181

X1	n0	n1	Calc Prob
1996.0000	182920	1232	0.0107
1997.0000	182424	2471	0.0140
1998.0000	167378	3674	0.0183
1999.0000	161147	4820	0.0237
2000.0000	164657	6065	0.0308
2001.0000	222352	7835	0.0400

10-14 YRS-TYPICAL

1098324 cases have Y=0; 8651 cases have Y=1.

Variable	Avg	SD
1	1998.5825	1.7696

Iteration History...
-2 Log Likelihood = 01178.5268 (Null Model)
-2 Log Likelihood = 00322.2552
-2 Log Likelihood = 00300.5989
-2 Log Likelihood = 00300.5858
-2 Log Likelihood = 00300.5858 (Converged)

Overall Model Fit...
Chi Square= 877.9410; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1833	0.0063	0.0000
Intercept	361.4063		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8325	0.8223	0.8429

X1	n0	n1	Calc Prob
1996.0000	182144	2008	0.0119
1997.0000	183114	1781	0.0099
1998.0000	169514	1538	0.0083
1999.0000	164582	1385	0.0069
2000.0000	169518	1204	0.0057
2001.0000	229452	735	0.0048

15-19 YRS-TOTAL

721075 cases have Y=0; 16018 cases have Y=1.

Variable	Avg	SD
1	1998.7149	1.7090

Iteration History...
-2 Log Likelihood = 54351.2340 (Null Model)
-2 Log Likelihood = 53975.2555
-2 Log Likelihood = 53973.1306
-2 Log Likelihood = 53973.1305
-2 Log Likelihood = 53973.1305 (Converged)

Overall Model Fit...
Chi Square= 378.1035; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.0920	0.0048	0.0000
Intercept	-187.7845		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.0964	1.0862	1.1067

X1	n0	n1	Calc Prob
1996.0000	107025	1695	0.0168
1997.0000	94697	2005	0.0184
1998.0000	118435	2382	0.0201
1999.0000	126113	2793	0.0220
2000.0000	130457	3240	0.0241
2001.0000	144348	3903	0.0264

15-19 YRS-ATYPICAL

724489 cases have Y=0; 12604 cases have Y=1.

Variable	Avg	SD
1	1998.7149	1.7090

Iteration History...
-2 Log Likelihood = 27555.0233 (Null Model)
-2 Log Likelihood = 26042.5638
-2 Log Likelihood = 25997.1688
-2 Log Likelihood = 25997.1165
-2 Log Likelihood = 25997.1165
-2 Log Likelihood = 25997.1165 (Converged)

Overall Model Fit...
Chi Square= 1557.9068; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2161	0.0056	0.0000
Intercept	-436.0994		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2413	1.2276	1.2551

X1	n0	n1	Calc Prob
1996.0000	108011	709	0.0090
1997.0000	95444	1258	0.0111
1998.0000	119027	1790	0.0138
1999.0000	126607	2299	0.0171
2000.0000	130823	2874	0.0211
2001.0000	144577	3674	0.0261

15-19 YRS-TYPICAL

731884 cases have Y=0; 5209 cases have Y=1.

Variable	Avg	SD
1	1998.7149	1.7090

Iteration History...
-2 Log Likelihood = 61974.4353 (Null Model)
-2 Log Likelihood = 61284.9587
-2 Log Likelihood = 61259.7509
-2 Log Likelihood = 61259.7236
-2 Log Likelihood = 61259.7236 (Converged)

Overall Model Fit...
Chi Square= 714.7117; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.2175	0.0082	0.0000
Intercept	429.7764		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8045	0.7916	0.8176

X1	n0	n1	Calc Prob
1996.0000	107524	1196	0.0119
1997.0000	95656	1046	0.0096
1998.0000	119916	901	0.0077
1999.0000	128094	812	0.0062
2000.0000	132987	710	0.0050
2001.0000	147707	544	0.0040

MALE-TOTAL

3124385 cases have Y=0; 48987 cases have Y=1.

Variable	Avg	SD
1	1998.5080	1.7528

Iteration History...
-2 Log Likelihood = 05862.9422 (Null Model)
-2 Log Likelihood = 02042.1340
-2 Log Likelihood = 01968.8952
-2 Log Likelihood = 01968.8685
-2 Log Likelihood = 01968.8685 (Converged)

Overall Model Fit...
Chi Square= 3894.0737; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1644	0.0027	0.0000
Intercept	-332.6561		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1786	1.1725	1.1848

X1	n0	n1	Calc Prob
1996.0000	562720	4992	0.0099
1997.0000	514408	6050	0.0116
1998.0000	488223	7266	0.0137
1999.0000	479187	8550	0.0161
2000.0000	515585	10107	0.0189
2001.0000	564262	12022	0.0222

MALE-ATYPICAL

3134436 cases have Y=0; 38936 cases have Y=1.

Variable	Avg	SD
1	1998.5080	1.7528

Iteration History...
-2 Log Likelihood = 20078.2229 (Null Model)
-2 Log Likelihood = 11240.2820
-2 Log Likelihood = 10711.0686
-2 Log Likelihood = 10709.2489
-2 Log Likelihood = 10709.2489
-2 Log Likelihood = 10709.2489 (Converged)

Overall Model Fit...
Chi Square= 9368.9740; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2937	0.0032	0.0000
Intercept	-591.5264		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3414	1.3331	1.3498

X1	n0	n1	Calc Prob
1996.0000	565780	1932	0.0052
1997.0000	516778	3680	0.0070
1998.0000	490034	5455	0.0093
1999.0000	480598	7139	0.0125
2000.0000	516499	9193	0.0167
2001.0000	564747	11537	0.0223

MALE-TYPICAL

3158635 cases have Y=0; 14737 cases have Y=1.

Variable	Avg	SD
1	1998.5080	1.7528

Iteration History...
-2 Log Likelihood = 87745.3452 (Null Model)
-2 Log Likelihood = 86191.1013
-2 Log Likelihood = 86148.8474
-2 Log Likelihood = 86148.8173
-2 Log Likelihood = 86148.8173 (Converged)

Overall Model Fit...
Chi Square= 1596.5279; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1916	0.0049	0.0000
Intercept	377.4647		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8256	0.8178	0.8336

X1	n0	n1	Calc Prob
1996.0000	564121	3591	0.0071
1997.0000	517292	3166	0.0059
1998.0000	492805	2684	0.0048
1999.0000	485404	2333	0.0040
2000.0000	523871	1821	0.0033
2001.0000	575142	1142	0.0027

FEMALE-TOTAL

3110111 cases have Y=0; 22599 cases have Y=1.

Variable	Avg	SD
1	1998.4694	1.7550

Iteration History...
-2 Log Likelihood = 67939.7291 (Null Model)
-2 Log Likelihood = 65645.9035
-2 Log Likelihood = 65586.1435
-2 Log Likelihood = 65586.1056
-2 Log Likelihood = 65586.1056 (Converged)

Overall Model Fit...
Chi Square= 2353.6236; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1871	0.0039	0.0000
Intercept	-378.8407		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2057	1.1965	1.2150

X1	n0	n1	Calc Prob
1996.0000	573123	2190	0.0043
1997.0000	523411	2740	0.0052
1998.0000	494242	3290	0.0063
1999.0000	484543	4011	0.0076
2000.0000	471967	4682	0.0091
2001.0000	562825	5686	0.0109

FEMALE-ATYPICAL

3114545 cases have Y=0; 18165 cases have Y=1.

Variable	Avg	SD
1	1998.4694	1.7550

Iteration History...
-2 Log Likelihood = 23329.6721 (Null Model)
-2 Log Likelihood = 18952.1096
-2 Log Likelihood = 18662.2559
-2 Log Likelihood = 18661.1429
-2 Log Likelihood = 18661.1429
-2 Log Likelihood = 18661.1429 (Converged)

Overall Model Fit...
Chi Square= 4668.5292; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3009	0.0046	0.0000
Intercept	-606.6443		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3511	1.3390	1.3633

X1	n0	n1	Calc Prob
1996.0000	574425	888	0.0024
1997.0000	524370	1781	0.0033
1998.0000	495002	2530	0.0044
1999.0000	485222	3332	0.0059
2000.0000	472432	4217	0.0080
2001.0000	563094	5417	0.0108

FEMALE-TYPICAL

3125881 cases have Y=0; 6829 cases have Y=1.

Variable	Avg	SD
1	1998.4694	1.7550

Iteration History...
-2 Log Likelihood = 97345.8206 (Null Model)
-2 Log Likelihood = 96964.0080
-2 Log Likelihood = 96958.5943
-2 Log Likelihood = 96958.5932
-2 Log Likelihood = 96958.5932 (Converged)

Overall Model Fit...
Chi Square= 387.2275; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.1375	0.0071	0.0000
Intercept	268.6743		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.8715	0.8595	0.8837

X1	n0	n1	Calc Prob
1996.0000	573752	1561	0.0030
1997.0000	524778	1373	0.0026
1998.0000	496345	1187	0.0023
1999.0000	487397	1157	0.0020
2000.0000	475702	947	0.0017
2001.0000	567907	604	0.0015

CHILDREN AND ADOLESCENTS ENROLLED IN A MANAGED CARE ORGANIZATION (MCO)

1. Prevalence of Total Antipsychotic Use (H_1).
2. Prevalence of Atypical Antipsychotic Use (H_2).
3. Prevalence of Typical Antipsychotic Use (H_3).
4. Age-Specific Prevalence of Total Antipsychotic Use (H_5).
5. Age-Specific Prevalence of Atypical Antipsychotic Use (H_6).
6. Age-Specific Prevalence of Typical Antipsychotic Use (H_7).
7. Gender-Specific Prevalence of Total Antipsychotic Use (H_8).
8. Gender-Specific Prevalence of Atypical Antipsychotic Use (H_9).
9. Gender-Specific Prevalence of Typical Antipsychotic Use (H_{10}).

TOTAL

4825017 cases have Y=0; 11824 cases have Y=1.

Variable	Avg	SD
1	1998.2976	1.6623

Iteration History...
-2 Log Likelihood = 65835.4417 (Null Model)
-2 Log Likelihood = 64418.0545
-2 Log Likelihood = 64371.2581
-2 Log Likelihood = 64371.2157
-2 Log Likelihood = 64371.2157 (Converged)

Overall Model Fit...
Chi Square= 1464.2260; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2122	0.0056	0.0000
Intercept	-430.1841		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2364	1.2229	1.2501

X1	n0	n1	Calc Prob
1996.0000	903972	1338	0.0014
1997.0000	866512	1423	0.0017
1998.0000	904618	1725	0.0022
1999.0000	826647	2305	0.0027
2000.0000	693001	2861	0.0033
2001.0000	630267	2172	0.0041

ATYPICAL

4829788 cases have Y=0; 7053 cases have Y=1.

Variable	Avg	SD
1	1998.2976	1.6623

Iteration History...
-2 Log Likelihood = 06215.8468 (Null Model)
-2 Log Likelihood = 03706.8650
-2 Log Likelihood = 03421.5842
-2 Log Likelihood = 03419.2333
-2 Log Likelihood = 03419.2330
-2 Log Likelihood = 03419.2330 (Converged)

Overall Model Fit...
Chi Square= 2796.6138; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3906	0.0077	0.0000
Intercept	-787.3449		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4779	1.4557	1.5005

X1	n0	n1	Calc Prob
1996.0000	904972	338	0.0005
1997.0000	867345	590	0.0007
1998.0000	905470	873	0.0011
1999.0000	827466	1486	0.0016
2000.0000	693787	2075	0.0023
2001.0000	630748	1691	0.0034

TYPICAL

4831562 cases have Y=0; 5279 cases have Y=1.

Variable	Avg	SD
1	1998.2976	1.6623

Iteration History...
-2 Log Likelihood = 82560.7569 (Null Model)
-2 Log Likelihood = 82554.8957
-2 Log Likelihood = 82554.8941
-2 Log Likelihood = 82554.8941 (Converged)

Overall Model Fit...
Chi Square= 5.8629; df=1; p= 0.0155

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0201	0.0083	0.0156
Intercept	33.3372		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9801	0.9643	0.9962

X1	n0	n1	Calc Prob
1996.0000	904231	1079	0.0011
1997.0000	867032	903	0.0011
1998.0000	905408	935	0.0011
1999.0000	828024	928	0.0011
2000.0000	694972	890	0.0011
2001.0000	631895	544	0.0010

<2 YEARS-TOTAL

446597 cases have Y=0; 213 cases have Y=1.

Variable	Avg	SD
1	1998.2202	1.6627

Iteration History...
-2 Log Likelihood = 3684.2006 (Null Model)
-2 Log Likelihood = 3671.3801
-2 Log Likelihood = 3671.1668
-2 Log Likelihood = 3671.1667
-2 Log Likelihood = 3671.1667 (Converged)

Overall Model Fit...
Chi Square= 13.0338; df=1; p= 0.0003

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1476	0.0409	0.0003
Intercept	-302.5399		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1590	1.0697	1.2557

X1	n0	n1	Calc Prob
1996.0000	89728	29	0.0003
1997.0000	82526	26	0.0004
1998.0000	85094	40	0.0004
1999.0000	74529	44	0.0005
2000.0000	58441	47	0.0006
2001.0000	56279	27	0.0007

<2 YEARS-ATYPICAL

446757 cases have Y=0; 53 cases have Y=1.

Variable	Avg	SD
1	1998.2202	1.6627

Iteration History...
-2 Log Likelihood = 1064.1910 (Null Model)
-2 Log Likelihood = 1055.2474
-2 Log Likelihood = 1054.7968
-2 Log Likelihood = 1054.7959
-2 Log Likelihood = 1054.7959 (Converged)

Overall Model Fit...
Chi Square= 9.3950; df=1; p= 0.0022

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2524	0.0833	0.0025
Intercept	-513.4849		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2871	1.0932	1.5155

X1	n0	n1	Calc Prob
1996.0000	89755	2	0.0001
1997.0000	82546	6	0.0001
1998.0000	85122	12	0.0001
1999.0000	74561	12	0.0001
2000.0000	58472	16	0.0002
2001.0000	56301	5	0.0002

<2 YEARS-TYPICAL

446648 cases have Y=0; 162 cases have Y=1.

Variable	Avg	SD
1	1998.2202	1.6627

Iteration History...
-2 Log Likelihood = 2890.7640 (Null Model)
-2 Log Likelihood = 2884.9943
-2 Log Likelihood = 2884.9385
-2 Log Likelihood = 2884.9385
-2 Log Likelihood = 2884.9385 (Converged)

Overall Model Fit...
Chi Square= 5.8255; df=1; p= 0.0158

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1131	0.0468	0.0157
Intercept	-234.0374		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1198	1.0216	1.2274

X1	n0	n1	Calc Prob
1996.0000	89730	27	0.0003
1997.0000	82532	20	0.0003
1998.0000	85105	29	0.0003
1999.0000	74540	33	0.0004
2000.0000	58457	31	0.0004
2001.0000	56284	22	0.0005

2-4 YRS-TOTAL

714673 cases have Y=0; 494 cases have Y=1.

Variable	Avg	SD
1	1998.2844	1.6610

Iteration History...
-2 Log Likelihood = 8178.0617 (Null Model)
-2 Log Likelihood = 8119.6969
-2 Log Likelihood = 8117.7740
-2 Log Likelihood = 8117.7723
-2 Log Likelihood = 8117.7723 (Converged)

Overall Model Fit...
Chi Square= 60.2894; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2103	0.0273	0.0000
Intercept	-427.5599		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2340	1.1697	1.3019

X1	n0	n1	Calc Prob
1996.0000	135088	51	0.0004
1997.0000	128677	49	0.0005
1998.0000	135241	88	0.0006
1999.0000	122687	114	0.0008
2000.0000	99809	111	0.0009
2001.0000	93171	81	0.0011

2-4 YRS-ATYPICAL

714941 cases have Y=0; 226 cases have Y=1.

Variable	Avg	SD
1	1998.2844	1.6610

Iteration History...
-2 Log Likelihood = 4094.9294 (Null Model)
-2 Log Likelihood = 4008.3569
-2 Log Likelihood = 3997.3728
-2 Log Likelihood = 3997.2661
-2 Log Likelihood = 3997.2661
-2 Log Likelihood = 3997.2661 (Converged)

Overall Model Fit...
Chi Square= 97.6633; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4083	0.0434	0.0000
Intercept	-824.2250		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5043	1.3816	1.6378

X1	n0	n1	Calc Prob
1996.0000	135132	7	0.0001
1997.0000	128717	9	0.0001
1998.0000	135295	34	0.0002
1999.0000	122733	68	0.0003
2000.0000	99861	59	0.0005
2001.0000	93203	49	0.0008

2-4 YRS-TYPICAL

714878 cases have Y=0; 289 cases have Y=1.

Variable	Avg	SD
1	1998.2844	1.6610

Iteration History...
-2 Log Likelihood = 5094.2854 (Null Model)
-2 Log Likelihood = 5092.3082
-2 Log Likelihood = 5092.3047
-2 Log Likelihood = 5092.3047 (Converged)

Overall Model Fit...
Chi Square= 1.9808; df=1; p= 0.1593

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.0497	0.0353	0.1588
Intercept	-107.0925		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.0509	0.9808	1.1261

X1	n0	n1	Calc Prob
1996.0000	135092	47	0.0004
1997.0000	128683	43	0.0004
1998.0000	135272	57	0.0004
1999.0000	122744	57	0.0004
2000.0000	99867	53	0.0004
2001.0000	93220	32	0.0005

5-9 YRS-TOTAL

1263706 cases have Y=0; 2482 cases have Y=1.

Variable	Avg	SD
1	1998.2958	1.6517

Iteration History...
-2 Log Likelihood = 35908.1893 (Null Model)
-2 Log Likelihood = 35377.0693
-2 Log Likelihood = 35343.8801
-2 Log Likelihood = 35343.7841
-2 Log Likelihood = 35343.7841
-2 Log Likelihood = 35343.7841 (Converged)

Overall Model Fit...
Chi Square= 564.4053; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2921	0.0126	0.0000
Intercept	-590.0334		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3392	1.3066	1.3726

X1	n0	n1	Calc Prob
1996.0000	234197	204	0.0009
1997.0000	225190	247	0.0012
1998.0000	242225	338	0.0016
1999.0000	219970	537	0.0021
2000.0000	180903	662	0.0029
2001.0000	161221	494	0.0038

5-9 YRS-ATYPICAL

1264485 cases have Y=0; 1703 cases have Y=1.

Variable	Avg	SD
1	1998.2958	1.6517

Iteration History...
-2 Log Likelihood = 25922.0507 (Null Model)
-2 Log Likelihood = 25146.9855
-2 Log Likelihood = 25026.1472
-2 Log Likelihood = 25024.4660
-2 Log Likelihood = 25024.4655
-2 Log Likelihood = 25024.4655 (Converged)

Overall Model Fit...
Chi Square= 897.5852; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.4603	0.0164	0.0000
Intercept	-926.6780		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.5845	1.5345	1.6362

X1	n0	n1	Calc Prob
1996.0000	234348	53	0.0004
1997.0000	225338	99	0.0006
1998.0000	242369	194	0.0009
1999.0000	220107	400	0.0014
2000.0000	181026	539	0.0022
2001.0000	161297	418	0.0035

5-9 YRS-TYPICAL

1265303 cases have Y=0; 885 cases have Y=1.

Variable	Avg	SD
1	1998.2958	1.6517

Iteration History...
-2 Log Likelihood = 14630.0840 (Null Model)
-2 Log Likelihood = 14629.6648
-2 Log Likelihood = 14629.6648
-2 Log Likelihood = 14629.6648 (Converged)

Overall Model Fit...
Chi Square= 0.4192; df=1; p= 0.5173

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0132	0.0204	0.5176
Intercept	19.1048		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9869	0.9482	1.0271

X1	n0	n1	Calc Prob
1996.0000	234236	165	0.0007
1997.0000	225278	159	0.0007
1998.0000	242399	164	0.0007
1999.0000	220344	163	0.0007
2000.0000	181419	146	0.0007
2001.0000	161627	88	0.0007

10-14 YRS-TOTAL

1238910 cases have Y=0; 4181 cases have Y=1.

Variable	Avg	SD
1	1998.3216	1.6664

Iteration History...
-2 Log Likelihood = 55967.8884 (Null Model)
-2 Log Likelihood = 55363.1071
-2 Log Likelihood = 55339.0033
-2 Log Likelihood = 55338.9721
-2 Log Likelihood = 55338.9721 (Converged)

Overall Model Fit...
Chi Square= 628.9163; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2346	0.0095	0.0000
Intercept	-474.6303		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2644	1.2411	1.2882

X1	n0	n1	Calc Prob
1996.0000	229052	425	0.0018
1997.0000	219795	481	0.0023
1998.0000	229537	589	0.0029
1999.0000	212497	809	0.0037
2000.0000	182953	1065	0.0046
2001.0000	165076	812	0.0058

10-14 YRS-ATYPICAL

1240262 cases have Y=0; 2829 cases have Y=1.

Variable	Avg	SD
1	1998.3216	1.6664

Iteration History...
-2 Log Likelihood = 40082.9369 (Null Model)
-2 Log Likelihood = 39093.3506
-2 Log Likelihood = 38985.3411
-2 Log Likelihood = 38984.4843
-2 Log Likelihood = 38984.4842
-2 Log Likelihood = 38984.4842 (Converged)

Overall Model Fit...
Chi Square= 1098.4527; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3872	0.0122	0.0000
Intercept	-780.0754		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4729	1.4379	1.5087

X1	n0	n1	Calc Prob
1996.0000	229343	134	0.0008
1997.0000	220037	239	0.0011
1998.0000	229779	347	0.0016
1999.0000	212734	572	0.0024
2000.0000	183167	851	0.0035
2001.0000	165202	686	0.0052

10-14 YRS-TYPICAL

1241572 cases have Y=0; 1519 cases have Y=1.

Variable	Avg	SD
1	1998.3216	1.6664

Iteration History...
-2 Log Likelihood = 23412.9329 (Null Model)
-2 Log Likelihood = 23405.0085
-2 Log Likelihood = 23404.9980
-2 Log Likelihood = 23404.9980 (Converged)

Overall Model Fit...
Chi Square= 7.9348; df=1; p= 0.0048

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0436	0.0155	0.0049
Intercept	80.3518		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9574	0.9287	0.9869

X1	n0	n1	Calc Prob
1996.0000	229158	319	0.0013
1997.0000	220010	266	0.0013
1998.0000	229857	269	0.0012
1999.0000	213039	267	0.0012
2000.0000	183767	251	0.0011
2001.0000	165741	147	0.0011

15-19 YRS-TOTAL

1161131 cases have Y=0; 4454 cases have Y=1.

Variable	Avg	SD
1	1998.3117	1.6689

Iteration History...
-2 Log Likelihood = 58483.3606 (Null Model)
-2 Log Likelihood = 58237.3971
-2 Log Likelihood = 58233.8326
-2 Log Likelihood = 58233.8320
-2 Log Likelihood = 58233.8320 (Converged)

Overall Model Fit...
Chi Square= 249.5286; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1418	0.0090	0.0000
Intercept	-288.8747		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1523	1.1321	1.1728

X1	n0	n1	Calc Prob
1996.0000	215907	629	0.0027
1997.0000	210324	620	0.0031
1998.0000	212521	670	0.0036
1999.0000	196964	801	0.0041
2000.0000	170895	976	0.0047
2001.0000	154520	758	0.0054

15-19 YRS-ATYPICAL

1163343 cases have Y=0; 2242 cases have Y=1.

Variable	Avg	SD
1	1998.3117	1.6689

Iteration History...
-2 Log Likelihood = 32520.8723 (Null Model)
-2 Log Likelihood = 31905.2219
-2 Log Likelihood = 31854.4167
-2 Log Likelihood = 31854.1726
-2 Log Likelihood = 31854.1726
-2 Log Likelihood = 31854.1726 (Converged)

Overall Model Fit...
Chi Square= 666.6997; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3340	0.0134	0.0000
Intercept	-673.7755		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.3965	1.3604	1.4336

X1	n0	n1	Calc Prob
1996.0000	216394	142	0.0008
1997.0000	210707	237	0.0011
1998.0000	212905	286	0.0015
1999.0000	197331	434	0.0021
2000.0000	171261	610	0.0029
2001.0000	154745	533	0.0040

15-19 YRS-TYPICAL

1163161 cases have Y=0; 2424 cases have Y=1.

Variable	Avg	SD
1	1998.3117	1.6689

Iteration History...
-2 Log Likelihood = 34782.0670 (Null Model)
-2 Log Likelihood = 34774.7645
-2 Log Likelihood = 34774.7589
-2 Log Likelihood = 34774.7589 (Converged)

Overall Model Fit...
Chi Square= 7.3081; df=1; p= 0.0069

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0330	0.0122	0.0070
Intercept	59.8349		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9675	0.9446	0.9910

X1	n0	n1	Calc Prob
1996.0000	216015	521	0.0022
1997.0000	210529	415	0.0022
1998.0000	212775	416	0.0021
1999.0000	197357	408	0.0020
2000.0000	171462	409	0.0020
2001.0000	155023	255	0.0019

MALE-TOTAL

2457400 cases have Y=0; 7051 cases have Y=1.

Variable	Avg	SD
1	1998.2975	1.6625

Iteration History...
-2 Log Likelihood = 96670.9443 (Null Model)
-2 Log Likelihood = 95644.1122
-2 Log Likelihood = 95602.3530
-2 Log Likelihood = 95602.2975
-2 Log Likelihood = 95602.2975
-2 Log Likelihood = 95602.2975 (Converged)

Overall Model Fit...
Chi Square= 1068.6468; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.2354	0.0073	0.0000
Intercept	-476.2787		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.2654	1.2474	1.2836

X1	n0	n1	Calc Prob
1996.0000	460606	736	0.0015
1997.0000	441752	811	0.0020
1998.0000	460228	977	0.0025
1999.0000	421119	1447	0.0031
2000.0000	352643	1740	0.0040
2001.0000	321052	1340	0.0050

MALE-ATYPICAL

2459763 cases have Y=0; 4688 cases have Y=1.

Variable	Avg	SD
1	1998.2975	1.6625

Iteration History...
-2 Log Likelihood = 68105.0753 (Null Model)
-2 Log Likelihood = 66396.3824
-2 Log Likelihood = 66196.5916
-2 Log Likelihood = 66194.8647
-2 Log Likelihood = 66194.8645
-2 Log Likelihood = 66194.8645 (Converged)

Overall Model Fit...
Chi Square= 1910.2108; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3966	0.0095	0.0000
Intercept	-798.9376		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4867	1.4592	1.5147

X1	n0	n1	Calc Prob
1996.0000	461130	212	0.0006
1997.0000	442180	383	0.0009
1998.0000	460639	566	0.0014
1999.0000	421540	1026	0.0020
2000.0000	353002	1381	0.0030
2001.0000	321272	1120	0.0045

MALE-TYPICAL

2461763 cases have Y=0; 2688 cases have Y=1.

Variable	Avg	SD
1	1998.2975	1.6625

Iteration History...
-2 Log Likelihood = 42042.3702 (Null Model)
-2 Log Likelihood = 42031.4147
-2 Log Likelihood = 42031.4033
-2 Log Likelihood = 42031.4033 (Converged)

Overall Model Fit...
Chi Square= 10.9669; df=1; p= 0.0009

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0386	0.0117	0.0010
Intercept	70.2879		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9621	0.9404	0.9844

X1	n0	n1	Calc Prob
1996.0000	460765	577	0.0012
1997.0000	442094	469	0.0011
1998.0000	460746	459	0.0011
1999.0000	422075	491	0.0011
2000.0000	353954	429	0.0010
2001.0000	322129	263	0.0010

FEMALE-TOTAL

2367617 cases have Y=0; 4773 cases have Y=1.

Variable	Avg	SD
1	1998.2977	1.6621

Iteration History...
-2 Log Likelihood = 68804.4322 (Null Model)
-2 Log Likelihood = 68393.4647
-2 Log Likelihood = 68383.9002
-2 Log Likelihood = 68383.8957
-2 Log Likelihood = 68383.8957 (Converged)

Overall Model Fit...
Chi Square= 420.5364; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.1785	0.0088	0.0000
Intercept	-362.9913		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.1954	1.1751	1.2161

X1	n0	n1	Calc Prob
1996.0000	443366	602	0.0013
1997.0000	424760	612	0.0015
1998.0000	444390	748	0.0018
1999.0000	405528	858	0.0022
2000.0000	340358	1121	0.0026
2001.0000	309215	832	0.0031

FEMALE-ATYPICAL

2370025 cases have Y=0; 2365 cases have Y=1.

Variable	Avg	SD
1	1998.2977	1.6621

Iteration History...
-2 Log Likelihood = 37416.0810 (Null Model)
-2 Log Likelihood = 36614.8637
-2 Log Likelihood = 36528.8725
-2 Log Likelihood = 36528.2305
-2 Log Likelihood = 36528.2304
-2 Log Likelihood = 36528.2304 (Converged)

Overall Model Fit...
Chi Square= 887.8506; df=1; p= 0.0000

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	0.3791	0.0133	0.0000
Intercept	-764.6493		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	1.4610	1.4234	1.4995

X1	n0	n1	Calc Prob
1996.0000	443842	126	0.0003
1997.0000	425165	207	0.0005
1998.0000	444831	307	0.0007
1999.0000	405926	460	0.0011
2000.0000	340785	694	0.0016
2001.0000	309476	571	0.0023

FEMALE-TYPICAL

2369799 cases have Y=0; 2591 cases have Y=1.

Variable	Avg	SD
1	1998.2977	1.6621

Iteration History...
-2 Log Likelihood = 40518.3844 (Null Model)
-2 Log Likelihood = 40518.3771
-2 Log Likelihood = 40518.3771 (Converged)

Overall Model Fit...
Chi Square= 0.0074; df=1; p= 0.9317

Coefficients and Standard Errors...

Variable	Coeff.	StdErr	p
1	-0.0010	0.0118	0.9317
Intercept	-4.7921		

Odds Ratios and 95% Confidence Intervals...

Variable	O.R.	Low --	High
1	0.9990	0.9761	1.0224

X1	n0	n1	Calc Prob
1996.0000	443466	502	0.0011
1997.0000	424938	434	0.0011
1998.0000	444662	476	0.0011
1999.0000	405949	437	0.0011
2000.0000	341018	461	0.0011
2001.0000	309766	281	0.0011

APPENDIX C

Analyses of Mean Daily Doses of Atypical Antipsychotics in Age Categories

CHILDREN AND ADOLESCENTS ENROLLED IN MEDI-CAL (CA)

Risperidone Dosing Analyses (H_{11})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	2	5.1250	1.59099	1.12500	-9.1695	19.4195	4.00	6.25
1997	6	4.2604	1.64527	.67168	2.5338	5.9870	1.56	6.00
1998	20	3.3188	2.19180	.49010	2.2930	4.3446	.52	8.00
1999	17	2.5376	1.75972	.42680	1.6328	3.4424	.42	6.00
2000	22	2.5723	2.35317	.50170	1.5290	3.6156	.40	8.00
2001	15	1.7244	1.54308	.39842	.8699	2.5789	.26	5.60

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.110	5	76	.362

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	48.616	5	9.723	2.411	.044
Within Groups	306.508	76	4.033		
Total	355.124	81			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	8	4.1170	2.30497	.81493	2.1900	6.0441	.50	6.00
1997	44	2.2220	1.65110	.24891	1.7200	2.7239	.50	6.16
1998	117	1.9644	1.30577	.12072	1.7253	2.2035	.43	6.02
1999	155	1.9232	1.32069	.10608	1.7136	2.1327	.25	7.50
2000	216	1.5304	1.10243	.07501	1.3825	1.6782	.25	6.00
2001	229	1.4689	1.09093	.07209	1.3268	1.6109	.25	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.997	5	763	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	92.634	5	18.527	12.255	.000
Within Groups	1153.459	763	1.512		
Total	1246.093	768			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	.4955	.14061	.007	.0157	.9753
1999	2001	.4543	.12826	.006	.0185	.8900

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	90	2.4740	1.34743	.14203	2.1918	2.7563	.50	6.00
1997	309	1.9597	1.17037	.06658	1.8287	2.0907	.48	6.00
1998	1010	1.7910	1.06662	.03356	1.7251	1.8568	.30	6.00
1999	1689	1.7803	1.12049	.02726	1.7268	1.8338	.25	6.00
2000	2549	1.6177	1.09902	.02177	1.5750	1.6604	.25	6.00
2001	3228	1.5343	1.11271	.01958	1.4960	1.5727	.25	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.073	5	8869	.009

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	184.684	5	36.937	29.989	.000
Within Groups	10923.707	8869	1.232		
Total	11108.391	8874			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1998	.6830	.14594	.000	.1777	1.1884
	1999	.6937	.14463	.000	.1924	1.1950
	2000	.8563	.14369	.000	.3579	1.3548
	2001	.9397	.14338	.000	.4422	1.4372
1997	2000	.3420	.07005	.000	.1046	.5794
	2001	.4254	.06940	.000	.1901	.6607
1998	2000	.1733	.04000	.000	.0385	.3081
	2001	.2566	.03886	.000	.1257	.3876
1999	2000	.1626	.03489	.000	.0452	.2801
	2001	.2460	.03357	.000	.1330	.3590

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	250	2.8783	1.55256	.09819	2.6849	3.0717	.50	6.67
1997	722	2.5377	1.53274	.05704	2.4257	2.6496	.50	7.00
1998	1819	2.2373	1.30812	.03067	2.1771	2.2974	.50	6.67
1999	2806	2.1366	1.24132	.02343	2.0906	2.1825	.50	7.00
2000	3901	2.0178	1.25752	.02013	1.9783	2.0573	.50	7.00
2001	4822	1.9075	1.26683	.01824	1.8717	1.9432	.50	7.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
26.844	5	14314	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	522.472	5	104.494	63.294	.000
Within Groups	23631.384	14314	1.651		
Total	24153.856	14319			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1998	.6410	.10287	.000	.2917	.9904
	1999	.7417	.10095	.000	.3987	1.0848
	2000	.8605	.10024	.000	.5198	1.2013
	2001	.9709	.09987	.000	.6313	1.3104
1997	1998	.3004	.06477	.000	.0820	.5188
	1999	.4011	.06167	.000	.1930	.6091
	2000	.5199	.06049	.000	.3157	.7240
	2001	.6302	.05989	.000	.4281	.8323
1998	2000	.2195	.03669	.000	.0960	.3430
	2001	.3298	.03569	.000	.2097	.4500
1999	2000	.1188	.03090	.002	.0148	.2228
	2001	.2291	.02970	.000	.1292	.3291
2000	2001	.1103	.02717	.001	.0189	.2018

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	491	4.1182	1.95707	.08832	3.9446	4.2917	.50	9.00
1997	955	3.5045	1.99894	.06468	3.3776	3.6315	.50	9.00
1998	1871	3.0337	1.79557	.04151	2.9523	3.1152	.50	9.00
1999	2300	2.8357	1.74582	.03640	2.7643	2.9071	.50	9.00
2000	2885	2.6696	1.66971	.03109	2.6086	2.7305	.50	9.00
2001	3322	2.5730	1.67041	.02898	2.5162	2.6298	.50	9.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
25.272	5	11818	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1610.057	5	322.011	105.616	.000
Within Groups	36031.596	11818	3.049		
Total	37641.653	11823			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1997	.6137	.10947	.000	.2444	.9829
	1998	1.0844	.09759	.000	.7548	1.4140
	1999	1.2825	.09553	.000	.9597	1.6052
	2000	1.4486	.09363	.000	1.1322	1.7650
	2001	1.5452	.09295	.000	1.2310	1.8593
1997	1998	.4708	.07686	.000	.2118	.7297
	1999	.6688	.07422	.000	.4187	.9189
	2000	.8349	.07177	.000	.5931	1.0768
	2001	.9315	.07088	.000	.6926	1.1704
1998	1999	.1980	.05521	.005	.0122	.3839
	2000	.3642	.05186	.000	.1896	.5388
	2001	.4608	.05063	.000	.2903	.6312
1999	2000	.1661	.04787	.007	.0050	.3273
	2001	.2627	.04653	.000	.1061	.4193

Olanzapine Dosing Analyses (H_{12})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	4	5.6250	3.14576	1.57288	.6194	10.6306	2.50	10.00
1998	14	9.8903	6.79883	1.81706	5.9648	13.8159	2.50	24.06
1999	25	11.2432	8.91052	1.78210	7.5652	14.9213	2.50	40.00
2000	17	11.6490	8.11759	1.96880	7.4753	15.8227	2.50	30.30
2001	14	11.7866	10.26226	2.74270	5.8613	17.7118	2.50	40.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.047	4	69	.389

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	149.030	4	37.258	.518	.722
Within Groups	4959.542	69	71.877		
Total	5108.572	73			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1	10.0000	.	.	.	.	10.00	10.00
1997	11	8.7879	7.57705	2.28457	3.6976	13.8782	2.50	30.00
1998	39	9.4614	5.76360	.92291	7.5931	11.3297	2.50	30.00
1999	45	10.2474	7.28720	1.08631	8.0580	12.4367	2.50	30.00
2000	50	7.7926	5.12179	.72433	6.3370	9.2482	2.50	20.00
2001	56	7.5398	4.61473	.61667	6.3039	8.7756	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.026	5	196	.077

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	248.298	5	49.660	1.468	.202
Within Groups	6629.654	196	33.825		
Total	6877.952	201			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	4	7.9167	4.33013	2.16506	1.0265	14.8069	2.50	12.50
1997	67	6.4815	4.04070	.49365	5.4959	7.4671	2.50	20.00
1998	255	6.9350	4.07778	.25536	6.4321	7.4378	2.50	20.00
1999	368	6.7522	4.16990	.21737	6.3247	7.1796	2.50	20.00
2000	605	6.2769	3.90250	.15866	5.9653	6.5885	2.50	20.00
2001	758	6.5085	3.98443	.14472	6.2244	6.7926	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.722	5	196	.077

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	106.777	5	21.355	1.329	.249
Within Groups	32955.369	2051	16.068		
Total	33062.146	2056			

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	5	8.0000	2.73861	1.22474	4.5996	11.4004	5.00	10.00
1997	181	8.9882	4.41030	.32781	8.3413	9.6350	2.50	20.15
1998	804	8.0984	4.59853	.16218	7.7801	8.4168	2.50	20.61
1999	1117	7.8025	4.56865	.13670	7.5343	8.0707	2.50	20.67
2000	1485	7.6990	4.53391	.11765	7.4682	7.9298	2.50	20.39
2001	1748	7.3776	4.40738	.10542	7.1709	7.5844	2.50	20.67

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.166	5	5334	.323

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	619.756	5	123.951	6.108	.000
Within Groups	108246.575	5334	20.294		
Total	108866.332	5339			

Post Hoc Analysis

Scheffe

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1997	2001	1.6105	.35175	.001	.2435	2.9775

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	24	11.1354	2.75782	.56294	9.9709	12.2999	7.75	20.00
1997	510	10.8180	5.34780	.23680	10.3528	11.2833	2.50	30.00
1998	1524	10.2364	5.50619	.14105	9.9598	10.5131	2.50	30.00
1999	1958	10.0746	5.64991	.12768	9.8242	10.3250	2.50	30.00
2000	2249	9.8226	5.91108	.12464	9.5781	10.0670	2.50	30.00
2001	2414	10.0730	6.01269	.12238	9.8330	10.3130	2.50	30.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.870	5	8673	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	490.911	5	98.182	2.945	.012
Within Groups	289159.161	8673	33.340		
Total	289650.072	8678			

Quetiapine Dosing Analyses (H_{13})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	3	143.0556	141.56451	81.73231	-208.6102	494.7213	25.00	300.00
1999	2	35.4167	14.73139	10.41667	-96.9396	167.7730	25.00	45.83
2000	3	179.5274	148.82956	85.92678	-190.1857	549.2405	25.00	321.92
2001	3	186.1915	167.06856	96.45708	-228.8298	601.2128	25.00	358.57

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.019	3	7	.440

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32694.570	3	10898.190	.543	.668
Within Groups	140422.313	7	20060.330		
Total	173116.884	10			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2	125.0000	106.06602	75.00000	-827.9654	1077.9654	50.00	200.00
1999	9	286.6021	317.64476	105.88159	42.4388	530.7655	45.83	800.00
2000	18	163.7205	128.70145	30.33522	99.7188	227.7223	37.50	500.00
2001	34	164.5088	161.01729	27.61424	108.3272	220.6904	25.00	782.61

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.304	3	59	.003

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	121241.704	3	40413.901	1.219	.311
Within Groups	1955601.380	59	33145.786		
Total	2076843.084	62			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	1	250.0000	.	.	.	.	250.00	250.00
1998	35	193.9234	141.86511	23.97958	145.1910	242.6558	25.00	600.00
1999	111	133.9920	121.22049	11.50574	111.1903	156.7937	25.00	600.00
2000	242	146.5170	117.09263	7.52700	131.6899	161.3441	25.00	600.00
2001	430	165.5974	131.94724	6.36306	153.0907	178.1040	25.00	600.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.184	4	814	.069

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	173503.214	4	43375.804	2.701	.030
Within Groups	13073856.014	814	16061.248		
Total	13247359.228	818			

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	109	207.7942	147.11982	14.09152	179.8624	235.7261	25.00	742.38
1999	326	194.3966	165.23454	9.15149	176.3930	212.4002	25.00	800.07
2000	573	225.9943	173.58261	7.25152	211.7515	240.2372	25.00	810.26
2001	1070	222.6013	180.75307	5.52578	211.7587	233.4439	25.00	900.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.307	3	2074	.005

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	252014.674	3	84004.891	2.749	.041
Within Groups	63371779.983	2074	30555.342		
Total	63623794.658	2077			

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	2	260.7143	196.97975	139.28571	-1509.0785	2030.5071	121.43	400.00
1998	154	219.8745	163.82371	13.20129	193.7942	245.9549	25.00	800.00
1999	481	241.9398	177.43389	8.09029	226.0430	257.8365	25.00	810.56
2000	726	250.3473	189.71938	7.04115	236.5238	264.1707	25.00	836.73
2001	1253	258.4873	195.73336	5.52954	247.6391	269.3355	25.00	900.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.836	4	2611	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	259400.517	4	64850.129	1.814	.123
Within Groups	93318088.544	2611	35740.363		
Total	93577489.061	2615			

CHILDREN AND ADOLESCENTS ENROLLED IN OHIO MEDICAID (OH)

Risperidone Dosing Analyses (H_{11})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1	6.0000	.	.	.	.	6.00	6.00
1997	2	2.4667	2.16846	1.53333	-17.0162	21.9495	.93	4.00
1998	3	.3778	.21170	.12222	-.1481	.9037	.13	.50
1999	15	2.7164	1.68992	.43634	1.7806	3.6523	.53	6.00
2000	32	1.5048	1.58491	.28017	.9334	2.0762	.15	6.00
2001	38	1.7411	1.33885	.21719	1.3010	2.1811	.26	4.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.347	5	85	.252

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39.994	5	7.999	3.598	.005
Within Groups	188.966	85	2.223		
Total	228.960	90			

Post hoc tests are not performed because at least one group has fewer than two cases.

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	15	2.1800	.95758	.24725	1.6497	2.7103	.50	3.33
1997	39	1.3821	.62674	.10036	1.1789	1.5852	.50	3.33
1998	147	1.2526	.69540	.05736	1.1393	1.3660	.33	4.00
1999	270	1.3337	.79622	.04846	1.2383	1.4291	.25	4.00
2000	449	1.1905	.77653	.03665	1.1185	1.2625	.25	4.00
2001	596	.9640	.63939	.02619	.9126	1.0154	.25	4.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
9.256	5	1510	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	50.017	5	10.003	19.309	.000
Within Groups	782.293	1510	.518		
Total	832.311	1515			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2001	1.2160	.24863	.002	.1871	2.2449
1997	2001	.4180	.10372	.003	.0451	.7910
1998	2001	.2886	.06305	.000	.0736	.5036
1999	2001	.3697	.05508	.000	.1832	.5562
2000	2001	.2265	.04504	.000	.0745	.3785

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	455	1.3025	.73307	.03437	1.2349	1.3700	.27	4.00
1997	1549	1.4213	.75523	.01919	1.3836	1.4589	.27	4.00
1998	2944	1.5410	.87121	.01606	1.5095	1.5725	.27	4.00
1999	4668	1.5399	.89568	.01311	1.5142	1.5656	.25	4.00
2000	6803	1.3422	.86140	.01044	1.3217	1.3627	.25	4.00
2001	8178	1.2544	.86244	.00954	1.2357	1.2731	.25	4.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
14.896	5	24591	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	339.701	5	67.940	91.626	.000
Within Groups	18234.039	24591	.741		
Total	18573.740	24596			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1998	-.2385	.03793	.000	-.3667	-.1104
	1999	-.2374	.03678	.000	-.3618	-.1131
1997	1998	-.1197	.02502	.000	-.2040	-.0355
	1999	-.1186	.02324	.000	-.1969	-.0404
	2000	.0791	.02185	.004	.0055	.1527
	2001	.1669	.02143	.000	.0947	.2390
1998	2000	.1988	.01915	.000	.1344	.2633
	2001	.2866	.01868	.000	.2237	.3494
1999	2000	.1977	.01676	.000	.1413	.2541
	2001	.2855	.01621	.000	.2309	.3400
2000	2001	.0878	.01414	.000	.0402	.1353

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1394	1.8734	1.19669	.03205	1.8105	1.9363	.27	6.00
1997	3278	1.8535	1.19038	.02079	1.8127	1.8942	.27	6.00
1998	5278	1.8558	1.19652	.01647	1.8235	1.8881	.27	6.00
1999	7128	1.7912	1.15971	.01374	1.7642	1.8181	.25	6.00
2000	10245	1.6423	1.09407	.01081	1.6211	1.6635	.25	6.00
2001	12117	1.5392	1.08967	.00990	1.5198	1.5586	.25	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.439	5	39434	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	651.315	5	130.263	101.866	.000
Within Groups	50426.796	39434	1.279		
Total	51078.111	39439			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2000	.2311	.03383	.000	.1171	.3450
	2001	.3342	.03355	.000	.2212	.4473
1997	2000	.2111	.02343	.000	.1323	.2900
	2001	.3143	.02303	.000	.2368	.3918
1998	2000	.2134	.01970	.000	.1472	.2797
	2001	.3166	.01922	.000	.2520	.3813
1999	2000	.1488	.01748	.000	.0900	.2076
	2001	.2520	.01693	.000	.1950	.3090
2000	2001	.1032	.01466	.000	.0539	.1525

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1700	2.2600	1.51694	.03679	2.1878	2.3321	.20	6.00
1997	2835	2.2517	1.45700	.02736	2.1980	2.3053	.20	6.00
1998	3965	2.2189	1.43473	.02278	2.1742	2.2636	.20	6.00
1999	4527	2.1352	1.44962	.02155	2.0930	2.1774	.18	6.00
2000	6012	1.9214	1.35642	.01749	1.8871	1.9557	.18	6.00
2001	6834	1.8119	1.36321	.01649	1.7795	1.8442	.18	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
13.906	5	25867	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	816.514	5	163.303	82.256	.000
Within Groups	51353.674	25867	1.985		
Total	52170.188	25872			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2000	.3386	.04074	.000	.2014	.4758
	2001	.4481	.04032	.000	.3123	.5839
1997	2000	.3303	.03248	.000	.2210	.4396
	2001	.4398	.03195	.000	.3323	.5474
1998	2000	.2975	.02873	.000	.2008	.3942
	2001	.4070	.02813	.000	.3124	.5017
1999	2000	.2138	.02775	.000	.1204	.3072
	2001	.3233	.02713	.000	.2321	.4146
2000	2001	.1095	.02404	.000	.0287	.1904

Olanzapine Dosing Analyses (H_{12})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1	5.0000	.	.	.	.	5.00	5.00
1997	8	10.7500	5.07327	1.79367	6.5086	14.9914	2.33	20.00
1998	24	5.8681	3.21792	.65686	4.5092	7.2269	.83	10.00
1999	39	6.9487	3.31445	.53074	5.8743	8.0231	1.17	10.00
2000	55	6.6167	4.17581	.56307	5.4878	7.7455	.83	18.67
2001	27	11.3519	6.36620	1.22518	8.8335	13.8702	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
7.985	5	148	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	607.866	5	121.573	6.355	.000
Within Groups	2831.145	148	19.129		
Total	3439.011	153			

Post hoc tests are not performed because at least one group has fewer than two cases.

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	2	5.0000	.00000	.00000	5.0000	5.0000	5.00	5.00
1998	14	9.3750	5.85789	1.56559	5.9928	12.7572	1.25	15.00
1999	36	4.3981	2.63795	.43966	3.5056	5.2907	1.67	15.00
2000	64	4.4987	2.76104	.34513	3.8090	5.1884	1.25	10.00
2001	176	4.7259	2.71809	.20488	4.3216	5.1303	1.25	15.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
10.686	4	287	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	304.630	4	76.158	8.875	.000
Within Groups	2462.820	287	8.581		
Total	2767.450	291			

Post Hoc Analysis

Games-Howell

No significant differences between years were found at the 0.01 level using Games-Howell post hoc analysis.

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	5	7.6000	2.37346	1.06145	4.6530	10.5470	5.00	9.33
1997	134	5.0399	2.78331	.24044	4.5643	5.5154	1.25	10.00
1998	587	5.3024	2.81890	.11635	5.0739	5.5309	1.25	15.00
1999	715	5.2265	2.71495	.10153	5.0271	5.4258	1.25	15.00
2000	1304	5.2181	2.74538	.07603	5.0689	5.3672	1.25	15.00
2001	2522	5.4600	3.09667	.06166	5.3391	5.5809	1.25	15.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
9.228	5	5261	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	103.328	5	20.666	2.418	.034
Within Groups	44967.851	5261	8.547		
Total	45071.179	5266			

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	18	7.0556	2.65684	.62622	5.7343	8.3768	2.33	10.33
1997	660	6.7462	3.54209	.13788	6.4755	7.0170	.83	20.00
1998	1490	7.0535	4.30837	.11161	6.8346	7.2724	.83	20.00
1999	1691	6.4124	4.03395	.09810	6.2199	6.6048	.83	20.00
2000	3010	6.4980	4.09885	.07471	6.3515	6.6445	.83	20.00
2001	4753	7.0757	4.53987	.06585	6.9466	7.2048	.83	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
25.975	5	11616	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	988.017	5	197.603	10.826	.000
Within Groups	212021.363	11616	18.253		
Total	213009.380	11621			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	.6411	.14860	.000	.1408	1.1415
	2000	.5555	.13431	.001	.1033	1.0077
1999	2001	-.6633	.11815	.000	-1.0611	-.2656
2000	2001	-.5777	.09959	.000	-.9128	-.2426

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	70	8.0940	4.41602	.52781	7.0411	9.1470	1.67	20.00
1997	1562	8.1253	4.67075	.11818	7.8935	8.3571	.75	20.00
1998	2449	8.3021	5.23065	.10570	8.0948	8.5093	.75	20.00
1999	2864	7.9703	5.12241	.09572	7.7826	8.1580	.75	20.00
2000	3412	8.1386	5.06710	.08675	7.9685	8.3087	.83	20.00
2001	4362	7.7383	5.02408	.07607	7.5891	7.8874	.75	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.532	5	14713	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	613.041	5	122.608	4.808	.000
Within Groups	375156.138	14713	25.498		
Total	375769.179	14718			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	.5638	.13022	.000	.1255	1.0021
2000	2001	.4003	.11538	.007	.0121	.7886

Quetiapine Dosing Analyses (H_{13})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2	50.0000	.00000	.00000	50.0000	50.0000	50.00	50.00
1999	1	300.0000	.	.	.	.	300.00	300.00
2000	52	69.4551	41.76325	5.79152	57.8282	81.0821	5.83	200.00
2001	6	100.0000	77.48118	31.63156	18.6885	181.3115	46.67	200.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.988	3	57	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57201.731	3	19067.244	9.135	.000
Within Groups	118969.284	57	2087.180		
Total	176171.015	60			

Post hoc tests are not performed because at least one group has fewer than two cases.

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2	25.0000	.00000	.00000	25.0000	25.0000	25.00	25.00
1999	13	63.7821	54.99854	15.25385	30.5468	97.0173	12.50	200.00
2000	57	99.9896	100.05481	13.25258	73.4414	126.5377	20.00	400.00
2001	125	73.7867	72.23297	6.46071	60.9991	86.5742	12.50	400.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.773	3	193	.043

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37062.256	3	12354.085	1.917	.128
Within Groups	1243894.760	193	6445.051		
Total	1280957.016	196			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	124	78.2508	67.90725	6.09825	66.1797	90.3219	23.33	400.00
1999	687	111.1303	95.90658	3.65906	103.9460	118.3146	23.33	400.00
2000	1159	113.5517	95.62311	2.80880	108.0407	119.0626	20.83	400.00
2001	1886	125.2368	100.41928	2.31231	120.7018	129.7717	20.83	400.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
13.837	3	3852	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	349701.220	3	116567.073	12.311	.000
Within Groups	36473974.584	3852	9468.841		
Total	36823675.804	3855			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	-32.8795	7.11178	.000	-55.2741	-10.4849
	2000	-35.3009	6.71402	.000	-56.5001	-14.1016
	2001	-46.9860	6.52192	.000	-67.6135	-26.3585
1999	2001	-14.1065	4.32846	.006	-27.6089	-.6041
2000	2001	-11.6851	3.63815	.007	-23.0229	-.3474

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	4	185.4167	106.80005	53.40002	15.4740	355.3594	41.67	300.00
1998	407	105.3403	90.73382	4.49751	96.4989	114.1816	13.33	500.00
1999	1620	140.1814	126.01645	3.13090	134.0403	146.3224	13.33	600.00
2000	3136	158.3942	136.48953	2.43731	153.6153	163.1731	13.33	600.00
2001	4927	158.7384	140.60963	2.00320	154.8113	162.6656	13.33	600.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
40.829	4	10089	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1445737.227	4	361434.307	19.723	.000
Within Groups	184882053.136	10089	18325.112		
Total	186327790.363	10093			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	-34.8411	5.47998	.000	-52.7341	-16.9482
	2000	-53.0539	5.11547	.000	-69.7705	-36.3374
	2001	-53.3982	4.92345	.000	-69.4974	-37.2989
1999	2000	-18.2128	3.96775	.000	-31.1366	-5.2890
	2001	-18.5570	3.71690	.000	-30.6651	-6.4489

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	10	142.9167	112.80052	35.67066	62.2240	223.6093	12.50	300.00
1998	592	148.1929	141.19183	5.80295	136.7960	159.5898	12.50	666.67
1999	1364	179.6938	168.82479	4.57119	170.7265	188.6611	12.50	666.67
2000	2513	186.6646	161.78129	3.22725	180.3363	192.9929	12.50	666.67
2001	3975	183.8045	160.01436	2.53799	178.8286	188.7804	12.50	666.67

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.776	4	8449	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	764197.288	4	191049.322	7.396	.000
Within Groups	218243858.306	8449	25830.732		
Total	219008055.593	8453			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	-31.5009	7.38715	.000	-55.5928	-7.4090
	2000	-38.4717	6.63998	.000	-60.1420	-16.8015
	2001	-35.6116	6.33369	.000	-56.2929	-14.9303

CHILDREN AND ADOLESCENTS ENROLLED IN TEXAS MEDICAID (TX)

Risperidone Dosing Analyses (H_{11})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	10	1.9237	1.39294	.44049	.9272	2.9201	.50	5.00
1997	21	1.4080	.92813	.20254	.9855	1.8305	.33	4.00
1998	21	1.6961	1.23113	.26865	1.1357	2.2565	.48	5.00
1999	33	1.4604	1.17349	.20428	1.0443	1.8765	.25	5.00
2000	42	1.2923	.89223	.13767	1.0143	1.5703	.25	3.69
2001	57	1.1112	.97399	.12901	.8528	1.3696	.25	5.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.940	5	178	.456

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.653	5	1.931	1.764	.123
Within Groups	194.836	178	1.095		
Total	204.488	183			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	143	1.4120	.68532	.05731	1.2987	1.5253	.50	3.93
1997	300	1.4378	.83010	.04793	1.3435	1.5321	.25	5.00
1998	384	1.4423	.84048	.04289	1.3579	1.5266	.25	5.00
1999	483	1.3221	.84348	.03838	1.2467	1.3975	.25	5.00
2000	681	1.1552	.85059	.03259	1.0912	1.2192	.25	5.00
2001	942	1.0274	.72841	.02373	.9808	1.0740	.25	5.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.738	5	2927	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	81.306	5	16.261	25.352	.000
Within Groups	1877.462	2927	.641		
Total	1958.768	2932			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2000	.2568	.06593	.002	.0324	.4812
	2001	.3846	.06203	.000	.1728	.5963
1997	2000	.2826	.05796	.000	.0867	.4786
	2001	.4104	.05348	.000	.2294	.5914
1998	2000	.2871	.05387	.000	.1052	.4689
	2001	.4149	.04902	.000	.2492	.5805
1999	2001	.2947	.04512	.000	.1424	.4470

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	919	1.7882	1.02703	.03388	1.7217	1.8547	.25	6.00
1997	1712	1.7150	1.01538	.02454	1.6669	1.7631	.25	6.00
1998	2371	1.6831	.99658	.02047	1.6429	1.7232	.25	6.00
1999	2807	1.6134	.97369	.01838	1.5773	1.6494	.25	6.00
2000	3733	1.4870	.99929	.01636	1.4549	1.5190	.25	6.00
2001	4250	1.4275	.99747	.01530	1.3975	1.4575	.25	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.768	5	15786	.573

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	226.994	5	45.399	45.646	.000
Within Groups	15700.595	15786	.995		
Total	15927.588	15791			

Post Hoc Analysis

Scheffe

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1999	.1749	.03790	.001	.0276	.3221
	2000	.3012	.03672	.000	.1586	.4439
	2001	.3607	.03628	.000	.2197	.5016
1997	2000	.2280	.02911	.000	.1149	.3411
	2001	.2875	.02855	.000	.1766	.3984
1998	2000	.1961	.02619	.000	.0944	.2978
	2001	.2556	.02556	.000	.1563	.3549
1999	2000	.1264	.02491	.000	.0296	.2232
	2001	.1858	.02426	.000	.0916	.2801

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1200	2.2386	1.26460	.03651	2.1670	2.3102	.50	6.00
1997	2144	2.0404	1.22545	.02647	1.9885	2.0923	.50	6.00
1998	2907	2.0344	1.20518	.02235	1.9905	2.0782	.50	6.00
1999	3424	1.9451	1.15580	.01975	1.9064	1.9839	.50	6.00
2000	4116	1.8573	1.17130	.01826	1.8215	1.8931	.50	6.00
2001	5081	1.7981	1.18806	.01667	1.7654	1.8308	.50	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.391	5	18866	.005

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	283.040	5	56.608	39.932	.000
Within Groups	26744.991	18866	1.418		
Total	27028.032	18871			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1997	.1982	.04509	.000	.0463	.3500
	1998	.2042	.04281	.000	.0600	.3484
	1999	.2935	.04151	.000	.1537	.4333
	2000	.3813	.04082	.000	.2438	.5188
	2001	.4405	.04013	.000	.3053	.5757
1997	2000	.1832	.03215	.000	.0749	.2914
	2001	.2423	.03128	.000	.1370	.3476
1998	2000	.1771	.02886	.000	.0800	.2742
	2001	.2363	.02788	.000	.1424	.3301
1999	2001	.1470	.02584	.000	.0600	.2340

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	664	2.9811	1.70516	.06617	2.8512	3.1110	.50	8.00
1997	982	2.7221	1.64737	.05257	2.6190	2.8253	.50	8.00
1998	1220	2.5991	1.59002	.04552	2.5098	2.6884	.50	8.00
1999	1475	2.4778	1.53527	.03998	2.3994	2.5563	.50	8.00
2000	1723	2.3281	1.50481	.03625	2.2570	2.3992	.50	8.00
2001	2024	2.3244	1.55258	.03451	2.2567	2.3921	.50	8.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
10.901	5	8082	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	328.100	5	65.620	26.621	.000
Within Groups	19921.926	8082	2.465		
Total	20250.026	8087			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	1998	.3820	.08032	.000	.1112	.6528
	1999	.5032	.07731	.000	.2426	.7639
	2000	.6530	.07545	.000	.3985	.9075
	2001	.6567	.07463	.000	.4050	.9084
1997	1999	.2443	.06604	.003	.0218	.4667
	2000	.3940	.06386	.000	.1789	.6092
	2001	.3977	.06289	.000	.1859	.6096
1998	2000	.2710	.05819	.000	.0751	.4670
	2001	.2747	.05712	.000	.0823	.4671

Olanzapine Dosing Analyses (H_{12})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	1	10.0000	.	.	.	.	10.00	10.00
1998	7	5.9821	2.88353	1.08987	3.3153	8.6490	2.50	10.00
1999	6	7.2917	3.20319	1.30770	3.9301	10.6532	2.50	10.00
2000	13	6.3365	4.03416	1.11887	3.8987	8.7744	2.00	15.00
2001	7	5.0434	2.77490	1.04881	2.4770	7.6097	2.50	10.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.983	4	29	.432

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31.345	4	7.836	.663	.623
Within Groups	342.684	29	11.817		
Total	374.029	33			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	2	3.7500	1.76777	1.25000	-12.1328	19.6328	2.50	5.00
1997	15	7.3083	4.15569	1.07300	5.0070	9.6097	2.50	15.00
1998	60	4.7101	2.77140	.35779	3.9942	5.4261	1.25	15.00
1999	110	4.7875	2.59143	.24708	4.2978	5.2772	1.25	13.13
2000	161	4.6328	2.94105	.23179	4.1750	5.0906	1.25	15.00
2001	259	4.7558	2.82562	.17558	4.4100	5.1015	1.25	15.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.321	5	601	.042

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	101.938	5	20.388	2.514	.029
Within Groups	4873.923	601	8.110		
Total	4975.861	606			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	19	7.7030	3.97279	.91142	5.7882	9.6178	2.50	17.50
1997	227	6.7292	3.37513	.22402	6.2878	7.1706	2.50	20.00
1998	491	5.9699	3.17127	.14312	5.6887	6.2511	2.50	20.00
1999	853	5.8416	3.57965	.12256	5.6010	6.0821	2.50	20.00
2000	1241	5.7925	3.55209	.10083	5.5946	5.9903	2.50	20.00
2001	1626	6.1302	3.64757	.09046	5.9528	6.3077	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.163	5	4451	.055

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	278.702	5	55.740	4.433	.000
Within Groups	55969.708	4451	12.575		
Total	56248.410	4456			

Post Hoc Analysis

Scheffe

No significant differences between years were found at the 0.01 level using Scheffe post hoc analysis.

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	36	9.7230	3.88693	.64782	8.4079	11.0382	2.50	20.00
1997	464	8.1024	3.80016	.17642	7.7557	8.4490	2.50	25.00
1998	941	7.5186	3.96894	.12938	7.2647	7.7725	2.50	25.00
1999	1421	7.4402	4.30240	.11413	7.2163	7.6641	2.50	25.00
2000	1770	7.3145	4.26774	.10144	7.1156	7.5135	2.50	25.00
2001	2236	7.3456	4.31787	.09131	7.1665	7.5246	2.50	25.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.943	5	6862	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	444.687	5	88.937	4.994	.000
Within Groups	122196.729	6862	17.808		
Total	122641.416	6867			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2000	2.4085	.65572	.009	.0216	4.7955
	2001	2.3775	.65423	.010	-.0058	4.7607
1997	2000	.7878	.20350	.002	.1008	1.4748
	2001	.7568	.19865	.002	.0860	1.4276

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	28	11.9459	5.58304	1.05510	9.7811	14.1108	5.00	22.50
1997	369	9.8892	4.58924	.23891	9.4194	10.3590	2.50	24.52
1998	634	9.8476	5.04746	.20046	9.4539	10.2412	2.50	30.00
1999	801	9.5919	5.57623	.19703	9.2052	9.9787	2.50	30.00
2000	994	9.6249	5.92935	.18807	9.2558	9.9939	2.50	30.00
2001	1221	9.7141	6.09972	.17456	9.3716	10.0565	2.50	30.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
13.039	5	4041	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	181.802	5	36.360	1.131	.341
Within Groups	129897.434	4041	32.145		
Total	130079.237	4046			

Quetiapine Dosing Analyses (H_{13})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1	25.0000	.	.	.	.	25.00	25.00
1999	2	50.0000	.00000	.00000	50.0000	50.0000	50.00	50.00
2001	9	89.3807	90.14632	30.04877	20.0881	158.6733	14.58	307.14

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.268	2	9	.327

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5539.077	2	2769.538	.383	.692
Within Groups	65010.879	9	7223.431		
Total	70549.956	11			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	4	107.8125	44.88846	22.44423	36.3849	179.2401	50.00	156.25
1998	15	58.3081	46.66359	12.04849	32.4666	84.1495	25.00	183.33
1999	52	79.4056	55.46015	7.69094	63.9654	94.8458	25.00	300.00
2000	61	101.4864	99.80197	12.77833	75.9260	127.0469	25.00	400.00
2001	107	113.4307	77.92426	7.53322	98.4954	128.3661	25.00	400.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.154	4	234	.015

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	67729.121	4	16932.280	2.762	.028
Within Groups	1434675.218	234	6131.091		
Total	1502404.339	238			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	20	80.9375	61.08514	13.65905	52.3488	109.5262	25.00	300.00
1998	124	70.8748	73.81509	6.62879	57.7535	83.9960	25.00	500.00
1999	366	98.0226	79.36483	4.14847	89.8647	106.1805	25.00	450.00
2000	530	114.0851	91.85933	3.99011	106.2467	121.9235	25.00	500.00
2001	894	125.4230	96.18279	3.21683	119.1096	131.7364	25.00	500.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
12.616	4	1929	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	461242.494	4	115310.624	14.109	.000
Within Groups	15765167.461	1929	8172.715		
Total	16226409.955	1933			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	-27.1478	7.81989	.006	-52.9062	-1.3894
	2000	-43.2103	7.73705	.000	-68.7028	-17.7179
	2001	-54.5482	7.36810	.000	-78.8815	-30.2149
1999	2001	-27.4004	5.24955	.000	-44.5430	-10.2579

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	27	145.8854	106.55795	20.50709	103.7325	188.0384	25.00	357.14
1998	227	129.2808	115.30663	7.65317	114.2001	144.3615	25.00	600.00
1999	597	141.2365	112.84895	4.61860	132.1658	150.3073	25.00	600.00
2000	910	157.8989	122.63987	4.06547	149.9201	165.8777	25.00	600.00
2001	1567	162.1882	126.81847	3.20367	155.9042	168.4721	25.00	600.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.103	4	3323	.003

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	354056.204	4	88514.051	5.912	.000
Within Groups	49747730.352	3323	14970.728		
Total	50101786.557	3327			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-28.6181	8.66597	.009	-57.0340	-.2022
	2001	-32.9074	8.29666	.001	-60.1474	-5.6675
1999	2001	-20.9516	5.62094	.002	-39.2874	-2.6159

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	10	104.4776	116.83283	36.94578	20.9004	188.0548	25.00	400.00
1998	119	156.7365	129.52581	11.87361	133.2235	180.2495	25.00	500.00
1999	304	188.2831	142.84165	8.19253	172.1617	204.4046	25.00	800.00
2000	474	210.2616	169.05434	7.76492	195.0036	225.5197	25.00	800.00
2001	789	217.3037	178.80541	6.36564	204.8081	229.7993	25.00	800.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.770	4	1691	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	595677.099	4	148919.275	5.358	.000
Within Groups	46996346.637	1691	27792.044		
Total	47592023.736	1695			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-53.5251	14.18720	.002	-100.2487	-6.8016
	2001	-60.5672	13.47234	.000	-105.0368	-16.0976

CHILDREN AND ADOLESCENTS ENROLLED IN A MANAGED CARE ORGANIZATION (MCO)

Risperidone Dosing Analyses (H_{11})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	2	2.1667	1.64992	1.16667	-12.6572	16.9906	1.00	3.33
1997	5	1.5164	.99346	.44429	.2829	2.7500	.55	3.00
1998	6	2.4583	1.53636	.62722	.8460	4.0706	1.00	5.00
1999	3	1.5667	1.43643	.82932	-2.0016	5.1350	.50	3.20
2000	7	2.7857	2.44706	.92490	.5226	5.0489	1.00	8.00
2001	2	1.0000	.70711	.50000	-5.3531	7.3531	.50	1.50

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.512	5	19	.764

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.042	5	1.808	.582	.713
Within Groups	59.027	19	3.107		
Total	68.069	24			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	6	1.1056	.51008	.20824	.5703	1.6409	.50	2.00
1997	8	2.1302	1.66150	.58743	.7412	3.5193	.50	5.00
1998	28	1.8641	1.35762	.25657	1.3377	2.3906	.50	6.00
1999	53	1.4236	.99777	.13705	1.1485	1.6986	.25	4.67
2000	41	1.1098	.86923	.13575	.8354	1.3842	.25	4.00
2001	38	1.0165	.79123	.12835	.7564	1.2766	.25	3.70

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.613	5	168	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.508	5	3.902	3.734	.003
Within Groups	175.544	168	1.045		
Total	195.052	173			

Post Hoc Analysis

Games-Howell

No significant differences between years were found at the 0.01 level using Games-Howell post hoc analysis.

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	53	1.7398	.73563	.10105	1.5370	1.9425	.50	4.00
1997	89	1.5829	.77782	.08245	1.4190	1.7467	.50	4.50
1998	161	1.5400	.86895	.06848	1.4048	1.6753	.47	4.50
1999	329	1.4074	.84245	.04645	1.3160	1.4987	.25	4.50
2000	415	1.2865	.84489	.04147	1.2050	1.3681	.25	4.00
2001	303	1.0917	.79396	.04561	1.0020	1.1815	.25	4.50

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.644	5	1344	.145

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	41.517	5	8.303	12.118	.000
Within Groups	920.883	1344	.685		
Total	962.399	1349			

Post Hoc Analysis

Scheffe

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2001	.6480	.12324	.000	.1683	1.1278
1997	2001	.4911	.09980	.000	.1026	.8796
1998	2001	.4483	.08073	.000	.1340	.7626
1999	2001	.3156	.06591	.000	.0590	.5722

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	130	1.8710	1.04447	.09161	1.6898	2.0523	.50	6.00
1997	210	1.8236	1.12799	.07784	1.6701	1.9770	.50	6.00
1998	283	1.7120	1.09757	.06524	1.5836	1.8405	.50	6.00
1999	436	1.7998	1.18536	.05677	1.6883	1.9114	.50	6.00
2000	601	1.7259	1.07516	.04386	1.6398	1.8120	.50	6.00
2001	428	1.5831	1.08312	.05235	1.4802	1.6860	.50	6.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.795	5	2082	.553

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.891	5	3.178	2.593	.024
Within Groups	2552.092	2082	1.226		
Total	2567.984	2087			

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	137	2.7620	1.82934	.15629	2.4529	3.0711	.50	8.00
1997	190	2.3275	1.47160	.10676	2.1169	2.5381	.50	7.50
1998	180	2.2371	1.55240	.11571	2.0088	2.4654	.50	8.00
1999	278	2.2760	1.57766	.09462	2.0898	2.4623	.50	8.00
2000	348	2.1845	1.55425	.08332	2.0206	2.3483	.50	8.00
2001	260	2.0028	1.42912	.08863	1.8282	2.1773	.50	8.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.509	5	1387	.004

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	54.651	5	10.930	4.522	.000
Within Groups	3352.479	1387	2.417		
Total	3407.130	1392			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1996	2001	.7592	.17967	.000	.1471	1.3713

Olanzapine Dosing Analyses (H_{12})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	1	10.0000	.	.	.	.	10.00	10.00
1998	4	12.3651	7.38080	3.69040	.6206	24.1096	5.00	20.00
1999	9	9.9861	5.94915	1.98305	5.4132	14.5590	5.00	20.00
2000	6	6.2202	2.11414	.86310	4.0016	8.4389	4.82	10.00
2001	2	3.7500	1.76777	1.25000	-12.1328	19.6328	2.50	5.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.650	4	17	.069

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	155.862	4	38.966	1.403	.275
Within Groups	472.041	17	27.767		
Total	627.903	21			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	1	10.0000	.	.	.	.	10.00	10.00
1997	1	10.0000	.	.	.	.	10.00	10.00
1998	5	5.0000	3.14245	1.40535	1.0981	8.9019	2.50	10.00
1999	15	6.4069	4.44122	1.14672	3.9474	8.8664	2.50	20.00
2000	10	6.7348	5.99910	1.89708	2.4433	11.0263	2.50	20.00
2001	12	4.9667	2.44358	.70540	3.4141	6.5192	1.46	10.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.421	5	38	.239

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57.324	5	11.465	.618	.687
Within Groups	705.227	38	18.559		
Total	762.551	43			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996								
1997	13	8.3974	4.67040	1.29534	5.5751	11.2197	5.00	20.00
1998	31	6.8368	3.51828	.63190	5.5463	8.1273	2.50	15.00
1999	72	6.1808	3.61689	.42625	5.3308	7.0307	2.50	20.00
2000	111	6.7681	3.99260	.37896	6.0171	7.5191	2.50	20.00
2001	76	6.0061	3.76702	.43211	5.1453	6.8669	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.619	4	298	.649

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	84.114	4	21.028	1.431	.224
Within Groups	4379.687	298	14.697		
Total	4463.801	302			

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	2	8.4375	2.20971	1.56250	-11.4159	28.2909	6.88	10.00
1997	39	8.0883	3.84878	.61630	6.8407	9.3360	2.50	20.00
1998	83	7.4169	3.53386	.38789	6.6453	8.1885	2.50	20.00
1999	138	6.7110	3.73016	.31753	6.0831	7.3389	2.50	17.50
2000	184	6.7869	3.71908	.27417	6.2459	7.3278	2.50	20.00
2001	141	6.3938	3.88069	.32681	5.7477	7.0400	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.523	5	581	.759

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	124.238	5	24.848	1.774	.116
Within Groups	8137.585	581	14.006		
Total	8261.823	586			

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1996	10	8.3333	2.63523	.83333	6.4482	10.2185	2.50	10.00
1997	59	8.3197	3.97810	.51790	7.2830	9.3564	2.50	20.00
1998	113	8.3026	4.43034	.41677	7.4769	9.1284	2.50	20.00
1999	154	8.7939	4.88171	.39338	8.0168	9.5711	2.50	20.00
2000	208	9.0310	4.91705	.34094	8.3589	9.7032	2.50	20.00
2001	166	8.5800	4.96555	.38540	7.8191	9.3410	2.50	20.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.150	5	704	.058

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	54.177	5	10.835	.480	.791
Within Groups	15897.936	704	22.582		
Total	15952.113	709			

Quetiapine Dosing Analyses (H_{13})

AGE <2 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1	75.0000	.	.	.	.	75.00	75.00
2000	5	238.7500	220.53636	98.62686	-35.0821	512.5821	50.00	600.00
2001	1	500.0000	.	.	.	.	500.00	500.00

Test of Homogeneity of Variances

Test of homogeneity of variances cannot be performed because only one group has a computed variance.

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	93707.589	2	46853.795	.963	.456
Within Groups	194545.139	4	48636.285		
Total	288252.728	6			

AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2	323.7809	245.76332	173.78091	-1884.3149	2531.8768	150.00	497.56
1999	3	91.6667	62.91529	36.32416	-64.6236	247.9569	25.00	150.00
2000	6	178.0116	217.10967	88.63465	-49.8310	405.8543	25.00	600.00
2001	4	233.4375	196.37702	98.18851	-79.0422	545.9172	50.00	480.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.032	3	11	.416

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	72843.746	3	24281.249	.636	.607
Within Groups	419691.120	11	38153.738		
Total	492534.866	14			

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	5	43.7500	20.72890	9.27025	18.0117	69.4883	25.00	75.00
1999	26	111.3515	106.47474	20.88141	68.3454	154.3576	25.00	455.56
2000	57	122.3357	84.43783	11.18406	99.9313	144.7401	25.00	400.00
2001	65	123.0582	102.11998	12.66642	97.7541	148.3623	25.00	450.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.780	3	149	.153

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31442.495	3	10480.832	1.155	.329
Within Groups	1351829.678	149	9072.682		
Total	1383272.172	152			

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	7	149.4048	127.34896	48.13338	31.6266	267.1829	50.00	400.00
1999	42	160.9522	111.88387	17.26406	126.0867	195.8177	25.00	522.22
2000	121	172.4037	157.60793	14.32799	144.0353	200.7721	25.00	800.00
2001	144	170.2254	158.92226	13.24352	144.0470	196.4037	25.00	800.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.075	3	310	.360

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6985.324	3	2328.441	.100	.960
Within Groups	7203024.118	310	23235.562		
Total	7210009.442	313			

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1997	2	62.5000	17.67767	12.50000	-96.3276	221.3276	50.00	75.00
1998	15	143.4306	106.05219	27.38256	84.7008	202.1603	25.00	300.00
1999	42	209.3033	159.39394	24.59502	159.6327	258.9740	35.00	666.67
2000	107	185.5980	171.09368	16.54025	152.8053	218.3907	25.00	800.00
2001	140	177.5157	173.31509	14.64780	148.5544	206.4770	25.00	800.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.297	4	301	.271

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	86360.356	4	21590.089	.767	.548
Within Groups	8477676.949	301	28165.040		
Total	8564037.306	305			

APPENDIX D

Analyses of Inpatient Hospitalization Data for Texas Medicaid Children and Adolescents Receiving Antipsychotic Treatment and Mental Health Care Services from TDMHMR

1. Parametric (ANOVA) and Nonparametric (Kruskal Wallis test) Analyses of Number of Hospitalizations Per Child or Adolescent (H_{26}).
2. Parametric (ANOVA) and Nonparametric (Kruskal Wallis test) Analyses of Number of Hospital Days Per Hospitalized Child or Adolescent (H_{27}).

Parametric (ANOVA) and Nonparametric (Kruskal Wallis test) Analyses of Number of Hospitalizations Per Child or Adolescent (H_{26}).

ALL MATCHED CHILDREN AND ADOLESCENTS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2413	.13	.439	.009	.12	.15	0	5
1999	2957	.16	.530	.010	.14	.18	0	7
2000	3394	.19	.535	.009	.17	.21	0	7
2001	4124	.17	.491	.008	.16	.19	0	5

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
21.025	3	12884	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.707	3	1.569	6.203	.000
Within Groups	3258.626	12884	.253		
Total	3263.333	12887			

Post Hoc Analysis
Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-.05	.013	.000	-.09	-.02
	2001	-.04	.012	.003	-.08	.00

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	2413	6288.67
	1999	2957	6364.77
	2000	3394	6544.23
	2001	4124	6510.77

Test Statistics

	Number of Hospitalizations
Chi-Square	27.763
df	3
Asymp. Sig.	.000

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	251	1.28	.621	.039	1.20	1.36	1	5
1999	341	1.38	.874	.047	1.28	1.47	1	7
2000	487	1.31	.723	.033	1.25	1.37	1	7
2001	573	1.25	.616	.026	1.20	1.31	1	5

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.305	3	1648	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.269	3	1.090	2.170	.090
Within Groups	827.411	1648	.502		
Total	830.680	1651			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	251	825.26
	1999	341	853.83
	2000	487	834.08
	2001	573	804.33

Test Statistics

	Number of Hospitalizations
Chi-Square	4.911
df	3
Asymp. Sig.	.178

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	32	1.13	.336	.059	1.00	1.25	1	2
1999	47	1.17	.433	.063	1.04	1.30	1	3
2000	57	1.09	.285	.038	1.01	1.16	1	2
2001	53	1.11	.423	.058	1.00	1.23	1	3

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.606	3	185	.190

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.181	3	.060	.428	.733
Within Groups	26.020	185	.141		
Total	26.201	188			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	32	96.63
	1999	47	99.06
	2000	57	93.16
	2001	53	92.40

Test Statistics

	Number of Hospitalizations
Chi-Square	1.661
df	3
Asymp. Sig.	.646

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	108	1.26	.632	.061	1.14	1.38	1	5
1999	151	1.30	.632	.051	1.20	1.41	1	6
2000	230	1.25	.566	.037	1.18	1.33	1	4
2001	258	1.22	.580	.036	1.15	1.29	1	5

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.323	3	743	.266

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.672	3	.224	.634	.593
Within Groups	262.508	743	.353		
Total	263.181	746			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	108	371.31
	1999	151	393.52
	2000	230	375.50
	2001	258	362.37

Test Statistics

	Number of Hospitalizations
Chi-Square	4.232
df	3
Asymp. Sig.	.237

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	113	1.30	.639	.060	1.18	1.42	1	4
1999	145	1.50	1.125	.093	1.31	1.68	1	7
2000	212	1.36	.817	.056	1.25	1.47	1	7
2001	269	1.27	.625	.038	1.19	1.34	1	4

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.550	3	735	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.197	3	1.732	2.689	.045
Within Groups	473.502	735	.644		
Total	478.698	738			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	113	370.17
	1999	145	386.06
	2000	212	375.25
	2001	269	357.13

Test Statistics

	Number of Hospitalizations
Chi-Square	3.638
df	3
Asymp. Sig.	.303

MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	167	1.29	.650	.050	1.19	1.39	1	5
1999	203	1.29	.743	.052	1.18	1.39	1	7
2000	294	1.24	.591	.034	1.18	1.31	1	5
2001	357	1.23	.567	.030	1.17	1.29	1	4

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.553	3	1017	.199

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.677	3	.226	.576	.631
Within Groups	398.621	1017	.392		
Total	399.299	1020			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	167	524.53
	1999	203	519.54
	2000	294	511.37
	2001	357	499.51

Test Statistics

	Number of Hospitalizations
Chi-Square	2.305
df	3
Asymp. Sig.	.512

FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	84	1.26	.562	.061	1.14	1.38	1	3
1999	138	1.51	1.027	.087	1.33	1.68	1	7
2000	193	1.41	.880	.063	1.28	1.53	1	7
2001	214	1.30	.689	.047	1.21	1.40	1	5

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.466	3	625	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.802	3	1.601	2.378	.069
Within Groups	420.651	625	.673		
Total	425.453	628			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	84	299.79
	1999	138	331.94
	2000	193	320.99
	2001	214	304.65

Test Statistics

	Number of Hospitalizations
Chi-Square	4.708
df	3
Asymp. Sig.	.195

ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	4	1.00	.000	.000	1.00	1.00	1	1
1999	2	1.00	.000	.000	1.00	1.00	1	1
2000	3	1.00	.000	.000	1.00	1.00	1	1
2001	7	1.29	.488	.184	.83	1.74	1	2

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
10.000	3	12	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.321	3	.107	.900	.470
Within Groups	1.429	12	.119		
Total	1.750	15			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	4	7.50
	1999	2	7.50
	2000	3	7.50
	2001	7	9.79

Test Statistics

	Number of Hospitalizations
Chi-Square	2.755
df	3
Asymp. Sig.	.431

BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	35	1.03	.169	.029	.97	1.09	1	2
1999	45	1.36	.712	.106	1.14	1.57	1	4
2000	72	1.38	.846	.100	1.18	1.57	1	6
2001	75	1.25	.522	.060	1.13	1.37	1	3

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
10.288	3	223	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.171	3	1.057	2.499	.060
Within Groups	94.344	223	.423		
Total	97.515	226			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	35	93.60
	1999	45	119.07
	2000	72	120.20
	2001	75	114.53

Test Statistics

	Number of Hospitalizations
Chi-Square	8.634
df	3
Asymp. Sig.	.035

DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	37	1.22	.584	.096	1.02	1.41	1	4
1999	59	1.22	.457	.060	1.10	1.34	1	3
2000	78	1.24	.687	.078	1.09	1.40	1	5
2001	72	1.26	.503	.059	1.15	1.38	1	3

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.324	3	242	.808

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.086	3	.029	.088	.967
Within Groups	78.764	242	.325		
Total	78.850	245			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	37	119.99
	1999	59	124.58
	2000	78	119.54
	2001	72	128.71

Test Statistics

	Number of Hospitalizations
Chi-Square	1.565
df	3
Asymp. Sig.	.667

DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	41	1.27	.549	.086	1.10	1.44	1	3
1999	55	1.13	.336	.045	1.04	1.22	1	2
2000	58	1.14	.476	.062	1.01	1.26	1	4
2001	51	1.12	.382	.053	1.01	1.23	1	3

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.649	3	201	.014

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.656	3	.219	1.147	.331
Within Groups	38.349	201	.191		
Total	39.005	204			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	41	112.20
	1999	55	102.29
	2000	58	100.16
	2001	51	99.61

Test Statistics

	Number of Hospitalizations
Chi-Square	3.759
df	3
Asymp. Sig.	.289

PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	18	1.39	.608	.143	1.09	1.69	1	3
1999	22	1.23	.429	.091	1.04	1.42	1	2
2000	38	1.21	.413	.067	1.07	1.35	1	2
2001	35	1.40	.736	.124	1.15	1.65	1	4

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.135	3	109	.008

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.913	3	.304	.951	.419
Within Groups	34.857	109	.320		
Total	35.770	112			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	18	61.44
	1999	22	54.89
	2000	38	53.97
	2001	35	59.33

Test Statistics

	Number of Hospitalizations
Chi-Square	1.597
df	3
Asymp. Sig.	.660

MENTAL RETARDATION / DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	14	1.14	.363	.097	.93	1.35	1	2
1999	7	1.14	.378	.143	.79	1.49	1	2
2000	14	1.64	1.151	.308	.98	2.31	1	5
2001	14	1.36	.745	.199	.93	1.79	1	3

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.712	3	45	.018

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.102	3	.701	1.168	.333
Within Groups	27.000	45	.600		
Total	29.102	48			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	14	22.71
	1999	7	22.71
	2000	14	28.39
	2001	14	25.04

Test Statistics

	Number of Hospitalizations
Chi-Square	2.500
df	3
Asymp. Sig.	.475

OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	11	1.18	.405	.122	.91	1.45	1	2
1999	11	1.18	.405	.122	.91	1.45	1	2
2000	17	1.29	.588	.143	.99	1.60	1	3
2001	25	1.08	.277	.055	.97	1.19	1	2

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.980	3	60	.012

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.467	3	.156	.878	.458
Within Groups	10.642	60	.177		
Total	11.109	63			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	11	33.23
	1999	11	33.23
	2000	17	35.21
	2001	25	30.02

Test Statistics

	Number of Hospitalizations
Chi-Square	2.108
df	3
Asymp. Sig.	.550

COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	81	1.48	.823	.091	1.30	1.66	1	5
1999	126	1.67	1.246	.111	1.45	1.89	1	7
2000	128	1.54	.904	.080	1.38	1.70	1	7
2001	53	1.55	.992	.136	1.27	1.82	1	5

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.066	3	384	.104

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.962	3	.654	.623	.601
Within Groups	403.159	384	1.050		
Total	405.121	387			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	81	189.72
	1999	126	196.90
	2000	128	197.02
	2001	53	190.02

Test Statistics

	Number of Hospitalizations
Chi-Square	.495
df	3
Asymp. Sig.	.920

NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	3	1.00	.000	.000	1.00	1.00	1	1
2000	1	1.00	.	.	.	.	1	1
2001	8	1.50	.756	.267	.87	2.13	1	3

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.766(a)	1	9	.016

a Groups with only one case are ignored in computing the test of homogeneity of variance for number of hospitalizations.

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.667	2	.333	.750	.500
Within Groups	4.000	9	.444		
Total	4.667	11			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospitalizations	1998	3	5.00
	2000	1	5.00
	2001	8	7.25

Test Statistics

	Number of Hospitalizations
Chi-Square	1.800
df	2
Asymp. Sig.	.407

Parametric (ANOVA) and Nonparametric (Kruskal Wallis test) Analyses of Number of Hospital Days Per Hospitalized Child or Adolescent (H_{27}).

HOSPITALIZED CHILDREN AND ADOLESCENTS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	251	83.1952	80.41770	5.07592	73.1982	93.1922	1.00	366.00
1999	341	82.6422	78.44842	4.24822	74.2861	90.9983	2.00	432.00
2000	487	67.7988	66.28263	3.00355	61.8972	73.7003	1.00	362.00
2001	573	56.9319	60.64228	2.53337	51.9561	61.9078	1.00	344.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
12.677	3	1648	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	197885.131	3	65961.710	13.677	.000
Within Groups	7947872.411	1648	4822.738		
Total	8145757.542	1651			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	26.2633	5.67300	.000	8.4837	44.0428
1999	2001	25.7103	4.94624	.000	10.2442	41.1763

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	251	914.45
	1999	341	911.73
	2000	487	831.31
	2001	573	733.17

Test Statistics

	Number of Hospital Days
Chi-Square	41.405
df	3
Asymp. Sig.	.000

AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	32	108.4688	90.28735	15.96070	75.9167	141.0208	10.00	336.00
1999	47	79.2340	89.53702	13.06032	52.9450	105.5231	2.00	432.00
2000	57	63.3684	49.68099	6.58041	50.1863	76.5506	3.00	198.00
2001	53	70.7925	62.11632	8.53233	53.6711	87.9138	3.00	344.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.766	3	185	.003

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44557.435	3	14852.478	2.861	.038
Within Groups	960340.374	185	5191.029		
Total	1004897.810	188			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	32	117.72
	1999	47	88.10
	2000	57	87.96
	2001	53	94.98

Test Statistics

	Number of Hospital Days
Chi-Square	7.214
df	3
Asymp. Sig.	.065

AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	108	89.8796	85.53228	8.23035	73.5639	106.1953	1.00	366.00
1999	151	91.1192	80.88098	6.58200	78.1138	104.1246	2.00	376.00
2000	230	67.1478	67.94073	4.47988	58.3208	75.9749	2.00	362.00
2001	258	58.9574	60.94823	3.79447	51.4851	66.4296	1.00	328.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.149	3	743	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	138874.172	3	46291.391	9.109	.000
Within Groups	3775772.794	743	5081.794		
Total	3914646.967	746			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	30.9223	9.06293	.005	2.2396	59.6050
1999	2001	32.1618	7.59742	.000	8.2684	56.0553

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	108	421.64
	1999	151	426.92
	2000	230	362.05
	2001	258	333.74

Test Statistics

	Number of Hospital Days
Chi-Square	24.036
df	3
Asymp. Sig.	.000

AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	113	66.1770	66.35137	6.24181	53.8096	78.5443	2.00	311.00
1999	145	73.7793	70.17819	5.82798	62.2599	85.2988	2.00	340.00
2000	212	65.8585	64.87735	4.45579	57.0749	74.6421	1.00	329.00
2001	269	50.5353	55.06993	3.35767	43.9245	57.1461	1.00	321.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.539	3	735	.014

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	60593.925	3	20197.975	5.114	.002
Within Groups	2903154.067	735	3949.869		
Total	2963747.992	738			

Post Hoc Analysis

Scheffe

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2001	23.2440	6.47488	.005	1.3583	45.1297

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	113	384.46
	1999	145	413.09
	2000	212	390.04
	2001	269	324.91

Test Statistics

	Number of Hospital Days
Chi-Square	20.300
df	3
Asymp. Sig.	.000

MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	167	89.4371	85.73731	6.63455	76.3381	102.5361	1.00	366.00
1999	203	78.3547	75.91092	5.32790	67.8492	88.8601	2.00	432.00
2000	294	65.2551	60.61358	3.53506	58.2978	72.2124	1.00	299.00
2001	357	54.6807	60.83057	3.21950	48.3491	61.0123	1.00	344.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
11.324	3	1017	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	164044.879	3	54681.626	11.639	.000
Within Groups	4778077.017	1017	4698.207		
Total	4942121.896	1020			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	24.1820	7.51757	.008	.5503	47.8138
	2001	34.7565	7.37444	.000	11.5613	57.9516
1999	2001	23.6740	6.22509	.001	4.1531	43.1949

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	167	588.85
	1999	203	555.36
	2000	294	517.19
	2001	357	444.26

Test Statistics

	Number of Hospital Days
Chi-Square	34.651
df	3
Asymp. Sig.	.000

FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	84	70.7857	67.40117	7.35407	56.1588	85.4127	1.00	356.00
1999	138	88.9493	81.91025	6.97266	75.1613	102.7372	2.00	340.00
2000	193	71.6736	74.08829	5.33299	61.1548	82.1923	2.00	362.00
2001	214	61.0981	60.38915	4.12812	52.9609	69.2353	1.00	328.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.896	3	625	.002

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	65182.645	3	21727.548	4.343	.005
Within Groups	3126916.162	625	5003.066		
Total	3192098.808	628			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2001	27.8511	8.10305	.004	2.3468	53.3555

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	84	320.26
	1999	138	353.74
	2000	193	313.21
	2001	214	289.57

Test Statistics

	Number of Hospital Days
Chi-Square	10.550
df	3
Asymp. Sig.	.014

ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	4	171.7500	120.82046	60.41023	-20.5023	364.0023	50.00	295.00
1999	2	56.5000	70.00357	49.50000	-572.4571	685.4571	7.00	106.00
2000	3	104.0000	80.66598	46.57252	-96.3854	304.3854	11.00	155.00
2001	7	65.8571	27.55255	10.41388	40.3753	91.3390	31.00	106.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
16.654	3	12	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32539.330	3	10846.443	1.964	.173
Within Groups	66262.107	12	5521.842		
Total	98801.438	15			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	4	11/75
	1999	2	6.25
	2000	3	9.67
	2001	4	6.79

Test Statistics

	Number of Hospital Days
Chi-Square	3.403
df	3
Asymp. Sig.	.334

BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	35	80.2286	61.24209	10.35180	59.1912	101.2660	7.00	245.00
1999	45	85.4444	85.94516	12.81195	59.6237	111.2652	2.00	340.00
2000	72	78.5417	77.33191	9.11365	60.3696	96.7138	6.00	333.00
2001	75	57.1600	60.67526	7.00618	43.1999	71.1201	2.00	285.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.250	3	223	.023

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	29824.225	3	9941.408	1.929	.126
Within Groups	1149555.238	223	5154.956		
Total	1179379.463	226			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	35	129.99
	1999	45	120.11
	2000	72	119.85
	2001	75	97.25

Test Statistics

	Number of Hospital Days
Chi-Square	7.914
df	3
Asymp. Sig.	.048

DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	37	59.4054	77.56233	12.75117	33.5448	85.2660	1.00	311.00
1999	59	47.1356	54.48614	7.09349	32.9364	61.3348	2.00	325.00
2000	78	48.4103	43.22050	4.89376	38.6655	58.1550	2.00	231.00
2001	72	36.7083	36.73906	4.32974	28.0751	45.3416	2.00	167.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.680	3	242	.003

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13367.086	3	4455.695	1.716	.164
Within Groups	628429.581	242	2596.816		
Total	641796.667	245			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	37	121.92
	1999	59	124.79
	2000	78	133.88
	2001	72	112.01

Test Statistics

	Number of Hospital Days
Chi-Square	3.574
df	3
Asymp. Sig.	.311

DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	41	80.8780	66.87982	10.44487	59.7682	101.9879	3.00	312.00
1999	55	92.2727	77.02151	10.38558	71.4509	113.0946	4.00	301.00
2000	58	74.7241	66.66907	8.75408	57.1944	92.2539	3.00	299.00
2001	51	69.4706	66.14419	9.26204	50.8672	88.0739	3.00	312.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.049	3	201	.372

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15499.413	3	5166.471	1.069	.363
Within Groups	971365.591	201	4832.665		
Total	986865.005	204			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	41	108.16
	1999	55	113.12
	2000	58	98.36
	2001	51	93.22

Test Statistics

	Number of Hospital Days
Chi-Square	3.652
df	3
Asymp. Sig.	.302

PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	18	69.3333	81.29757	19.16202	28.9050	109.7617	6.00	353.00
1999	22	64.1818	53.77788	11.46548	40.3380	88.0256	7.00	212.00
2000	38	55.8947	58.04602	9.41631	36.8155	74.9740	3.00	262.00
2001	35	80.2857	80.27071	13.56823	52.7118	107.8597	9.00	321.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.124	3	109	.343

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11132.324	3	3710.775	.783	.506
Within Groups	516831.995	109	4741.578		
Total	527964.319	112			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	18	57.92
	1999	22	59.36
	2000	38	50.63
	2001	35	61.96

Test Statistics

	Number of Hospital Days
Chi-Square	2.366
df	3
Asymp. Sig.	.500

MENTAL RETARDATION / DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	14	134.4286	122.94446	32.85829	63.4426	205.4146	15.00	366.00
1999	7	93.8571	64.60761	24.41938	34.1051	153.6092	26.00	194.00
2000	14	79.2857	77.47995	20.70739	34.5501	124.0213	5.00	267.00
2001	14	49.3571	37.09988	9.91536	27.9363	70.7780	4.00	136.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.699	3	45	.002

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	52371.643	3	17457.214	2.474	.074
Within Groups	317478.357	45	7055.075		
Total	369850.000	48			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	14	30.68
	1999	7	28.86
	2000	14	23.04
	2001	14	19.36

Test Statistics

	Number of Hospital Days
Chi-Square	5.170
df	3
Asymp. Sig.	.160

OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	11	48.5455	31.60495	9.52925	27.3130	69.7779	2.00	116.00
1999	11	123.8182	127.34349	38.39551	38.2677	209.3687	14.00	432.00
2000	17	81.9412	77.23460	18.73214	42.2308	121.6515	6.00	266.00
2001	25	65.8000	70.75839	14.15168	36.5924	95.0076	2.00	270.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.722	3	60	.016

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	36568.133	3	12189.378	1.886	.142
Within Groups	387757.305	60	6462.622		
Total	424325.438	63			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	11	28.45
	1999	11	40.05
	2000	17	34.53
	2001	25	29.58

Test Statistics

	Number of Hospital Days
Chi-Square	3.145
df	3
Asymp. Sig.	.370

COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	81	96.3580	85.51569	9.50174	77.4490	115.2671	1.00	361.00
1999	126	92.4524	80.04635	7.13110	78.3391	106.5657	2.00	376.00
2000	128	80.3516	68.13622	6.02245	68.4342	92.2689	4.00	317.00
2001	53	64.0755	66.39215	9.11966	45.7755	82.3754	2.00	290.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.147	3	384	.025

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	43356.371	3	14452.124	2.517	.058
Within Groups	2204776.709	384	5741.606		
Total	2248133.080	387			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	81	206.20
	1999	126	203.96
	2000	128	192.54
	2001	53	158.84

Test Statistics

	Number of Hospital Days
Chi-Square	7.178
df	3
Asymp. Sig.	.066

NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	3	40.3333	21.38535	12.34684	-12.7908	93.4575	17.00	59.00
2000	1	35.0000	.	.	.	.	35.00	35.00
2001	8	71.5000	99.62071	35.22124	-11.7850	154.7850	2.00	296.00

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.241(a)	1	9	.169

a Groups with only one case are ignored in computing the test of homogeneity of variance for number of hospital days.

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2838.000	2	1419.000	.181	.837
Within Groups	70384.667	9	7820.519		
Total	73222.667	11			

Ranks

	RX YEAR	N	Mean Rank
Number of Hospital Days	1998	3	7.00
	2000	1	7.00
	2001	8	6.25

Test Statistics

	Number of Hospital Days
Chi-Square	.115
df	2
Asymp. Sig.	.944

APPENDIX E

Analyses of Outpatient Mental Health Care Service Utilization Data for Texas Medicaid Children and Adolescents Receiving Antipsychotic Treatment and Mental Health Care Services from TDMHMR

1. Parametric (ANOVA) and Nonparametric (Kruskal Wallis test) Analyses of Duration of Enrollment in Different Types of Outpatient Mental Health Care Services Per Child or Adolescent (H_{29}).
    a. Assessment services
    b. Counseling and psychotherapy
    c. Crisis intervention
    d. Medication-related services
    e. Service coordination
    f. Skills training
    g. Supportive services

ASSESSMENT SERVICES

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1557	5.01	13.987	.354	4.31	5.70	1	365
1999	2013	3.39	7.253	.162	3.07	3.71	1	111
2000	1825	2.35	5.432	.127	2.10	2.60	1	160
2001	2322	2.29	4.201	.087	2.12	2.47	1	59

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
100.546	3	7713	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8367.050	3	2789.017	42.596	.000
Within Groups	505017.401	7713	65.476		
Total	513384.450	7716			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	1.62	.390	.000	.41	2.83
	2000	2.66	.377	.000	1.49	3.83
	2001	2.71	.365	.000	1.58	3.85
1999	2000	1.04	.206	.000	.40	1.68
	2001	1.09	.184	.000	.52	1.67

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1557	4294.96
	1999	2013	3913.14
	2000	1825	3675.18
	2001	2322	3664.22

Test Statistics

	Duration of Enrollment
Chi-Square	245.347
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	23	5.30	6.560	1.368	2.47	8.14	1	15
1999	25	2.12	3.876	.775	.52	3.72	1	15
2000	30	2.90	4.831	.882	1.10	4.70	1	15
2001	58	2.45	4.301	.565	1.32	3.58	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.824	3	132	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	159.328	3	53.109	2.307	.080
Within Groups	3038.554	132	23.019		
Total	3197.882	135			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	23	81.54
	1999	25	63.52
	2000	30	69.15
	2001	58	65.14

Test Statistics

	Duration of Enrollment
Chi-Square	8.531
df	3
Asymp. Sig.	.036

ASSESSMENT SERVICES: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	374	4.93	6.437	.333	4.27	5.58	1	30
1999	477	3.96	7.272	.333	3.31	4.62	1	107
2000	486	2.50	4.306	.195	2.11	2.88	1	15
2001	567	2.50	4.400	.185	2.14	2.87	1	27

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
63.183	3	1900	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1871.436	3	623.812	19.566	.000
Within Groups	60577.609	1900	31.883		
Total	62449.046	1903			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	2.43	.386	.000	1.23	3.64
	2001	2.43	.381	.000	1.23	3.62
1999	2000	1.47	.386	.001	.26	2.67
	2001	1.46	.381	.001	.27	2.65

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	374	1064.56
	1999	477	985.94
	2000	486	899.44
	2001	567	895.93

Test Statistics

	Duration of Enrollment
Chi-Square	66.891
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	773	5.25	14.383	.517	4.24	6.27	1	365
1999	918	3.30	6.720	.222	2.87	3.74	1	111
2000	781	2.50	6.940	.248	2.02	2.99	1	160
2001	1045	2.25	4.270	.132	1.99	2.51	1	59

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
43.455	3	3513	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4582.732	3	1527.577	20.824	.000
Within Groups	257706.353	3513	73.358		
Total	262289.086	3516			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	1.95	.563	.003	.20	3.71
	2000	2.75	.574	.000	.96	4.54
	2001	3.00	.534	.000	1.34	4.67
1999	2001	1.05	.258	.000	.24	1.85

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	773	1982.39
	1999	918	1770.53
	2000	781	1671.02
	2001	1045	1649.38

Test Statistics

	Duration of Enrollment
Chi-Square	142.337
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	387	4.58	18.221	.926	2.76	6.40	1	328
1999	593	3.12	8.080	.332	2.47	3.77	1	102
2000	528	1.95	3.502	.152	1.65	2.25	1	15
2001	652	2.17	3.897	.153	1.87	2.47	1	25

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
22.114	3	2156	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1926.923	3	642.308	7.561	.000
Within Groups	183164.343	2156	84.956		
Total	185091.266	2159			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2000	1.17	.365	.008	.03	2.31

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	387	1157.42
	1999	593	1096.16
	2000	528	1037.87
	2001	652	1055.12

Test Statistics

	Duration of Enrollment
Chi-Square	33.539
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1104	5.01	11.941	.359	4.30	5.71	1	328
1999	1337	3.56	7.901	.216	3.14	3.99	1	111
2000	1290	2.38	5.927	.165	2.06	2.70	1	160
2001	1616	2.40	4.385	.109	2.18	2.61	1	59

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
75.764	3	5343	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5686.016	3	1895.339	31.946	.000
Within Groups	316992.467	5343	59.329		
Total	322678.483	5346			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	1.44	.419	.003	.13	2.75
	2000	2.63	.395	.000	1.39	3.86
	2001	2.61	.376	.000	1.44	3.78
1999	2000	1.18	.272	.000	.34	2.03
	2001	1.17	.242	.000	.41	1.92

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1104	2983.13
	1999	1337	2717.16
	2000	1290	2528.69
	2001	1616	2543.10

Test Statistics

	Duration of Enrollment
Chi-Square	178.298
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	453	5.02	18.042	.848	3.35	6.68	1	365
1999	676	3.04	5.749	.221	2.61	3.48	1	78
2000	535	2.27	3.998	.173	1.93	2.61	1	15
2001	706	2.06	3.741	.141	1.78	2.34	1	25

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
28.087	3	2366	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2743.072	3	914.357	11.517	.000
Within Groups	187842.730	2366	79.393		
Total	190585.801	2369			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	2.74	.865	.009	.04	5.45
	2001	2.95	.859	.004	.27	5.64
1999	2001	.98	.262	.001	.16	1.80

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	453	1310.49
	1999	676	1199.12
	2000	535	1147.18
	2001	706	1121.30

Test Statistics

	Duration of Enrollment
Chi-Square	68.108
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	37	4.43	5.909	.971	2.46	6.40	1	15
1999	32	4.19	5.671	1.002	2.14	6.23	1	15
2000	34	4.35	6.004	1.030	2.26	6.45	1	15
2001	46	4.35	6.038	.890	2.55	6.14	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.178	3	145	.911

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.066	3	.355	.010	.999
Within Groups	5084.156	145	35.063		
Total	5085.221	148			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	37	75.45
	1999	32	75.48
	2000	34	75.37
	2001	46	74.03

Test Statistics

	Duration of Enrollment
Chi-Square	.057
df	3
Asymp. Sig.	.996

ASSESSMENT SERVICES: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	89	9.57	34.766	3.685	2.25	16.90	1	328
1999	116	4.09	5.782	.537	3.02	5.15	1	15
2000	171	2.64	4.512	.345	1.96	3.32	1	15
2001	299	1.54	2.651	.153	1.24	1.84	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
15.137	3	671	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4576.675	3	1525.558	8.842	.000
Within Groups	115766.741	671	172.529		
Total	120343.416	674			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2001	2.55	.558	.000	.78	4.32

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	89	420.03
	1999	116	369.44
	2000	171	330.82
	2001	299	305.49

Test Statistics

	Duration of Enrollment
Chi-Square	75.807
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	287	5.36	22.251	1.313	2.78	7.95	1	365
1999	394	3.80	7.615	.384	3.05	4.56	1	98
2000	270	2.84	10.392	.632	1.60	4.09	1	160
2001	397	2.68	5.177	.260	2.17	3.19	1	59

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
7.209	3	1344	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1399.623	3	466.541	3.073	.027
Within Groups	204058.463	1344	151.829		
Total	205458.085	1347			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	287	723.33
	1999	394	690.52
	2000	270	636.74
	2001	397	648.98

Test Statistics

	Duration of Enrollment
Chi-Square	23.815
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	505	4.94	7.549	.336	4.28	5.60	1	99
1999	647	3.55	7.829	.308	2.95	4.16	1	111
2000	474	2.35	4.114	.189	1.98	2.73	1	15
2001	471	2.69	4.632	.213	2.27	3.11	1	27

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
43.811	3	2093	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1971.630	3	657.210	15.918	.000
Within Groups	86412.336	2093	41.286		
Total	88383.966	2096			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	2.59	.385	.000	1.38	3.79
	2001	2.25	.398	.000	1.01	3.50
1999	2000	1.20	.361	.005	.07	2.33

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	505	1163.60
	1999	647	1046.29
	2000	474	979.58
	2001	471	999.71

Test Statistics

	Duration of Enrollment
Chi-Square	65.017
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	113	4.48	6.410	.603	3.28	5.67	1	31
1999	145	2.96	4.845	.402	2.16	3.75	1	15
2000	99	2.53	4.322	.434	1.66	3.39	1	15
2001	162	1.60	2.855	.224	1.16	2.05	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
37.242	3	515	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	560.481	3	186.827	8.648	.000
Within Groups	11125.349	515	21.603		
Total	11685.830	518			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	2.87	.643	.000	.83	4.91

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	113	288.86
	1999	145	264.07
	2000	99	257.46
	2001	162	237.78

Test Statistics

	Duration of Enrollment
Chi-Square	23.326
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	45	3.16	5.081	.757	1.63	4.68	1	15
1999	49	3.29	5.228	.747	1.78	4.79	1	15
2000	46	3.46	5.357	.790	1.87	5.05	1	15
2001	79	1.53	2.693	.303	.93	2.13	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
13.247	3	215	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	160.000	3	53.333	2.664	.049
Within Groups	4304.995	215	20.023		
Total	4464.995	218			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	45	113.40
	1999	49	114.54
	2000	46	117.82
	2001	79	100.70

Test Statistics

	Duration of Enrollment
Chi-Square	8.576
df	3
Asymp. Sig.	.035

ASSESSMENT SERVICES: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	74	5.35	7.208	.838	3.68	7.02	1	36
1999	99	4.47	11.681	1.174	2.14	6.80	1	107
2000	64	1.23	1.752	.219	.80	1.67	1	15
2001	87	2.75	4.624	.496	1.76	3.73	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
12.852	3	320	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	723.894	3	241.298	4.022	.008
Within Groups	19197.473	320	59.992		
Total	19921.367	323			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	4.12	.866	.000	1.34	6.90

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	74	184.30
	1999	99	165.80
	2000	64	140.66
	2001	87	156.26

Test Statistics

	Duration of Enrollment
Chi-Square	19.419
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	391	3.99	5.850	.296	3.41	4.57	1	35
1999	513	2.60	6.181	.273	2.07	3.14	1	102
2000	440	1.71	3.056	.146	1.42	1.99	1	15
2001	153	2.28	4.050	.327	1.63	2.93	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
47.077	3	1493	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1114.598	3	371.533	14.041	.000
Within Groups	39504.724	1493	26.460		
Total	40619.323	1496			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	1.39	.403	.003	.13	2.64
	2000	2.28	.330	.000	1.25	3.31
	2001	1.71	.441	.001	.33	3.09

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	391	823.49
	1999	513	739.85
	2000	440	700.13
	2001	153	729.86

Test Statistics

	Duration of Enrollment
Chi-Square	57.002
df	3
Asymp. Sig.	.000

ASSESSMENT SERVICES: NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	14	9.14	7.336	1.961	4.91	13.38	1	17
1999	17	2.65	4.649	1.128	.26	5.04	1	15
2000	10	1.00	.000	.000	1.00	1.00	1	1
2001	44	1.93	3.487	.526	.87	2.99	1	15

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
16.395	3	81	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	618.620	3	206.207	10.650	.000
Within Groups	1568.392	81	19.363		
Total	2187.012	84			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	8.14	1.961	.005	.65	15.63

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	14	61.21
	1999	17	41.50
	2000	10	36.50
	2001	44	39.26

Test Statistics

	Duration of Enrollment
Chi-Square	24.071
df	3
Asymp. Sig.	.000

COUNSELING AND PSYCHOTHERAPY

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1294	58.57	78.480	2.182	54.29	62.85	1	365
1999	1515	51.99	73.399	1.886	48.29	55.69	1	365
2000	1377	52.70	68.387	1.843	49.08	56.31	1	366
2001	1892	50.11	70.594	1.623	46.92	53.29	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.113	3	6074	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57702.689	3	19234.230	3.653	.012
Within Groups	31979415.916	6074	5264.968		
Total	32037118.605	6077			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1294	3167.35
	1999	1515	3024.75
	2000	1377	3089.72
	2001	1892	2927.31

Test Statistics

	Duration of Enrollment
Chi-Square	16.282
df	3
Asymp. Sig.	.001

COUNSELING AND PSYCHOTHERAPY: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	22	58.64	82.760	17.644	21.94	95.33	1	287
1999	21	78.52	104.978	22.908	30.74	126.31	1	314
2000	22	46.73	46.809	9.980	25.97	67.48	1	165
2001	55	45.51	60.996	8.225	29.02	62.00	1	309

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.302	3	116	.002

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18230.729	3	6076.910	1.153	.331
Within Groups	611160.438	116	5268.624		
Total	629391.167	119			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	22	59.05
	1999	21	66.88
	2000	22	64.11
	2001	55	57.20

Test Statistics

	Duration of Enrollment
Chi-Square	1.531
df	3
Asymp. Sig.	.675

COUNSELING AND PSYCHOTHERAPY: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	363	72.30	89.853	4.716	63.03	81.57	1	365
1999	364	55.10	81.596	4.277	46.69	63.51	1	365
2000	340	54.07	71.348	3.869	46.46	61.68	1	366
2001	467	54.47	77.953	3.607	47.38	61.56	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
7.973	3	1530	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	87500.062	3	29166.687	4.509	.004
Within Groups	9896873.313	1530	6468.545		
Total	9984373.375	1533			

Post Hoc Analysis

Games-Howell

No significant differences between years were found at the 0.01 level using Games-Howell post hoc analysis.

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	363	832.25
	1999	364	741.12
	2000	340	766.35
	2001	467	738.56

Test Statistics

	Duration of Enrollment
Chi-Square	11.407
df	3
Asymp. Sig.	.010

COUNSELING AND PSYCHOTHERAPY: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	598	53.58	74.519	3.047	47.60	59.57	1	365
1999	720	54.39	73.128	2.725	49.04	59.74	1	365
2000	678	56.10	73.526	2.824	50.55	61.64	1	366
2001	858	50.82	70.023	2.391	46.12	55.51	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.371	3	2850	.774

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11320.853	3	3773.618	.716	.542
Within Groups	15022101.076	2850	5270.913		
Total	15033421.929	2853			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	598	1429.58
	1999	720	1456.02
	2000	678	1457.74
	2001	858	1378.22

Test Statistics

	Duration of Enrollment
Chi-Square	4.985
df	3
Asymp. Sig.	.173

COUNSELING AND PSYCHOTHERAPY: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	311	52.14	69.235	3.926	44.42	59.87	1	365
1999	410	43.66	63.001	3.111	37.54	49.77	1	365
2000	337	44.87	53.831	2.932	39.10	50.63	1	309
2001	512	45.43	65.129	2.878	39.77	51.08	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.852	3	1566	.136

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14537.074	3	4845.691	1.214	.303
Within Groups	6250554.455	1566	3991.414		
Total	6265091.529	1569			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	311	844.03
	1999	410	764.25
	2000	337	802.40
	2001	512	755.84

Test Statistics

	Duration of Enrollment
Chi-Square	8.948
df	3
Asymp. Sig.	.030

COUNSELING AND PSYCHOTHERAPY: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	941	60.30	80.974	2.640	55.12	65.48	1	365
1999	1055	52.13	74.988	2.309	47.60	56.66	1	365
2000	934	51.83	66.868	2.188	47.54	56.13	1	366
2001	1318	49.62	70.644	1.946	45.80	53.44	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.792	3	4244	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	67265.242	3	22421.747	4.167	.006
Within Groups	22834631.572	4244	5380.450		
Total	22901896.814	4247			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	10.68	3.279	.006	.46	20.91

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	941	2222.95
	1999	1055	2116.81
	2000	934	2162.15
	2001	1318	2033.69

Test Statistics

	Duration of Enrollment
Chi-Square	14.642
df	3
Asymp. Sig.	.002

COUNSELING AND PSYCHOTHERAPY: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	353	53.96	71.311	3.795	46.50	61.43	1	365
1999	460	51.67	69.695	3.250	45.28	58.06	1	365
2000	443	54.52	71.527	3.398	47.84	61.20	1	366
2001	574	51.22	70.530	2.944	45.44	57.00	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.146	3	1826	.932

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3770.163	3	1256.721	.251	.860
Within Groups	9131209.783	1826	5000.663		
Total	9134979.945	1829			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	353	944.00
	1999	460	908.88
	2000	443	927.74
	2001	574	893.83

Test Statistics

	Duration of Enrollment
Chi-Square	2.356
df	3
Asymp. Sig.	.502

COUNSELING AND PSYCHOTHERAPY: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	39	24.10	45.415	7.272	9.38	38.82	1	245
1999	38	45.53	58.106	9.426	26.43	64.63	1	232
2000	20	71.15	98.110	21.938	25.23	117.07	1	325
2001	45	37.84	46.199	6.887	23.96	51.72	1	179

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.366	3	138	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	30537.715	3	10179.238	2.926	.036
Within Groups	480095.525	138	3478.953		
Total	510633.239	141			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	39	59.95
	1999	38	75.59
	2000	20	80.30
	2001	45	74.14

Test Statistics

	Duration of Enrollment
Chi-Square	4.868
df	3
Asymp. Sig.	.182

COUNSELING AND PSYCHOTHERAPY: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	105	54.03	77.431	7.556	39.04	69.01	1	365
1999	114	44.75	74.756	7.002	30.88	58.63	1	365
2000	138	61.84	71.124	6.054	49.87	73.81	1	366
2001	255	50.65	69.866	4.375	42.03	59.26	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.424	3	608	.736

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19985.797	3	6661.932	1.271	.284
Within Groups	3187898.765	608	5243.255		
Total	3207884.562	611			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	105	306.00
	1999	114	275.19
	2000	138	342.59
	2001	255	301.17

Test Statistics

	Duration of Enrollment
Chi-Square	9.919
df	3
Asymp. Sig.	.019

COUNSELING AND PSYCHOTHERAPY: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	187	55.39	81.428	5.955	43.64	67.14	1	365
1999	328	52.25	69.928	3.861	44.65	59.84	1	365
2000	232	52.76	65.915	4.328	44.24	61.29	1	366
2001	349	53.58	69.211	3.705	46.29	60.86	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.051	3	1092	.369

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1274.071	3	424.690	.084	.969
Within Groups	5502912.699	1092	5039.297		
Total	5504186.770	1095			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	187	536.91
	1999	328	547.99
	2000	232	554.69
	2001	349	551.07

Test Statistics

	Duration of Enrollment
Chi-Square	.370
df	3
Asymp. Sig.	.946

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	433	63.05	77.316	3.716	55.75	70.35	1	365
1999	440	59.60	84.922	4.049	51.65	67.56	1	365
2000	422	56.78	73.056	3.556	49.79	63.77	1	366
2001	526	54.63	80.767	3.522	47.71	61.55	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.623	3	1817	.600

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18590.679	3	6196.893	.986	.398
Within Groups	11419960.307	1817	6285.063		
Total	11438550.986	1820			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	433	971.71
	1999	440	921.40
	2000	422	917.71
	2001	526	846.95

Test Statistics

	Duration of Enrollment
Chi-Square	14.262
df	3
Asymp. Sig.	.003

COUNSELING AND PSYCHOTHERAPY: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	69	43.90	57.568	6.930	30.07	57.73	1	244
1999	111	53.85	75.976	7.211	39.56	68.14	1	365
2000	76	55.36	77.521	8.892	37.64	73.07	1	354
2001	73	35.15	53.639	6.278	22.64	47.67	1	243

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.370	3	325	.071

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21119.050	3	7039.683	1.507	.213
Within Groups	1518169.437	325	4671.291		
Total	1539288.486	328			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	69	167.82
	1999	111	177.80
	2000	76	167.04
	2001	73	140.75

Test Statistics

	Duration of Enrollment
Chi-Square	7.073
df	3
Asymp. Sig.	.070

COUNSELING AND PSYCHOTHERAPY: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	44	49.89	64.660	9.748	30.23	69.54	1	274
1999	34	47.38	55.730	9.558	27.94	66.83	1	243
2000	24	21.21	26.870	5.485	9.86	32.55	1	99
2001	72	67.65	90.729	10.692	46.33	88.97	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.607	3	170	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	41207.813	3	13735.938	2.644	.051
Within Groups	883324.739	170	5196.028		
Total	924532.552	173			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	44	90.14
	1999	34	87.54
	2000	24	64.96
	2001	72	93.38

Test Statistics

	Duration of Enrollment
Chi-Square	6.039
df	3
Asymp. Sig.	.110

COUNSELING AND PSYCHOTHERAPY: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	60	71.58	89.348	11.535	48.50	94.66	1	365
1999	54	50.57	76.071	10.352	29.81	71.34	1	365
2000	50	78.64	95.944	13.569	51.37	105.91	1	366
2001	70	40.13	55.942	6.686	26.79	53.47	1	332

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.560	3	230	.004

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57543.350	3	19181.117	3.054	.029
Within Groups	1444703.150	230	6281.318		
Total	1502246.500	233			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	60	128.25
	1999	54	108.39
	2000	50	133.52
	2001	70	103.87

Test Statistics

	Duration of Enrollment
Chi-Square	8.336
df	3
Asymp. Sig.	.040

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	337	54.35	70.236	3.826	46.83	61.88	1	365
1999	384	45.17	62.099	3.169	38.94	51.40	1	365
2000	289	45.12	58.234	3.426	38.38	51.86	1	366
2001	95	35.39	58.704	6.023	23.43	47.35	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.618	3	1101	.013

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	33319.715	3	11106.572	2.757	.041
Within Groups	4435108.225	1101	4028.255		
Total	4468427.940	1104			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	337	587.95
	1999	384	539.49
	2000	289	559.79
	2001	95	463.00

Test Statistics

	Duration of Enrollment
Chi-Square	12.732
df	3
Asymp. Sig.	.005

COUNSELING AND PSYCHOTHERAPY: NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	9	32.89	49.642	16.547	-5.27	71.05	1	135
1999	8	45.13	41.602	14.708	10.35	79.90	1	92
2000	5	41.60	46.934	20.990	-16.68	99.88	1	97
2001	7	43.43	30.908	11.682	14.84	72.01	9	101

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.304	3	25	.295

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	757.529	3	252.510	.136	.938
Within Groups	46372.678	25	1854.907		
Total	47130.207	28			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	9	12.83
	1999	8	15.13
	2000	5	15.00
	2001	7	17.64

Test Statistics

	Duration of Enrollment
Chi-Square	1.298
df	3
Asymp. Sig.	.730

CRISIS INTERVENTION

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	532	37.93	63.669	2.760	32.51	43.35	1	365
1999	543	35.71	65.591	2.815	30.18	41.24	1	365
2000	387	49.06	78.385	3.985	41.23	56.89	1	366
2001	420	50.20	79.267	3.868	42.60	57.80	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
12.214	3	1878	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	77635.164	3	25878.388	5.122	.002
Within Groups	9488669.725	1878	5052.540		
Total	9566304.889	1881			

Post Hoc Analysis

Games-Howell

No significant differences between years were found at the 0.01 level using Games-Howell post hoc analysis.

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	532	931.62
	1999	543	873.72
	2000	387	1018.19
	2001	420	970.98

Test Statistics

	Duration of Enrollment
Chi-Square	17.592
df	3
Asymp. Sig.	.001

CRISIS INTERVENTION: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	14	45.93	45.867	12.258	19.45	72.41	5	168
1999	5	44.20	39.003	17.442	-4.23	92.63	4	104
2000	6	102.33	127.624	52.102	-31.60	236.27	10	353
2001	7	76.29	118.878	44.932	-33.66	186.23	4	337

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.926	3	28	.148

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16365.010	3	5455.003	.765	.523
Within Groups	199664.490	28	7130.875		
Total	216029.500	31			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	14	15.54
	1999	5	15.30
	2000	6	20.75
	2001	7	15.64

Test Statistics

	Duration of Enrollment
Chi-Square	1.523
df	3
Asymp. Sig.	.677

CRISIS INTERVENTION: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	111	53.22	80.728	7.662	38.03	68.40	1	365
1999	100	50.46	83.725	8.373	33.85	67.07	1	365
2000	90	55.70	74.460	7.849	40.10	71.30	1	366
2001	90	71.98	81.728	8.615	54.86	89.10	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.161	3	387	.324

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	26145.453	3	8715.151	1.350	.258
Within Groups	2498764.506	387	6456.756		
Total	2524909.959	390			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	111	191.20
	1999	100	175.45
	2000	90	205.31
	2001	90	215.45

Test Statistics

	Duration of Enrollment
Chi-Square	6.788
df	3
Asymp. Sig.	.079

CRISIS INTERVENTION: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	275	32.31	56.920	3.432	25.55	39.06	1	365
1999	262	33.12	58.860	3.636	25.96	40.28	1	365
2000	187	47.48	74.552	5.452	36.73	58.24	1	366
2001	178	56.08	85.085	6.377	43.50	68.67	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
15.480	3	898	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	85074.474	3	28358.158	6.200	.000
Within Groups	4107144.094	898	4573.657		
Total	4192218.569	901			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	-23.78	7.242	.006	-46.53	-1.03

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	275	429.44
	1999	262	431.44
	2000	187	489.14
	2001	178	475.57

Test Statistics

	Duration of Enrollment
Chi-Square	8.962
df	3
Asymp. Sig.	.030

CRISIS INTERVENTION: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	132	35.94	60.819	5.294	25.47	46.41	1	365
1999	175	29.94	61.964	4.684	20.69	39.18	1	365
2000	103	41.13	82.666	8.145	24.97	57.28	1	366
2001	145	28.20	61.703	5.124	18.07	38.33	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.616	3	551	.050

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12924.529	3	4308.176	.990	.397
Within Groups	2397910.383	551	4351.924		
Total	2410834.912	554			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	132	292.01
	1999	175	256.89
	2000	103	296.03
	2001	145	277.92

Test Statistics

	Duration of Enrollment
Chi-Square	5.357
df	3
Asymp. Sig.	.147

CRISIS INTERVENTION: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	357	37.64	62.339	3.299	31.16	44.13	1	365
1999	347	37.28	68.291	3.666	30.07	44.49	1	365
2000	247	49.42	78.926	5.022	39.53	59.31	1	366
2001	289	56.10	82.717	4.866	46.52	65.67	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
11.566	3	1236	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	79574.363	3	26524.788	5.044	.002
Within Groups	6500049.479	1236	5258.940		
Total	6579623.842	1239			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	-18.45	5.879	.010	-36.84	-.06

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	357	602.80
	1999	347	580.79
	2000	247	662.28
	2001	289	654.33

Test Statistics

	Duration of Enrollment
Chi-Square	11.097
df	3
Asymp. Sig.	.011

CRISIS INTERVENTION: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	175	38.51	66.479	5.025	28.59	48.43	1	365
1999	196	32.93	60.587	4.328	24.39	41.46	1	365
2000	140	48.43	77.699	6.567	35.44	61.41	1	366
2001	131	37.19	69.609	6.082	25.16	49.22	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.107	3	638	.098

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20083.728	3	6694.576	1.446	.228
Within Groups	2953851.252	638	4629.861		
Total	2973934.980	641			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	175	329.27
	1999	196	294.36
	2000	140	356.81
	2001	131	313.99

Test Statistics

	Duration of Enrollment
Chi-Square	9.809
df	3
Asymp. Sig.	.020

CRISIS INTERVENTION: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	10	42.80	48.529	15.346	8.08	77.52	1	149
1999	9	20.78	19.999	6.666	5.41	36.15	4	55
2000	3	35.00	20.809	12.014	-16.69	86.69	22	59
2001	2	5.00	1.414	1.000	-7.71	17.71	4	6

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.130	3	20	.049

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3724.678	3	1241.559	.983	.421
Within Groups	25263.156	20	1263.158		
Total	28987.833	23			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	10	13.50
	1999	9	11.56
	2000	3	17.00
	2001	2	5.00

Test Statistics

	Duration of Enrollment
Chi-Square	3.836
df	3
Asymp. Sig.	.280

CRISIS INTERVENTION: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	49	60.12	100.938	14.420	31.13	89.12	1	365
1999	44	51.55	83.624	12.607	26.12	76.97	1	365
2000	38	55.24	93.277	15.131	24.58	85.90	2	366
2001	46	65.65	96.016	14.157	37.14	94.17	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.672	3	173	.571

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5012.161	3	1670.720	.189	.904
Within Groups	1526525.478	173	8823.847		
Total	1531537.638	176			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	49	84.61
	1999	44	88.78
	2000	38	93.49
	2001	46	90.17

Test Statistics

	Duration of Enrollment
Chi-Square	.677
df	3
Asymp. Sig.	.879

CRISIS INTERVENTION: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	99	32.18	59.728	6.003	20.27	44.09	1	310
1999	94	36.61	63.000	6.498	23.70	49.51	1	365
2000	93	48.13	79.542	8.248	31.75	64.51	1	366
2001	95	32.80	62.067	6.368	20.16	45.44	1	319

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.935	3	377	.033

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15468.119	3	5156.040	1.169	.321
Within Groups	1662926.815	377	4410.946		
Total	1678394.934	380			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	99	192.02
	1999	94	178.63
	2000	93	208.54
	2001	95	185.01

Test Statistics

	Duration of Enrollment
Chi-Square	3.844
df	3
Asymp. Sig.	.279

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	125	39.27	62.347	5.576	28.23	50.31	1	365
1999	130	40.38	71.887	6.305	27.91	52.86	1	365
2000	74	63.97	82.293	9.566	44.91	83.04	1	366
2001	76	83.96	93.967	10.779	62.49	105.43	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
7.666	3	401	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	125916.575	3	41972.192	7.301	.000
Within Groups	2305240.349	401	5748.729		
Total	2431156.923	404			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	-44.69	12.136	.002	-83.31	-6.07
1999	2001	-43.58	12.487	.004	-83.24	-3.91

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	125	188.45
	1999	130	178.00
	2000	74	227.88
	2001	76	245.47

Test Statistics

	Duration of Enrollment
Chi-Square	21.234
df	3
Asymp. Sig.	.000

CRISIS INTERVENTION: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	35	29.34	36.989	6.252	16.64	42.05	1	194
1999	46	32.11	63.889	9.420	13.14	51.08	1	317
2000	20	36.95	80.272	17.949	-.62	74.52	2	366
2001	26	51.73	62.292	12.216	26.57	76.89	3	194

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.816	3	123	.148

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8697.577	3	2899.192	.793	.500
Within Groups	449636.408	123	3655.581		
Total	458333.984	126			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	35	65.13
	1999	46	57.93
	2000	20	66.65
	2001	26	71.17

Test Statistics

	Duration of Enrollment
Chi-Square	2.378
df	3
Asymp. Sig.	.498

CRISIS INTERVENTION: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	13	35.15	55.703	15.449	1.49	68.81	1	168
1999	21	39.05	90.736	19.800	-2.25	80.35	1	365
2000	13	29.23	65.344	18.123	-10.26	68.72	3	244
2001	9	73.22	79.281	26.427	12.28	134.16	2	182

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.849	3	52	.474

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11662.349	3	3887.450	.666	.577
Within Groups	303416.508	52	5834.933		
Total	315078.857	55			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	13	28.31
	1999	21	27.81
	2000	13	26.46
	2001	9	33.33

Test Statistics

	Duration of Enrollment
Chi-Square	1.039
df	3
Asymp. Sig.	.792

CRISIS INTERVENTION: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	28	39.04	49.167	9.292	19.97	58.10	1	190
1999	14	37.36	47.999	12.828	9.64	65.07	1	157
2000	10	37.90	69.267	21.904	-11.65	87.45	2	229
2001	12	98.42	95.493	27.567	37.74	159.09	7	280

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.587	3	60	.006

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35189.005	3	11729.668	2.948	.040
Within Groups	238709.995	60	3978.500		
Total	273899.000	63			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	28	30.70
	1999	14	28.75
	2000	10	29.20
	2001	12	43.83

Test Statistics

	Duration of Enrollment
Chi-Square	5.600
df	3
Asymp. Sig.	.133

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	169	33.89	55.600	4.277	25.45	42.34	1	365
1999	179	29.47	57.136	4.271	21.05	37.90	1	365
2000	87	54.90	82.860	8.883	37.24	72.56	1	366
2001	45	22.00	59.623	8.888	4.09	39.91	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.595	3	476	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	47715.336	3	15905.112	4.098	.007
Within Groups	1847312.789	476	3880.909		
Total	1895028.125	479			

Post Hoc Analysis

Games-Howell

No significant differences between years were found at the 0.01 level using Games-Howell post hoc analyses.

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	169	243.96
	1999	179	225.65
	2000	87	291.84
	2001	45	187.32

Test Statistics

	Duration of Enrollment
Chi-Square	20.732
df	3
Asymp. Sig.	.000

CRISIS INTERVENTION: NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	3	13.00	8.888	5.132	-9.08	35.08	6	23
1999	5	23.20	45.180	20.205	-32.90	79.30	2	104
2000	7	37.29	56.497	21.354	-14.97	89.54	3	152
2001	4	8.00	4.899	2.449	.20	15.80	4	14

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.960	3	15	.066

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2622.403	3	874.134	.476	.704
Within Groups	27546.229	15	1836.415		
Total	30168.632	18			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	3	12.67
	1999	5	6.40
	2000	7	11.64
	2001	4	9.63

Test Statistics

	Duration of Enrollment
Chi-Square	3.373
df	3
Asymp. Sig.	.338

MEDICATION-RELATED SERVICES

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2314	148.42	118.613	2.466	143.58	153.25	1	365
1999	3011	148.77	125.472	2.287	144.29	153.26	1	365
2000	3609	137.26	115.679	1.926	133.48	141.03	1	366
2001	4559	139.21	116.854	1.731	135.82	142.60	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
20.313	3	13489	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	347873.421	3	115957.807	8.213	.000
Within Groups	190448299.842	13489	14118.786		
Total	190796173.264	13492			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	11.16	3.129	.002	1.41	20.90
1999	2000	11.51	2.989	.001	2.20	20.82
	2001	9.56	2.868	.005	.63	18.49

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	2314	6962.42
	1999	3011	6833.03
	2000	3609	6668.79
	2001	4559	6642.75

Test Statistics

	Duration of Enrollment
Chi-Square	13.284
df	3
Asymp. Sig.	.004

MEDICATION-RELATED SERVICES: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	41	168.59	126.279	19.722	128.73	208.44	1	365
1999	48	149.40	121.091	17.478	114.23	184.56	1	365
2000	54	120.11	94.534	12.864	94.31	145.91	16	366
2001	78	146.94	99.870	11.308	124.42	169.45	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.569	3	217	.015

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57476.539	3	19158.846	1.619	.186
Within Groups	2568677.443	217	11837.223		
Total	2626153.982	220			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	41	121.65
	1999	48	110.31
	2000	54	97.44
	2001	78	115.21

Test Statistics

	Duration of Enrollment
Chi-Square	3.910
df	3
Asymp. Sig.	.271

MEDICATION-RELATED SERVICES: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	634	160.13	119.167	4.733	150.83	169.42	1	365
1999	792	161.79	128.938	4.582	152.79	170.78	1	365
2000	960	155.86	121.289	3.915	148.18	163.54	1	366
2001	1211	152.24	119.949	3.447	145.47	159.00	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.125	3	3593	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	52736.504	3	17578.835	1.177	.317
Within Groups	53656519.193	3593	14933.626		
Total	53709255.697	3596			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	634	1840.10
	1999	792	1807.72
	2000	960	1818.33
	2001	1211	1756.46

Test Statistics

	Duration of Enrollment
Chi-Square	3.419
df	3
Asymp. Sig.	.331

MEDICATION-RELATED SERVICES: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1105	147.42	120.320	3.620	140.32	154.52	1	365
1999	1423	152.91	127.450	3.379	146.28	159.54	1	365
2000	1739	133.72	114.656	2.749	128.33	139.12	1	366
2001	2115	143.66	117.328	2.551	138.66	148.67	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
15.436	3	6378	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	309039.763	3	103013.254	7.218	.000
Within Groups	91029489.346	6378	14272.419		
Total	91338529.109	6381			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2000	19.19	4.356	.000	5.61	32.76

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1105	3238.03
	1999	1423	3269.61
	2000	1739	3079.53
	2001	2115	3206.70

Test Statistics

	Duration of Enrollment
Chi-Square	9.844
df	3
Asymp. Sig.	.020

MEDICATION-RELATED SERVICES: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	533	135.27	112.357	4.867	125.71	144.83	1	365
1999	748	127.08	115.348	4.218	118.80	135.36	1	365
2000	856	124.66	110.002	3.760	117.28	132.04	1	366
2001	1155	116.87	110.663	3.256	110.49	123.26	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.452	3	3288	.226

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	133718.844	3	44572.948	3.563	.014
Within Groups	41132995.603	3288	12510.035		
Total	41266714.447	3291			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	533	1760.07
	1999	748	1654.76
	2000	856	1673.98
	2001	1155	1568.38

Test Statistics

	Duration of Enrollment
Chi-Square	16.206
df	3
Asymp. Sig.	.001

MEDICATION-RELATED SERVICES: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1728	151.64	118.348	2.847	146.06	157.22	1	365
1999	2152	151.15	126.426	2.725	145.81	156.50	1	365
2000	2585	140.19	115.709	2.276	135.73	144.65	1	366
2001	3338	138.49	116.144	2.010	134.55	142.43	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
20.237	3	9799	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	349850.105	3	116616.702	8.270	.000
Within Groups	138179418.821	9799	14101.380		
Total	138529268.926	9802			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	11.45	3.645	.009	.09	22.81
	2001	13.15	3.485	.001	2.29	24.01
1999	2001	12.66	3.387	.001	2.11	23.21

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1728	5103.26
	1999	2152	4967.88
	2000	2585	4885.89
	2001	3338	4767.82

Test Statistics

	Duration of Enrollment
Chi-Square	17.516
df	3
Asymp. Sig.	.001

MEDICATION-RELATED SERVICES: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	586	138.92	118.986	4.915	129.26	148.57	1	365
1999	859	142.81	122.921	4.194	134.57	151.04	1	365
2000	1024	129.86	115.328	3.604	122.79	136.93	1	366
2001	1221	141.17	118.798	3.400	134.50	147.84	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.153	3	3686	.091

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	100451.523	3	33483.841	2.370	.069
Within Groups	52070578.753	3686	14126.581		
Total	52171030.275	3689			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	586	1848.49
	1999	859	1869.98
	2000	1024	1788.19
	2001	1221	1874.91

Test Statistics

	Duration of Enrollment
Chi-Square	4.359
df	3
Asymp. Sig.	.225

MEDICATION-RELATED SERVICES: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	60	108.05	93.341	12.050	83.94	132.16	1	365
1999	56	166.59	134.512	17.975	130.57	202.61	1	365
2000	70	155.54	120.900	14.450	126.72	184.37	1	366
2001	72	127.35	114.517	13.496	100.44	154.26	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
7.490	3	254	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	129032.716	3	43010.905	3.168	.025
Within Groups	3448846.094	254	13578.134		
Total	3577878.810	257			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	60	114.07
	1999	56	140.44
	2000	70	141.36
	2001	72	122.32

Test Statistics

	Duration of Enrollment
Chi-Square	6.213
df	3
Asymp. Sig.	.102

MEDICATION-RELATED SERVICES: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	179	153.71	120.404	8.999	135.95	171.47	1	365
1999	230	162.47	131.684	8.683	145.36	179.58	1	365
2000	352	142.59	118.738	6.329	130.14	155.03	1	366
2001	544	154.99	125.667	5.388	144.41	165.57	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.726	3	1301	.011

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	60987.794	3	20329.265	1.317	.267
Within Groups	20075283.558	1301	15430.656		
Total	20136271.352	1304			

Post Hoc Analysis

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	179	661.97
	1999	230	671.31
	2000	352	635.49
	2001	544	653.64

Test Statistics

	Duration of Enrollment
Chi-Square	1.409
df	3
Asymp. Sig.	.703

MEDICATION-RELATED SERVICES: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	352	130.09	114.243	6.089	118.12	142.07	1	365
1999	500	144.54	122.617	5.484	133.76	155.31	1	365
2000	539	130.81	112.107	4.829	121.32	140.29	1	366
2001	668	128.42	110.487	4.275	120.03	136.81	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.504	3	2055	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	86017.107	3	28672.369	2.183	.088
Within Groups	26987419.525	2055	13132.564		
Total	27073436.631	2058			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	352	1008.96
	1999	500	1070.91
	2000	539	1029.67
	2001	668	1010.73

Test Statistics

	Duration of Enrollment
Chi-Square	3.513
df	3
Asymp. Sig.	.319

MEDICATION-RELATED SERVICES: DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	761	154.22	121.080	4.389	145.60	162.84	1	365
1999	965	155.58	124.524	4.009	147.71	163.45	1	365
2000	1098	144.65	115.994	3.501	137.78	151.52	1	366
2001	1167	151.67	120.720	3.534	144.73	158.60	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.171	3	3987	.006

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	72815.905	3	24271.968	1.673	.171
Within Groups	57842070.255	3987	14507.667		
Total	57914886.159	3990			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	761	2017.14
	1999	965	2016.92
	2000	1098	1967.05
	2001	1167	1992.15

Test Statistics

	Duration of Enrollment
Chi-Square	1.282
df	3
Asymp. Sig.	.733

MEDICATION-RELATED SERVICES: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	164	166.30	122.244	9.546	147.46	185.15	1	365
1999	229	154.88	128.100	8.465	138.20	171.56	1	365
2000	230	146.50	117.292	7.734	131.26	161.73	1	366
2001	272	150.47	131.006	7.943	134.83	166.11	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.960	3	891	.031

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	41104.732	3	13701.577	.873	.454
Within Groups	13978678.593	891	15688.753		
Total	14019783.325	894			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	164	477.81
	1999	229	448.28
	2000	230	445.38
	2001	272	432.00

Test Statistics

	Duration of Enrollment
Chi-Square	3.256
df	3
Asymp. Sig.	.354

MEDICATION-RELATED SERVICES: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	122	160.14	110.024	9.961	140.42	179.86	1	365
1999	136	158.38	130.382	11.180	136.27	180.49	1	365
2000	168	147.91	111.514	8.603	130.93	164.90	1	366
2001	161	178.34	125.854	9.919	158.75	197.92	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.554	3	583	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	78159.467	3	26053.156	1.815	.143
Within Groups	8370632.298	583	14357.860		
Total	8448791.765	586			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	122	298.40
	1999	136	283.18
	2000	168	279.95
	2001	161	314.47

Test Statistics

	Duration of Enrollment
Chi-Square	4.142
df	3
Asymp. Sig.	.246

MEDICATION-RELATED SERVICES: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	99	137.54	126.422	12.706	112.32	162.75	1	365
1999	128	144.61	126.238	11.158	122.53	166.69	1	365
2000	151	134.74	113.516	9.238	116.48	152.99	1	366
2001	136	144.79	116.301	9.973	125.06	164.51	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.279	3	510	.281

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10543.300	3	3514.433	.244	.866
Within Groups	7349061.315	510	14409.924		
Total	7359604.615	513			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	99	246.55
	1999	128	258.02
	2000	151	256.76
	2001	136	265.80

Test Statistics

	Duration of Enrollment
Chi-Square	.969
df	3
Asymp. Sig.	.809

MEDICATION-RELATED SERVICES: COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	518	142.81	111.635	4.905	133.17	152.44	1	365
1999	716	130.48	120.390	4.499	121.65	139.32	1	365
2000	665	142.07	117.854	4.570	133.09	151.04	1	366
2001	191	124.64	120.253	8.701	107.48	141.81	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.278	3	2086	.078

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	93901.095	3	31300.365	2.269	.079
Within Groups	28776166.373	2086	13794.902		
Total	28870067.468	2089			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	518	1099.59
	1999	716	995.34
	2000	665	1080.36
	2001	191	965.46

Test Statistics

	Duration of Enrollment
Chi-Square	14.718
df	3
Asymp. Sig.	.002

MEDICATION-RELATED SERVICES: NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	14	69.21	64.393	17.210	32.03	106.39	1	226
1999	13	103.08	109.550	30.384	36.88	169.28	1	340
2000	14	118.50	91.093	24.346	65.90	171.10	5	284
2001	20	92.40	71.982	16.096	58.71	126.09	1	258

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.511	3	57	.221

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18016.190	3	6005.397	.847	.474
Within Groups	404239.580	57	7091.922		
Total	422255.770	60			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	14	25.68
	1999	13	30.00
	2000	14	35.96
	2001	20	31.90

Test Statistics

	Duration of Enrollment
Chi-Square	2.448
df	3
Asymp. Sig.	.485

SERVICE COORDINATION

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2355	82.23	97.353	2.006	78.29	86.16	1	365
1999	3300	90.49	97.413	1.696	87.17	93.82	1	365
2000	3073	116.69	109.414	1.974	112.82	120.56	1	366
2001	3964	118.43	111.837	1.776	114.95	121.91	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
48.469	3	12688	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3039084.469	3	1013028.156	91.836	.000
Within Groups	139959082.602	12688	11030.823		
Total	142998167.071	12691			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	-8.27	2.627	.009	-16.45	-.09
	2000	-34.47	2.814	.000	-43.24	-25.70
	2001	-36.20	2.680	.000	-44.55	-27.86
1999	2000	-26.20	2.602	.000	-34.31	-18.10
	2001	-27.94	2.456	.000	-35.58	-20.29

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	2355	5446.31
	1999	3300	5864.22
	2000	3073	6880.05
	2001	3964	6869.17

Test Statistics

	Duration of Enrollment
Chi-Square	346.205
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	53	91.57	98.599	13.544	64.39	118.74	1	365
1999	58	94.31	91.914	12.069	70.14	118.48	1	365
2000	47	142.23	111.670	16.289	109.45	175.02	1	366
2001	78	124.54	108.473	12.282	100.08	149.00	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.337	3	232	.263

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	95148.401	3	31716.134	2.983	.032
Within Groups	2466733.243	232	10632.471		
Total	2561881.644	235			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	53	101.33
	1999	58	106.82
	2000	47	138.87
	2001	78	126.58

Test Statistics

	Duration of Enrollment
Chi-Square	10.350
df	3
Asymp. Sig.	.016

SERVICE COORDINATION: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	670	85.58	99.293	3.836	78.05	93.12	1	365
1999	861	97.94	101.921	3.473	91.12	104.76	1	365
2000	866	122.26	113.882	3.870	114.67	129.86	1	366
2001	1074	127.80	112.764	3.441	121.05	134.55	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
12.618	3	3467	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	992663.589	3	330887.863	28.402	.000
Within Groups	40391508.408	3467	11650.276		
Total	41384171.997	3470			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-36.68	5.449	.000	-53.67	-19.69
	2001	-42.22	5.153	.000	-58.29	-26.15
1999	2000	-24.32	5.200	.000	-40.54	-8.11
	2001	-29.86	4.889	.000	-45.10	-14.62

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	670	1463.20
	1999	861	1605.66
	2000	866	1851.54
	2001	1074	1917.51

Test Statistics

	Duration of Enrollment
Chi-Square	111.259
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1159	76.99	94.617	2.779	71.54	82.44	1	365
1999	1604	90.39	98.798	2.467	85.55	95.23	1	365
2000	1432	120.03	112.000	2.960	114.23	125.84	1	366
2001	1909	118.45	112.815	2.582	113.38	123.51	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
37.031	3	6100	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1908302.557	3	636100.852	56.855	.000
Within Groups	68247650.415	6100	11188.139		
Total	70155952.972	6103			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	1999	-13.40	3.716	.002	-24.98	-1.82
	2000	-43.05	4.060	.000	-55.70	-30.39
	2001	-41.46	3.794	.000	-53.28	-29.64
1999	2000	-29.65	3.853	.000	-41.65	-17.64
	2001	-28.06	3.571	.000	-39.18	-16.93

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1159	2556.12
	1999	1604	2831.36
	2000	1432	3363.77
	2001	1909	3306.19

Test Statistics

	Duration of Enrollment
Chi-Square	202.204
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	473	89.25	100.581	4.625	80.17	98.34	1	365
1999	777	82.18	88.955	3.191	75.91	88.44	1	365
2000	728	101.85	96.713	3.584	94.81	108.89	1	366
2001	903	106.72	107.960	3.593	99.67	113.77	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
9.903	3	2877	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	298670.354	3	99556.785	10.147	.000
Within Groups	28228507.634	2877	9811.786		
Total	28527177.988	2880			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2000	-19.67	4.799	.000	-34.64	-4.71
	2001	-24.54	4.805	.000	-39.53	-9.56

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	473	1338.48
	1999	777	1327.06
	2000	728	1535.82
	2001	903	1516.29

Test Statistics

	Duration of Enrollment
Chi-Square	38.715
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1734	83.19	97.260	2.336	78.61	87.77	1	365
1999	2358	91.88	98.133	2.021	87.92	95.85	1	365
2000	2149	119.71	111.287	2.401	115.01	124.42	1	366
2001	2824	120.20	113.189	2.130	116.03	124.38	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
41.678	3	9061	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2344551.100	3	781517.033	69.519	.000
Within Groups	101861858.834	9061	11241.790		
Total	104206409.934	9064			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-36.52	3.349	.000	-46.96	-26.09
	2001	-37.01	3.161	.000	-46.86	-27.16
1999	2000	-27.83	3.138	.000	-37.60	-18.05
	2001	-28.32	2.936	.000	-37.46	-19.17

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1734	3902.15
	1999	2358	4193.11
	2000	2149	4933.86
	2001	2824	4899.11

Test Statistics

	Duration of Enrollment
Chi-Square	246.996
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	621	79.53	97.639	3.918	71.83	87.22	1	365
1999	942	87.01	95.547	3.113	80.90	93.12	1	365
2000	924	109.67	104.650	3.443	102.92	116.43	1	366
2001	1140	114.03	108.340	3.209	107.74	120.33	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.428	3	3623	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	730166.524	3	243388.841	23.218	.000
Within Groups	37979052.429	3623	10482.764		
Total	38709218.953	3626			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-30.15	5.216	.000	-46.42	-13.88
	2001	-34.51	5.064	.000	-50.30	-18.71
1999	2000	-22.66	4.642	.000	-37.13	-8.19
	2001	-27.02	4.471	.000	-40.96	-13.09

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	621	1537.59
	1999	942	1671.21
	2000	924	1950.81
	2001	1140	1971.67

Test Statistics

	Duration of Enrollment
Chi-Square	102.699
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	87	49.41	65.012	6.970	35.56	63.27	1	365
1999	65	91.68	101.749	12.620	66.46	116.89	1	365
2000	78	110.74	109.655	12.416	86.02	135.47	1	366
2001	100	76.69	95.573	9.557	57.73	95.65	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.091	3	326	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	164988.919	3	54996.306	6.277	.000
Within Groups	2856223.581	326	8761.422		
Total	3021212.500	329			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-61.33	14.239	.000	-106.59	-16.07

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	87	136.30
	1999	65	178.88
	2000	78	196.74
	2001	100	157.85

Test Statistics

	Duration of Enrollment
Chi-Square	18.583
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	167	87.47	93.557	7.240	73.18	101.77	1	365
1999	270	89.49	100.707	6.129	77.43	101.56	1	365
2000	297	121.66	115.224	6.686	108.50	134.81	1	366
2001	538	121.42	116.222	5.011	111.58	131.27	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.675	3	1268	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	308786.477	3	102928.826	8.494	.000
Within Groups	15364543.459	1268	12117.148		
Total	15673329.936	1271			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-34.18	9.855	.003	-65.06	-3.31
	2001	-33.95	8.805	.001	-61.57	-6.33
1999	2000	-32.16	9.070	.002	-60.53	-3.80
	2001	-31.93	7.916	.000	-56.68	-7.18

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	167	573.31
	1999	270	559.00
	2000	297	678.32
	2001	538	671.92

Test Statistics

	Duration of Enrollment
Chi-Square	25.927
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	338	77.77	93.698	5.097	67.74	87.79	1	365
1999	540	91.70	96.035	4.133	83.58	99.81	1	365
2000	477	119.05	106.668	4.884	109.46	128.65	1	366
2001	593	114.80	109.325	4.489	105.98	123.62	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
7.548	3	1944	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	489638.749	3	163212.916	15.537	.000
Within Groups	20421219.002	1944	10504.742		
Total	20910857.752	1947			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-41.28	7.059	.000	-63.33	-19.24
	2001	-37.03	6.792	.000	-58.24	-15.82
1999	2000	-27.36	6.398	.000	-47.33	-7.39
	2001	-23.10	6.102	.001	-42.14	-4.06

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	338	809.85
	1999	540	910.65
	2000	477	1081.64
	2001	593	1040.31

Test Statistics

	Duration of Enrollment
Chi-Square	61.465
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	887	80.52	98.096	3.294	74.06	86.99	1	365
1999	1115	92.31	99.110	2.968	86.49	98.14	1	365
2000	968	123.54	111.275	3.577	116.52	130.55	1	366
2001	1029	136.06	119.723	3.732	128.73	143.38	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
34.981	3	3995	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1986682.094	3	662227.365	57.293	.000
Within Groups	46176915.018	3995	11558.677		
Total	48163597.112	3998			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-43.01	4.862	.000	-58.17	-27.86
	2001	-55.54	4.978	.000	-71.05	-40.02
1999	2000	-31.22	4.648	.000	-45.71	-16.73
	2001	-43.74	4.769	.000	-58.61	-28.88

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	887	1653.58
	1999	1115	1830.98
	2000	968	2208.37
	2001	1029	2285.74

Test Statistics

	Duration of Enrollment
Chi-Square	198.953
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	159	94.23	99.122	7.861	78.70	109.75	1	365
1999	225	95.07	105.046	7.003	81.27	108.87	1	365
2000	204	109.20	110.967	7.769	93.88	124.52	1	366
2001	259	119.64	116.814	7.258	105.34	133.93	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.624	3	843	.049

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	99145.478	3	33048.493	2.774	.040
Within Groups	10044393.355	843	11915.057		
Total	10143538.834	846			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	159	401.38
	1999	225	396.34
	2000	204	434.77
	2001	259	453.43

Test Statistics

	Duration of Enrollment
Chi-Square	8.419
df	3
Asymp. Sig.	.038

SERVICE COORDINATION: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	62	78.35	96.608	12.269	53.82	102.89	1	365
1999	76	85.71	102.227	11.726	62.35	109.07	1	365
2000	69	133.30	119.643	14.403	104.56	162.05	1	366
2001	100	138.43	120.763	12.076	114.47	162.39	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.327	3	303	.005

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	223879.317	3	74626.439	5.997	.001
Within Groups	3770262.944	303	12443.112		
Total	3994142.261	306			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	-60.08	17.215	.004	-114.59	-5.56

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	62	124.10
	1999	76	134.53
	2000	69	172.33
	2001	100	174.69

Test Statistics

	Duration of Enrollment
Chi-Square	19.151
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	104	100.28	104.011	10.199	80.05	120.51	1	365
1999	168	95.54	98.060	7.566	80.60	110.47	1	365
2000	142	104.42	106.620	8.947	86.73	122.10	1	366
2001	140	118.57	112.969	9.548	99.69	137.45	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.202	3	550	.308

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	43074.724	3	14358.241	1.295	.275
Within Groups	6096911.471	550	11085.294		
Total	6139986.195	553			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	104	265.78
	1999	168	266.17
	2000	142	276.19
	2001	140	301.13

Test Statistics

	Duration of Enrollment
Chi-Square	4.473
df	3
Asymp. Sig.	.215

SERVICE COORDINATION: COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	521	78.81	93.481	4.095	70.76	86.85	1	365
1999	798	81.20	86.495	3.062	75.19	87.21	1	365
2000	617	112.99	104.036	4.188	104.76	121.21	1	366
2001	196	105.74	104.685	7.477	91.00	120.49	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
9.988	3	2128	.000

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	492565.565	3	164188.522	18.093	.000
Within Groups	19311141.881	2128	9074.785		
Total	19803707.447	2131			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2000	-34.18	5.858	.000	-52.46	-15.90
	2001	-26.94	8.526	.009	-53.69	-.18
1999	2000	-31.79	5.188	.000	-47.97	-15.60

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	521	957.26
	1999	798	1005.04
	2000	617	1210.29
	2001	196	1154.47

Test Statistics

	Duration of Enrollment
Chi-Square	62.272
df	3
Asymp. Sig.	.000

SERVICE COORDINATION: NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	5	179.80	164.418	73.530	-24.35	383.95	32	360
1999	18	85.33	76.670	18.071	47.21	123.46	1	255
2000	9	102.33	103.977	34.659	22.41	182.26	1	284
2001	16	87.81	90.330	22.582	39.68	135.95	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.236	3	44	.031

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38106.075	3	12702.025	1.340	.273
Within Groups	416947.238	44	9476.074		
Total	455053.313	47			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	5	30.90
	1999	18	23.47
	2000	9	24.89
	2001	16	23.44

Test Statistics

	Duration of Enrollment
Chi-Square	1.244
df	3
Asymp. Sig.	.742

SKILLS TRAINING

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1885	66.55	78.647	1.811	63.00	70.10	1	365
1999	2587	66.52	82.636	1.625	63.33	69.70	1	365
2000	3294	65.03	79.514	1.385	62.32	67.75	1	366
2001	4180	59.44	78.131	1.208	57.07	61.81	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.580	3	11942	.052

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	117451.769	3	39150.590	6.181	.000
Within Groups	75642815.934	11942	6334.183		
Total	75760267.703	11945			

Post Hoc Analysis

Scheffe

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2001	7.08	1.991	.006	.37	13.78

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1885	6229.07
	1999	2587	6134.60
	2000	3294	6051.93
	2001	4180	5696.73

Test Statistics

	Duration of Enrollment
Chi-Square	45.291
df	3
Asymp. Sig.	.000

SKILLS TRAINING: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	40	52.23	64.653	10.222	31.55	72.90	1	294
1999	42	54.12	62.361	9.623	34.69	73.55	1	306
2000	46	74.48	84.417	12.447	49.41	99.55	1	366
2001	85	56.52	81.534	8.844	38.93	74.10	1	333

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.822	3	209	.144

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14377.984	3	4792.661	.834	.477
Within Groups	1201556.082	209	5749.072		
Total	1215934.066	212			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	40	104.38
	1999	42	112.10
	2000	46	122.28
	2001	85	97.45

Test Statistics

	Duration of Enrollment
Chi-Square	5.377
df	3
Asymp. Sig.	.146

SKILLS TRAINING: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	551	73.34	82.925	3.533	66.40	80.28	1	365
1999	687	67.58	84.666	3.230	61.23	73.92	1	365
2000	903	67.69	84.176	2.801	62.20	73.19	1	366
2001	1079	66.63	84.569	2.575	61.57	71.68	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.052	3	3216	.984

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17684.872	3	5894.957	.831	.476
Within Groups	22800531.134	3216	7089.717		
Total	22818216.006	3219			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	551	1720.47
	1999	687	1613.65
	2000	903	1598.52
	2001	1079	1562.36

Test Statistics

	Duration of Enrollment
Chi-Square	10.912
df	3
Asymp. Sig.	.012

SKILLS TRAINING: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	940	65.19	78.022	2.545	60.19	70.18	1	365
1999	1264	68.48	83.376	2.345	63.88	73.08	1	365
2000	1605	67.51	80.408	2.007	63.57	71.45	1	366
2001	2099	58.67	76.989	1.680	55.38	61.97	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.612	3	5904	.013

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	105799.938	3	35266.646	5.582	.001
Within Groups	37301871.735	5904	6318.068		
Total	37407671.673	5907			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1999	2001	9.81	2.830	.007	.27	19.34

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	940	3017.34
	1999	1264	3053.85
	2000	1605	3044.00
	2001	2099	2798.10

Test Statistics

	Duration of Enrollment
Chi-Square	28.034
df	3
Asymp. Sig.	.000

SKILLS TRAINING: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	354	61.23	74.263	3.947	53.47	68.99	1	365
1999	594	62.00	79.822	3.275	55.57	68.43	1	365
2000	740	55.82	70.320	2.585	50.74	60.89	1	366
2001	917	53.02	71.717	2.368	48.37	57.67	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.769	3	2601	.151

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	36734.898	3	12244.966	2.260	.079
Within Groups	14090640.941	2601	5417.394		
Total	14127375.839	2604			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	354	1379.12
	1999	594	1359.73
	2000	740	1293.21
	2001	917	1244.76

Test Statistics

	Duration of Enrollment
Chi-Square	12.834
df	3
Asymp. Sig.	.005

SKILLS TRAINING: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	1409	67.25	78.465	2.090	63.15	71.35	1	365
1999	1901	65.21	82.769	1.898	61.48	68.93	1	365
2000	2373	64.86	78.673	1.615	61.69	68.02	1	366
2001	3072	58.00	76.729	1.384	55.29	60.72	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.274	3	8751	.020

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	119540.527	3	39846.842	6.404	.000
Within Groups	54446389.628	8751	6221.733		
Total	54565930.155	8754			

Post Hoc Analysis

Games-Howell

(I) RX YEAR	(J) RX YEAR	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
1998	2001	9.25	2.538	.004	.70	17.80

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	1409	4627.76
	1999	1901	4446.56
	2000	2373	4464.26
	2001	3072	4154.39

Test Statistics

	Duration of Enrollment
Chi-Square	42.627
df	3
Asymp. Sig.	.000

SKILLS TRAINING: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	476	64.48	79.232	3.632	57.34	71.61	1	365
1999	686	70.16	82.217	3.139	63.99	76.32	1	365
2000	921	65.49	81.684	2.692	60.20	70.77	1	366
2001	1108	63.43	81.795	2.457	58.61	68.26	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.147	3	3187	.931

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20053.937	3	6684.646	1.007	.389
Within Groups	21157048.030	3187	6638.547		
Total	21177101.966	3190			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	476	1599.22
	1999	686	1688.66
	2000	921	1588.39
	2001	1108	1543.57

Test Statistics

	Duration of Enrollment
Chi-Square	10.734
df	3
Asymp. Sig.	.013

SKILLS TRAINING: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	54	71.78	78.232	10.646	50.42	93.13	1	313
1999	44	49.48	61.998	9.346	30.63	68.33	1	241
2000	81	53.15	82.873	9.208	34.82	71.47	1	366
2001	81	60.26	85.726	9.525	41.30	79.21	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.828	3	256	.480

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15669.677	3	5223.226	.822	.483
Within Groups	1627006.088	256	6355.493		
Total	1642675.765	259			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	54	152.28
	1999	44	127.11
	2000	81	120.05
	2001	81	128.27

Test Statistics

	Duration of Enrollment
Chi-Square	6.449
df	3
Asymp. Sig.	.092

SKILLS TRAINING: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	158	66.74	78.609	6.254	54.39	79.09	1	365
1999	239	65.70	82.779	5.355	55.15	76.25	1	365
2000	339	67.12	81.565	4.430	58.41	75.84	1	366
2001	615	59.17	78.492	3.165	52.96	65.39	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.353	3	1347	.256

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18665.688	3	6221.896	.971	.406
Within Groups	8632545.449	1347	6408.720		
Total	8651211.137	1350			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	158	729.24
	1999	239	696.22
	2000	339	688.26
	2001	615	647.70

Test Statistics

	Duration of Enrollment
Chi-Square	7.267
df	3
Asymp. Sig.	.064

SKILLS TRAINING: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	263	60.38	74.744	4.609	51.30	69.46	1	365
1999	440	62.36	79.215	3.776	54.94	69.79	1	365
2000	437	69.65	82.249	3.935	61.92	77.39	1	366
2001	573	56.57	76.789	3.208	50.27	62.87	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.767	3	1709	.152

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	43227.051	3	14409.017	2.336	.072
Within Groups	10540799.313	1709	6167.817		
Total	10584026.364	1712			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	263	859.10
	1999	440	871.64
	2000	437	907.23
	2001	573	806.49

Test Statistics

	Duration of Enrollment
Chi-Square	11.058
df	3
Asymp. Sig.	.011

SKILLS TRAINING: DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	686	67.68	80.625	3.078	61.64	73.73	1	365
1999	904	67.10	81.673	2.716	61.77	72.44	1	365
2000	1149	68.07	81.005	2.390	63.38	72.75	1	366
2001	1311	62.16	78.770	2.176	57.89	66.42	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.396	3	4046	.756

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27246.769	3	9082.256	1.406	.239
Within Groups	26137317.997	4046	6460.039		
Total	26164564.766	4049			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	686	2091.96
	1999	904	2056.75
	2000	1149	2061.64
	2001	1311	1937.50

Test Statistics

	Duration of Enrollment
Chi-Square	11.544
df	3
Asymp. Sig.	.009

SKILLS TRAINING: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	146	55.83	69.414	5.745	44.47	67.18	1	320
1999	166	66.98	88.291	6.853	53.45	80.51	1	365
2000	182	61.76	73.796	5.470	50.97	72.56	1	366
2001	289	55.28	79.862	4.698	46.04	64.53	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.290	3	779	.276

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17302.396	3	5767.465	.935	.423
Within Groups	4807442.197	779	6171.299		
Total	4824744.593	782			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	146	393.99
	1999	166	414.44
	2000	182	412.20
	2001	289	365.39

Test Statistics

	Duration of Enrollment
Chi-Square	7.256
df	3
Asymp. Sig.	.064

SKILLS TRAINING: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	42	51.33	73.895	11.402	28.31	74.36	1	352
1999	54	82.67	89.778	12.217	58.16	107.17	1	365
2000	85	64.35	88.971	9.650	45.16	83.54	1	366
2001	99	66.98	96.230	9.671	47.79	86.17	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.268	3	276	.286

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	24152.863	3	8050.954	.999	.394
Within Groups	2223498.705	276	8056.155		
Total	2247651.568	279			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	42	127.38
	1999	54	161.50
	2000	85	138.85
	2001	99	136.03

Test Statistics

	Duration of Enrollment
Chi-Square	5.146
df	3
Asymp. Sig.	.161

SKILLS TRAINING: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	68	72.99	75.567	9.164	54.69	91.28	1	365
1999	119	78.95	88.276	8.092	62.92	94.97	1	365
2000	138	65.53	91.306	7.772	50.16	80.90	1	366
2001	145	73.77	80.751	6.706	60.51	87.02	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.074	3	466	.360

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11903.376	3	3967.792	.547	.651
Within Groups	3383249.094	466	7260.191		
Total	3395152.470	469			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	68	253.46
	1999	119	252.73
	2000	138	208.84
	2001	145	238.31

Test Statistics

	Duration of Enrollment
Chi-Square	8.556
df	3
Asymp. Sig.	.036

SKILLS TRAINING: COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	452	69.39	78.481	3.691	62.14	76.65	1	365
1999	598	64.78	83.108	3.399	58.10	71.45	1	365
2000	686	61.25	73.118	2.792	55.77	66.73	1	366
2001	233	49.73	73.279	4.801	40.27	59.19	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.426	3	1965	.017

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	63423.443	3	21141.148	3.518	.015
Within Groups	11809224.502	1965	6009.783		
Total	11872647.944	1968			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	452	1045.04
	1999	598	989.09
	2000	686	986.67
	2001	233	853.12

Test Statistics

	Duration of Enrollment
Chi-Square	17.874
df	3
Asymp. Sig.	.000

SKILLS TRAINING: NO PSYCHIATRIC DISORDER

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	7	31.00	44.057	16.652	-9.75	71.75	2	113
1999	16	100.50	109.905	27.476	41.94	159.06	2	365
2000	15	48.80	47.847	12.354	22.30	75.30	1	152
2001	12	46.83	102.072	29.466	-18.02	111.69	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.422	3	46	.248

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35809.713	3	11936.571	1.617	.198
Within Groups	339490.067	46	7380.219		
Total	375299.780	49			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	7	21.14
	1999	16	33.25
	2000	15	24.83
	2001	12	18.54

Test Statistics

	Duration of Enrollment
Chi-Square	7.952
df	3
Asymp. Sig.	.047

SUPPORTIVE SERVICES

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	217	44.77	68.815	4.671	35.56	53.98	1	365
1999	196	27.36	51.721	3.694	20.08	34.65	1	324
2000	72	34.10	53.576	6.314	21.51	46.69	1	230
2001	72	47.56	85.136	10.033	27.55	67.56	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.312	3	553	.005

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39716.721	3	13238.907	3.235	.022
Within Groups	2262925.857	553	4092.090		
Total	2302642.578	556			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	217	295.95
	1999	196	250.67
	2000	72	272.66
	2001	72	311.37

Test Statistics

	Duration of Enrollment
Chi-Square	11.886
df	3
Asymp. Sig.	.008

SUPPORTIVE SERVICES: AGE 2 – 4 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	2	63.50	9.192	6.500	-19.09	146.09	57	70
1999	4	25.50	29.682	14.841	-21.73	72.73	1	61
2001	2	24.50	9.192	6.500	-58.09	107.09	18	31

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.694	2	5	.039

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2205.500	2	1102.750	1.961	.235
Within Groups	2812.000	5	562.400		
Total	5017.500	7			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	2	7.00
	1999	4	3.75
	2001	2	3.50

Test Statistics

	Duration of Enrollment
Chi-Square	2.825
df	2
Asymp. Sig.	.243

SUPPORTIVE SERVICES: AGE 5 – 9 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	52	54.50	82.225	11.403	31.61	77.39	1	339
1999	37	27.43	49.965	8.214	10.77	44.09	1	243
2000	18	27.33	44.971	10.600	4.97	49.70	1	153
2001	22	34.05	75.233	16.040	.69	67.40	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.135	3	125	.028

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20406.980	3	6802.327	1.446	.233
Within Groups	587919.036	125	4703.352		
Total	608326.016	128			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	52	71.05
	1999	37	60.64
	2000	18	55.08
	2001	22	66.16

Test Statistics

	Duration of Enrollment
Chi-Square	3.246
df	3
Asymp. Sig.	.355

SUPPORTIVE SERVICES: AGE 10 – 14 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	119	39.60	62.141	5.696	28.32	50.88	1	334
1999	102	30.97	58.895	5.831	19.40	42.54	1	324
2000	45	33.80	50.811	7.575	18.53	49.07	1	230
2001	34	50.59	87.618	15.026	20.02	81.16	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.852	3	296	.138

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11248.534	3	3749.511	.946	.419
Within Groups	1172924.986	296	3962.584		
Total	1184173.520	299			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	119	150.07
	1999	102	139.52
	2000	45	157.69
	2001	34	175.43

Test Statistics

	Duration of Enrollment
Chi-Square	4.916
df	3
Asymp. Sig.	.178

SUPPORTIVE SERVICES: AGE 15 – 19 YEARS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	44	46.41	70.446	10.620	24.99	67.83	1	365
1999	53	20.51	37.968	5.215	10.04	30.97	1	232
2000	9	49.11	81.363	27.121	-13.43	111.65	1	195
2001	14	64.71	101.082	27.015	6.35	123.08	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.965	3	116	.010

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	30369.964	3	10123.321	2.477	.065
Within Groups	474141.628	116	4087.428		
Total	504511.592	119			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	44	70.92
	1999	53	50.04
	2000	9	54.56
	2001	14	71.18

Test Statistics

	Duration of Enrollment
Chi-Square	10.708
df	3
Asymp. Sig.	.013

SUPPORTIVE SERVICES: MALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	165	40.87	61.996	4.826	31.34	50.40	1	365
1999	134	28.87	55.641	4.807	19.36	38.37	1	324
2000	47	31.43	51.649	7.534	16.26	46.59	1	195
2001	50	49.20	87.789	12.415	24.25	74.15	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.720	3	392	.162

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20216.811	3	6738.937	1.713	.164
Within Groups	1542453.399	392	3934.830		
Total	1562670.210	395			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	165	210.28
	1999	134	177.73
	2000	47	186.20
	2001	50	226.87

Test Statistics

	Duration of Enrollment
Chi-Square	10.138
df	3
Asymp. Sig.	.017

SUPPORTIVE SERVICES: FEMALE

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	52	57.13	86.555	12.003	33.04	81.23	1	339
1999	62	24.11	42.256	5.367	13.38	34.84	1	273
2000	25	39.12	57.777	11.555	15.27	62.97	1	230
2001	22	43.82	80.634	17.191	8.07	79.57	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.703	3	157	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31249.460	3	10416.487	2.311	.078
Within Groups	707650.180	157	4507.326		
Total	738899.640	160			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	52	86.44
	1999	62	73.28
	2000	25	85.28
	2001	22	85.02

Test Statistics

	Duration of Enrollment
Chi-Square	2.850
df	3
Asymp. Sig.	.415

SUPPORTIVE SERVICES: ANXIETY DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	3	53.33	38.423	22.184	-42.11	148.78	9	77
2000	4	23.00	31.230	15.615	-26.69	72.69	3	69
2001	2	24.00	9.899	7.000	-64.94	112.94	17	31

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.639	2	6	.270

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1801.333	2	900.667	.904	.454
Within Groups	5976.667	6	996.111		
Total	7778.000	8			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	3	6.67
	2000	4	3.50
	2001	2	5.50

Test Statistics

	Duration of Enrollment
Chi-Square	2.378
df	2
Asymp. Sig.	.305

SUPPORTIVE SERVICES: BIPOLAR DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	13	59.77	75.082	20.824	14.40	105.14	6	253
1999	7	67.86	87.154	32.941	-12.75	148.46	1	232
2000	4	48.00	50.033	25.017	-31.61	127.61	2	119
2001	14	81.57	124.491	33.272	9.69	153.45	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.991	3	34	.409

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5059.301	3	1686.434	.178	.911
Within Groups	322206.593	34	9476.665		
Total	327265.895	37			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	13	19.85
	1999	7	19.36
	2000	4	19.38
	2001	14	19.29

Test Statistics

	Duration of Enrollment
Chi-Square	.020
df	3
Asymp. Sig.	.999

SUPPORTIVE SERVICES: DEPRESSIVE DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	26	59.73	83.001	16.278	26.21	93.26	1	282
1999	29	19.17	29.940	5.560	7.78	30.56	1	102
2000	6	84.33	96.742	39.495	-17.19	185.86	1	230
2001	13	40.38	44.595	12.369	13.44	67.33	1	134

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
6.128	3	70	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	34058.499	3	11352.833	2.965	.038
Within Groups	267987.664	70	3828.395		
Total	302046.162	73			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	26	42.85
	1999	29	28.83
	2000	6	45.33
	2001	13	42.54

Test Statistics

	Duration of Enrollment
Chi-Square	8.024
df	3
Asymp. Sig.	.046

SUPPORTIVE SERVICES: DISRUPTIVE BEHAVIORAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	76	36.17	54.358	6.235	23.75	48.59	1	312
1999	67	31.45	61.684	7.536	16.40	46.49	1	324
2000	29	24.10	44.308	8.228	7.25	40.96	1	188
2001	17	35.88	88.225	21.398	-9.48	81.24	1	365

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.775	3	185	.509

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3334.774	3	1111.591	.315	.814
Within Groups	652241.798	185	3525.631		
Total	655576.571	188			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	76	103.38
	1999	67	89.45
	2000	29	88.07
	2001	17	91.24

Test Statistics

	Duration of Enrollment
Chi-Square	3.231
df	3
Asymp. Sig.	.357

SUPPORTIVE SERVICES: PSYCHOTIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	16	55.56	95.462	23.866	4.69	106.43	1	365
1999	18	22.89	58.739	13.845	-6.32	52.10	1	243
2000	4	103.00	102.823	51.412	-60.62	266.62	1	195
2001	9	23.22	10.438	3.479	15.20	31.25	1	31

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.095	3	43	.037

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27517.197	3	9172.399	1.730	.175
Within Groups	227939.271	43	5300.913		
Total	255456.468	46			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	16	26.81
	1999	18	17.42
	2000	4	32.13
	2001	9	28.56

Test Statistics

	Duration of Enrollment
Chi-Square	7.596
df	3
Asymp. Sig.	.055

SUPPORTIVE SERVICES: MENTAL RETARDATION/DEVELOPMENTAL DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	7	74.43	91.360	34.531	-10.07	158.92	1	229
1999	2	124.00	168.291	119.000	-1388.04	1636.04	5	243
2000	5	37.20	12.133	5.426	22.14	52.26	22	56
2001	2	38.00	49.497	35.000	-406.72	482.72	3	73

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
8.285	3	12	.003

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12901.423	3	4300.474	.634	.607
Within Groups	81440.514	12	6786.710		
Total	94341.938	15			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	7	7.86
	1999	2	9.50
	2000	5	9.40
	2001	2	7.50

Test Statistics

	Duration of Enrollment
Chi-Square	.486
df	3
Asymp. Sig.	.922

SUPPORTIVE SERVICES: OTHER PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	5	30.80	41.246	18.446	-20.41	82.01	1	91
1999	7	36.29	29.815	11.269	8.71	63.86	4	91
2000	3	29.67	29.535	17.052	-43.70	103.04	1	60
2001	1	1.00	.	.	.	.	1	1

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.076(a)	2	12	.372

a Groups with only one case are ignored in computing the test of homogeneity of variance for Duration of Enrollment.

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1100.855	3	366.952	.317	.813
Within Groups	13882.895	12	1156.908		
Total	14983.750	15			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	5	7.80
	1999	7	9.71
	2000	3	8.83
	2001	1	2.50

Test Statistics

	Duration of Enrollment
Chi-Square	2.205
df	3
Asymp. Sig.	.531

SUPPORTIVE SERVICES: COMORBID PSYCHIATRIC DISORDERS

Descriptives

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1998	71	41.01	69.721	8.274	24.51	57.52	1	339
1999	66	19.86	32.742	4.030	11.81	27.91	1	229
2000	17	16.41	29.392	7.129	1.30	31.52	1	114
2001	5	19.40	15.900	7.111	-.34	39.14	1	31

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
5.848	3	155	.001

Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18911.018	3	6303.673	2.300	.080
Within Groups	424788.076	155	2740.568		
Total	443699.094	158			

Ranks

	RX YEAR	N	Mean Rank
Duration of Enrollment	1998	71	82.62
	1999	66	80.05
	2000	17	66.91
	2001	5	86.60

Test Statistics

	Duration of Enrollment
Chi-Square	1.778
df	3
Asymp. Sig.	.620

SUPPORTIVE SERVICES: NO PSYCHIATRIC DISORDER

No child or adolescent without a psychiatric disorder received supportive services.

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