

**The Transition from Adolescence to
Adulthood on Medicaid:
Use of Mental Health Services**

Submitted to the Florida Agency for Health Care Administration

by the

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EXECUTIVE OVERVIEW

Transition from adolescence to adulthood presents major challenges for young people with mental health disorders. This vulnerable population must complete this complex change in life status as the institutional supports they have relied on previously are no longer provided through the same agencies or people. This report provides findings from an analysis of changes in Medicaid mental health service use among adolescents who have been diagnosed with mental disorders during the transition years from ages 12 to 23.

Medicaid enrolled youth in AHCA areas 4 and 6 were divided into age cohorts within three diagnostic categories: SED (serious emotional disturbance) SMI (severe mental illness) and less severe mental disorders. The age cohorts were followed across six years, and the pattern of service use revealed a dramatic drop-off in services received by those youth diagnosed SED between the ages of 17 and 18. Findings include the following:

- Service penetration increases slightly from ages 12 to 15, decreases substantially between ages 15 to 18, and then seems to increase slightly during early adulthood.
- The largest decreases in eligibility and service use occur during the transition years to adulthood between ages 17 and 18.
- 40% of the adolescents and young adults who did not receive mental health Medicaid services in the subsequent birth year remained Medicaid-enrolled. Less than 16% of these adolescents received services reported by other state contract providers of mental health services.
- Less than 3% of decline in service use could be attributed to mobility within the state of Florida in the population.
- Service penetration for users with an SED diagnosis decreased across key points of transition at a greater rate than those with an SMI diagnosis or Less Severe diagnosis.
- Service penetration for users with an SMI or Less Severe diagnosis increases in adulthood (ages 18 to 23), but levels off to almost zero for adolescents with an SED diagnosis.
- HLM analysis broadens this picture and suggests that there is greater continuity of care in Medicaid for adolescents with schizophrenia or bi-polar than for their SED counterparts.

Hierarchical linear modeling was used to model gender, race, and diagnosis differences across key points of transition for the youth identified in this study. The development and testing of models to examine these service trends provides a foundation for further study of the factors related to a decline in service use with a wider range of data sources and variables in future studies.

Policy Implications and Future Research Directions

Institutional support systems change or disappear for many adolescents who have needed mental health services previously as they make the transition to adulthood. Links to needed services must be constructed to support these adolescents because of their vulnerability. Procedures are needed that target adolescents while they are still in the children's Medicaid system and plan their transitions to alternative service plans under the adult system. Males who have a greater probability of dropping out of services should be specifically targeted within transition planning procedures. Further study is needed to define specific issues that need to be addressed regarding the disappearance of a diagnostic category as adolescents move from the children's system to the adult system. The characteristics and needs of the group who have SED diagnoses must be determined, and a path to mental health services that will meet these needs must be forged.

In the next phase of this study, attempts will be made to examine other sources of data like state education data, employment data, Florida juvenile justice data, Florida criminal justice data, and child welfare data. Information from these datasets will provide additional insight into the changes that occur in enrollment status and penetration rates. Factors that promote successful transition to appropriate mental health treatment as adolescents move to adulthood will be sought.

BACKGROUND

The Florida Agency for Health Care Administration (AHCA) contracted with the Louis de la Parte Florida Mental Health Institute to study patterns of use for mental health services for young clients on Medicaid in AHCA areas 4 and 6 during fiscal years 1994-2000 as they move through the transition years from childhood to adulthood. The “transition years” from adolescence to adulthood have been well documented as particularly challenging for all persons, and even more complex for persons with mental illnesses who rely on institutional services to provide assistance (Armstrong, 1995; Vander Stoep, Davis, and Collins, 2000). Changes in social expectations are great for adolescents as they transition from a place of dependence, in which they rely on families and social systems to provide them with food, shelter, education, and nurturance, to a place of independence in which they are now responsible for seeking post-secondary education, securing and maintaining a job, starting a family, and providing for their own food and shelter (Clark & Stewart, 1992; Vander Stoep, *et al*, 2000).

Within the context of a “typical” childhood, the support systems are primarily the family, neighborhood, and school. Little need arises for additional institutional support from child welfare, juvenile justice, or mental health. For those who struggle with poverty, emotional and behavioral difficulties, or physical disability, the need for institutional support is much greater. However, according to Davis and Vander Stoep (1997) “these systems often complicate the transition to adulthood further by terminating eligibility for services at a specific age that has been designated as signifying the end of childhood, while failing to ensure accommodation into the adult service systems or functional adult roles” (p. 400).

Included among the reasons why children have difficulty transitioning from adolescence to adulthood are both developmental and institutional factors. Vander Stoep, *et al*, (2000) distinguish between developmental transition and institutional transition, arguing that institutional transition represents changes in status as a result of legal or bureaucratic policy. Among the institutional factors, which this study addresses, are differences in Medicaid eligibility criteria for children and adults, differences in diagnoses used for children and adults, and differences in service provisions for children and adults that often result in a loss of appropriate and needed services. The more severe illnesses among children, classified in the Medicaid claims data for this study as Severe Emotional Disturbance (SED), include emotional, behavioral, and functional impairments like impulse disorder, severe behavioral disorder and attention deficit/hyperactivity disorder. The more severe diagnoses among adults are classified

in this study as Severe Mental Illness (SMI) and include major depression, schizophrenia and bipolar disorders. These three SMI diagnostic categories are less frequently applied to children, but those children who have these diagnoses will be tracked throughout the age categories.

Researchers and clinicians have found that many children diagnosed with severe emotional disturbance (SED) before the age of 18 do not fit the diagnostic criteria for an adult severe mental illness (SMI) such as schizophrenia. On the other hand, their need for services does not arbitrarily end at the age of 18. This has produced tremendous challenges for children and families as adolescents “age out” of eligibility for services (Davis and Vander Stoep, 1997; Vander Stoep, *et al*, 2000).

Organizationally, there are changes in the types of agencies that serve adolescents and young adults. Differences range from complete omission of service options in adulthood, to changes in the composition of the service array. Education, housing, and case management are among the top three areas in which large scale institutional changes occur. For adolescents, schools are one of the major providers and sources of referral to mental health and developmental services. However, these services and support systems cease to exist upon dropout or graduation from secondary school, which typically occurs before the age of 18. In the Medicaid system, adolescents change case managers at the age of 18, and may not receive the necessary continuity of care to appropriate adult services. Further, the developmental appropriateness of adult mental health services, through such programs as Medicaid, poses large scale challenges for many who do not have the skills with which to live independently.

The Medicaid system is a large public provider of services for persons with mental illnesses. Among children and adolescents it is estimated that between five and nine percent of the population need mental health services annually, and up to 28 percent of adults are in need (Friedman, Katz-Leavy, Manderscheid, *et al*, 1996; Robins and Regier, 1991). A number of studies detail factors associated with developmental transition, yet less is known about institutional transition, particularly within the Medicaid system. Platte, Kroner, and Ortiz (2000) note that youth in transition describe this as “moving from a cocoon-like environment into a fast-moving and very cold river (p. 92)”. The lack of institutional service options available to young adults, as well as different eligibility and diagnostic criteria, create many points at which adolescents “fall through the cracks” of institutional care.

The preliminary analyses for the study, which were presented in the preliminary report submitted last contract year (Snyder, Stiles, Lo, & Dailey, 2000), focused on the rate at which

service utilization patterns for persons with mental illness change in the Medicaid system during the transition years of 15 to 23. The results from the preliminary analyses provided evidence that there was a decrease in the number of people served during the transition years. Hence, it supports the concern that institutional policies contribute to difficulty in the transition years.

Specifically, the following was noted:

- ❑ Penetration, service utilization and the number of users decreased substantially between the ages of 15 to 18, and then began to level off during early adulthood.
- ❑ The largest decrease occurred between the ages of 17 and 18, which is a key point-of-transition from adolescence to adulthood.
- ❑ The number of adolescents with SED who used services decreased during the transition years at a greater rate than those with schizophrenia or bi-polar disorders.
- ❑ Among those in the SMI diagnostic category, the volume of service declined; however, the number of people remained fairly stable. This suggests that there may be greater continuity of care in Medicaid for adolescents with schizophrenia or bi-polar disorder than for their SED counterparts.
- ❑ Most adolescents identified as using a mental health service in FY 1994 between the ages of 15 and 18, were no longer receiving services in 1998.

The preliminary analyses revealed a decline in penetration rates for mental health services, as well as decreases in the volume of service. Finding reasons for the observed changes requires further exploration. Part of the decline may be attributed to mobility within the population. For some, movement out of the education or child welfare systems may contribute to changes in referral or access to services. For others, the decrease may be a result of changes in the classification of need. Children who were identified with SED during their adolescent years often do not fit the DSM-IV diagnostic criteria for adult SMI disorders, such as schizophrenia and bi-polar disorder, and as a result are not referred for treatment (Davis & Vander Stoep, 1997). In this phase of this study we further explore trends across expanded age categories showing that adolescents in the transition years have lower rates of service use than at other times in their lives. A hierarchical linear model is designed and tested to estimate the risk factors.

Hierarchical Linear Modeling (HLM) provides an opportunity to look at the aggregate effect of different covariates while controlling for confounding factors at the same time. A descriptive analysis of the data gives us an idea which factors may be potential covariates of mental health

service use in AHCA system, however statistical modeling controls for confounding factors and helps to see the effect of all the covariates together on mental health service use. Traditional multivariate analysis methods in longitudinal studies require complete information on every individual in this study. The AHCA data sets have information for the individuals while they are enrolled in the Medicaid system. The enrollment status in Medicaid has a unique trend for every adolescent and very few adolescents have continuous enrollment in the six years of data analyzed in this study. As a result, sparseness or missing values for individuals is introduced into the data. HLM has the ability to use 100% of the available data, even when some data points are missing for some individuals. Hence, HLM is more powerful tool in modeling than other multivariate analysis. In HLM change is represented in a two-stage model encompassing individual (within) and group (between) level effects (Greenbaum, Dedrick, & Friedman, 1993). HLM allows for estimation of individual level effects including individual starting points (intercepts) and trends (slopes). Since the individual level effects are taken into account, HLM is not only advantageous conceptually, but also provides useful information at individual level not typically available when using more traditional multilevel methods for analyzing risk factors. HLM is based on Bayes estimation where individual level information is supplemented with group level information.

GUIDING QUESTIONS

- 1) What is the change in the trajectory of service use for adolescents across different ages?
- 2) What are the changes in level of service across key points-of-change prior to and during the transition years between ages 12 and 23? The literature suggests that transition starts before 15 for many children. For this reason, the lower end of the age range for this study has been extended to age 12 to include pre-transition and early transition children.
- 3) What are the patterns of change in Medicaid eligibility as young people move from services provided by Medicaid to services provided by ADM (the Florida general revenue system)? What changes in Medicaid eligibility for older adolescents are evidenced by services for children that were previously provided under Medicaid now being provided by ADM rather than Medicaid?
- 4) What are the utilization patterns in each diagnostic category of children and young adults who are Medicaid-enrolled across the transition years?

- 5) What proportion of those children and young adults who were Medicaid enrolled moved and received services elsewhere (statewide search)? As adolescents reach 18, they often become mobile/transient as they attempt to find a fit in an adult society. This question is designed to reveal the extent to which attrition from the age-group cohorts is due to age-appropriate mobility where services are actually continued in a new location rather than simply due to disappearance from treatment.
- 6) What proportion of children and young adolescents who were identified with SED before age 18 but did not fit the DSM-IV diagnostic criteria for adult SMI disorders at the age of 18 lost Medicaid eligibility?
- 7) Using hierarchical linear modeling analysis across the transition age categories:
 - a) What is the relationship between specific covariates and eligibility and utilization outcomes for those in the transition years?
 - b) What factors can be used to predict successful transition from mental health treatment as an adolescent to treatment as an adult within the Medicaid mental health system?
 - Two outcomes will be the focus of the HLM analysis:
 1. Person remains Medicaid enrolled across key points of transition with no use of MH services.
 2. Person remains Medicaid enrolled across key points of transition with continued use of MH services.

RESEARCH DESIGN & METHODS

Study Population. The population selected for this study included children and young adults in the transition years between ages 12 and 23 who were enrolled and received mental health services in Medicaid in AHCA areas 4 and 6 from 1994 to 2000. Only those who had a diagnosis attached to their claims were included in the study population.

Datasets. The research questions were answered using multiple data sets. These datasets included comprehensive Medicaid eligibility, claims and encounter records for Areas 4 and 6 (1994-2000); statewide Medicaid mental health demographics and claims (1998-2000); and statewide public behavioral health (ADM Integrated Data System) certification and event records for fiscal years 1996-2000.

Defining SED & SMI. Diagnostic groups for mental illness were defined based on those commonly found among children with serious emotional disturbance (SED) and those with adult

severe mental illness (SMI). For this analysis, SED was defined as any of the following DSM-IV diagnoses: impulse disorder (DSM code = 312), severe behavioral disorder (DSM code = 313), and attention deficit/hyperactivity disorder (DSM code = 314). Typically, diagnosis for a child with SED is based on several factors, including performance in school, functional skill level, and social interaction skills. For purposes of this study, the DSM-IV diagnoses serve as a proxy. The adult SMI category was defined as either of the following DSM-IV diagnoses: major affective disorder (DSM code = 296) and/or schizophrenia (DSM code = 295). A person was placed in the “Less Severe” diagnostic category if the mental health diagnosis on a claim did not fall into either of the above groups.

Analytical Procedures. The Florida Medicaid claims and eligibility data from 1994-2000 for AHCA Areas 4 and 6 were examined to determine the pattern of mental health service utilization by children and young adults in the transition years between ages 12 and 23. Service utilization patterns also were examined in ADM Integrated Data System mental health events data.

Hierarchical Linear Modeling (HLM) was used to estimate the risk factors associated with transitioning to adulthood. In the HLM framework, service utilization (outcome variable) was analyzed using a multilevel model encompassing both within- and between-subject factors. The multilevel model included a Level 1 model (within-subject) and a Level 2 model (between-subject). Potential covariates tested in the model included diagnosis, race, and gender. In the Level 1 model, each person’s observed service use (1=service received, 0=service not received) was modeled as function of the age of the child when he/she received services (i.e., within subjects) plus random error. The resulting growth curves show the patterns of service use across the time period for which each child was Medicaid enrolled. These growth curves become outcomes to be analyzed in the Level 2 model. In the Level 2 model, the parameter estimates (e.g. the slopes) describe the group trend lines, and are tested for between group differences (i.e., gender, race and diagnosis). The specific HLM analysis performed for this report involved all six waves (years) of data with diagnosis category, gender and race as between-subject factors. In the HLM analysis all subjects were included even though many did not receive services across all six years. The best-fitted model was chosen for the data. Interactions between the covariates could not be tested at this point in time due to complexity of the analysis and sparseness of the data. Consultation on HLM was provided by Eric C. Brown and Paul E. Greenbaum of the

Department of Child and Family Studies at the Louis de la Parte Mental Health Institute of the University of South Florida.

In the proposal for this study, we originally planned to look at a third outcome, specifically, whether a person is no longer a Medicaid enrollee at key points of transition. We could not perform these analyses, because we did not have adequate indicators available within the data regarding what caused a child to be eligible for Medicaid enrollment. Hence, at this point in time we do not know how many children were eligible to be enrolled at a given period in time (the denominator).

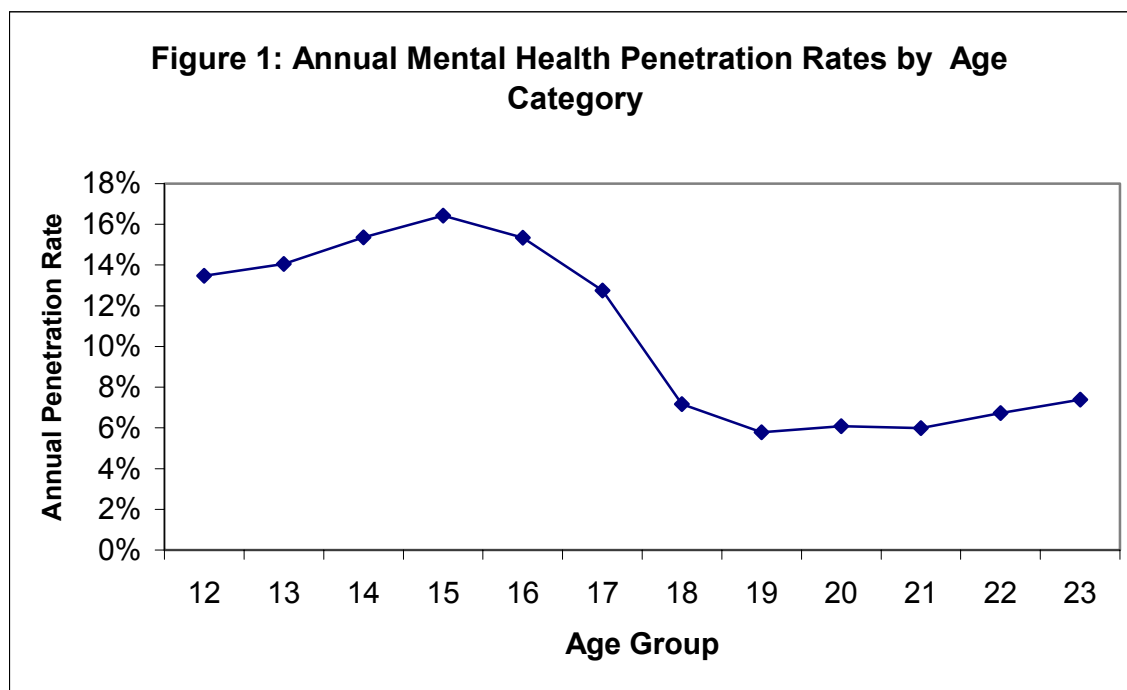
FINDINGS

Questions 1 and 2

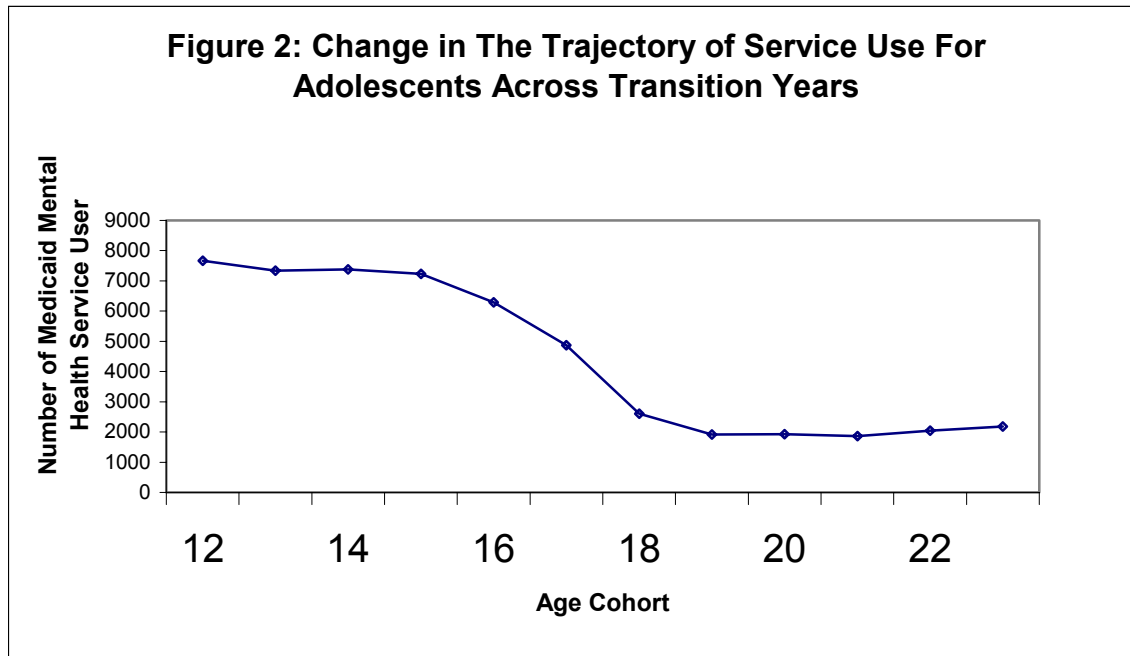
What are the changes in level of service across key points-of-change prior to and during the transition years between ages 12 and 23?

What is the change in the trajectories of service use for adolescents across different ages?

All claims and encounter records for all Medicaid recipients ages 12-23 using mental health services in ACHA areas 4 and 6 during the fiscal years 1994-1999 were combined and divided into age-year categories based upon age calculated within each fiscal year. An unduplicated annual count of mental health service users in each age category was calculated and compared with the total number of enrollees in each age category to obtain annual service penetration rates for each age category. Throughout the six years of data examined, persons could be reflected in multiple age categories. Figure 1 displays the results of these calculations. There is a slight increase in service penetration rates from age 12 to age 15. However, there is a clear decrease in service penetration from age 15 to age 18 (almost 62%) with a decrease of almost 44% between the ages of 17 and 18. After age 18, the service penetration rates level off and seem to rise slightly over subsequent age groups.



The numbers of mental health service users regardless of service type are presented in Figure 2. There is a clear decrease in number of mental health service users as age increases from age 12 to age 19 where it plateaus, and then there is a slight increase over subsequent age groups.



The curve from age 15 to age 23 is very similar to the curve for penetration rates.

However, the total enrolled decreased by 39% (45033 to 27398) from age 12 to age 18, whereas the number of service users declined by 66% (7664 to 2608) over the same age range. This suggests that the number of users is declining at a higher rate than that seen for the number of Medicaid enrollees. This implies that service access is lower as adolescents reach the transition years of 18 and 19.

Question 3

What are the patterns of change in Medicaid enrollment as young people move from services provided by Medicaid to services provided by ADM (the Florida general revenue system)? What changes in Medicaid enrollment for older adolescents are evidenced by services for children that were previously provided under Medicaid now being provided by ADM rather than Medicaid?

The rate of decline in mental health service was calculated for each age cohort. The proportions of users in each age cohort who do not use services in the following age-year

(“Dropouts”) ranged from 43% to 71%. The highest rate of attrition in this year’s analysis was between 17 and 19 years of age. The service utilization patterns for the adolescents who did not use services in the following age year were also examined in the ADM Integrated Data System mental health events data. For those who remained enrolled after the subsequent age-year of no service utilization in Medicaid, the service utilization in ADM varied from 18% to 39%. The proportion of service use in ADM was lowest between ages 18 and 19 years of age. This again brings us to infer that transition years from childhood to adulthood have the lowest mental health service utilization within the studied age ranges. The proportion of those who had no service utilization in Medicaid but moved to ADM was even lower and varied from 6% to 15%. These findings are displayed in Table 1.

Table 1: Proportions Of Users In Each Age Cohort That Move From Services Provided By Medicaid To Services Provided By ADM In The Following Year

Transition Year	% Who “Dropout” of Services	% Who Remained Enrolled At Subsequent Year Of “Dropouts”	% Who Used Services In ADM Only Out Of Those Who Were Enrolled At Subsequent Year	% Who Used Services In ADM Only Out Of All “Dropouts”(Whether Medicaid Enrolled Or Not)
12 to 13	43%	40%	37%	15%
13 to 14	43%	40%	39%	15%
14 to 15	46%	40%	32%	13%
15 to 16	55%	39%	26%	10%
16 to 17	58%	37%	25%	9%
17 to 18	71%	33%	21%	7%
18 to 19	70%	31%	18%	6%
19 to 20	64%	35%	24%	8%
20 to 21	64%	31%	26%	8%
21 to 22	61%	34%	26%	9%
22 to 23	59%	30%	33%	10%

The types of services transitioning adolescents were using that were captured in the ADM Integrated Data System are presented in Table 2. Thirty-six percent were outpatient services, 11% were TASC (a substance abuse program) services, and 10% were case management services.

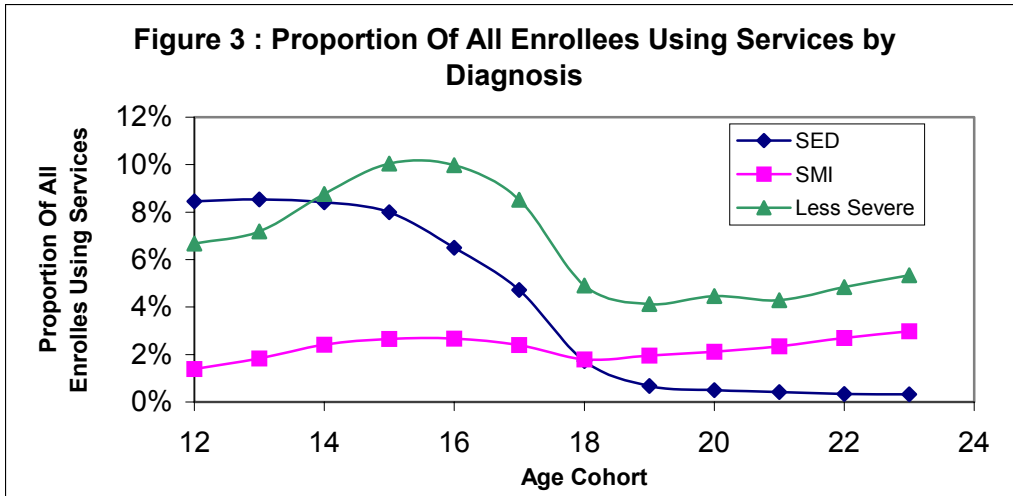
Table 2: Proportion and Types of Services Received in ADM (1996-2000)

Types Of Service	Proportion of total adolescent who received services in ADM
Outpatient	36.0%
TASC (a substance abuse program)	11.0%
Case Management	10.0%
Intervention	8.0%
Assessment	7.0%
In-Home	5.0%
Medical Service	5.0%
Crisis Support / Emergency	4.0%
Crisis Stabilization	3.0%
Intensive Case Management	3.0%
SA Detox	3.0%
Preventive/Intensive Day treatment	1.0%
Residential Level1	1.0%
Other Services	2.0%

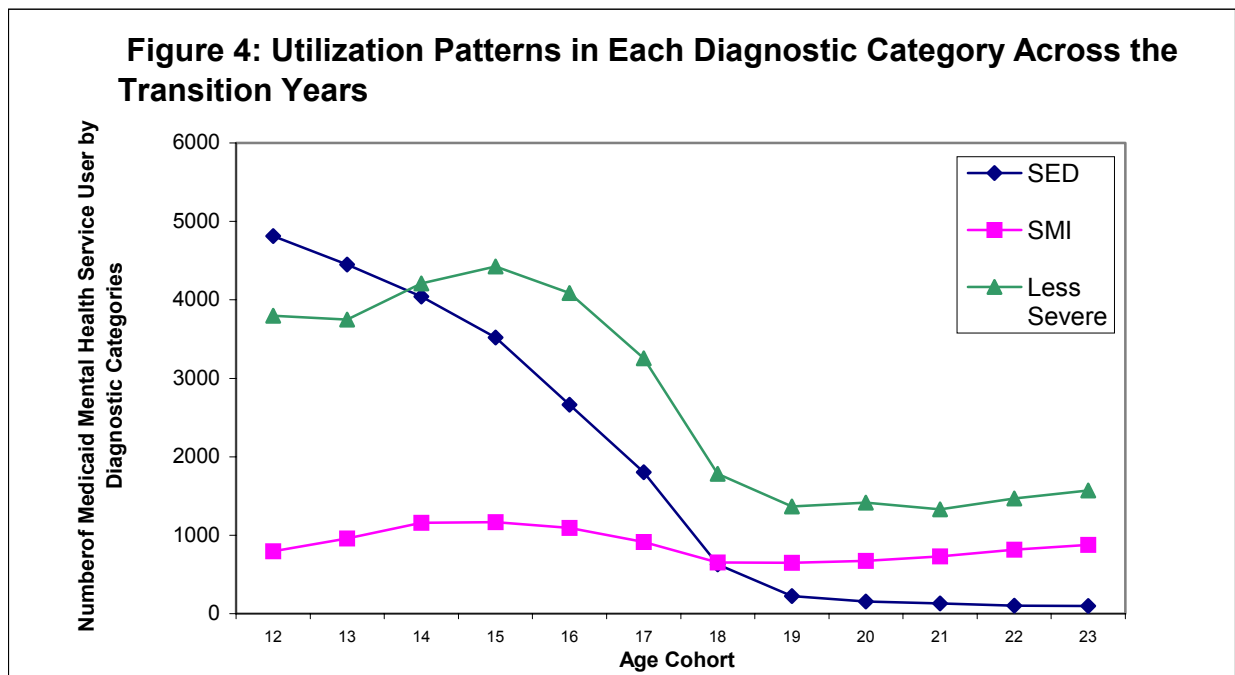
Question 4

What are the utilization patterns in each diagnostic category of children and young adults who remain Medicaid-enrolled across the transition years?

All service claims within each age category were portioned into three broad diagnosis categories (SED, SMI, less severe) based upon the diagnosis on each service record. A person could have received multiple diagnoses and thus be counted in more than one diagnostic type within an age category. An unduplicated annual count of mental health service users in each diagnostic category for an age group was calculated and compared with the total number of all enrollees in the age group to obtain the proportion of enrollees using services by diagnosis for each age category. The results are displayed in Figure 3. The proportion of all enrollees using services decreases across all age cohorts for SED. The proportion increases from age 12 to age 15 and then decreases till age 19, but it increases again in later age cohorts for those categorized less severe by their diagnosis. For adolescents diagnosed as SMI, the proportion of all enrollees using services increases from age 12 to age 15 and then decreases till age 18; however, it increases slightly again from age 18 to age 23. Nevertheless, the proportion of all enrollees using services for SMI is fairly consistent at around 2% - 3% across all age groups.



The number of users in each age category partitioned by the type of mental health service used is displayed in Figure 4. The trends for each diagnosis category are very similar to the trends of penetration rates in each diagnosis category. This suggests that there is a decline in service use in the transition years of age 17 to 18 for those with diagnoses on the service record that are classified as SED or Less Severe within this study. This also suggests that the adolescents receiving services in their early years may not successfully transition into the adult mental health service system.



Question 5**What proportion of those children and young adults who were Medicaid enrolled moved and received services elsewhere (statewide search)?**

Medicaid statewide data were available only for fiscal years 1998-99 and 1999-00. To reveal the extent to which attrition from the age-group cohorts is due to age-appropriate mobility where services are actually continued in a new location rather than simply to disappearance from treatment, the fiscal years 1997-98 and 1998-99 were considered as baseline data and searched in statewide claims files for follow-up in the fiscal years of 1998-99 and 1999-00. It was observed that 1% to 3% (average of less than 2%) of adolescents actually continued in a new location rather than simply disappeared from treatment. Table 3 shows the breakdown, and the proportions are evenly distributed in all the age cohorts.

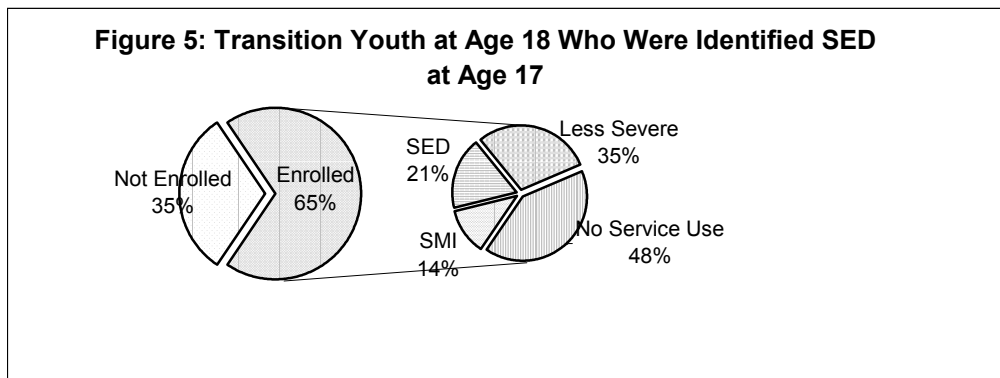
Table 3: The Frequency of Children Located in a Statewide Search

Transition Years	Number in the First Age Year	Frequency of "Drop-out" in the Subsequent Age Year	Proportion of Those in the First Year	Frequency Who Used services Elsewhere in state	Proportion of "Drop-out"
12 to 13	3179	1552	49%	48	3%
13 to 14	3010	1331	44%	23	2%
14 to 15	2903	1311	45%	20	2%
15 to 16	2759	1351	49%	24	2%
16 to 17	2514	1393	55%	19	1%
17 to 18	1874	1249	67%	13	1%
18 to 19	1029	658	64%	6	1%
19 to 20	715	437	61%	14	3%
20 to 21	737	454	62%	5	1%
21 to 22	645	386	60%	12	3%
22 to 23	698	408	58%	11	3%

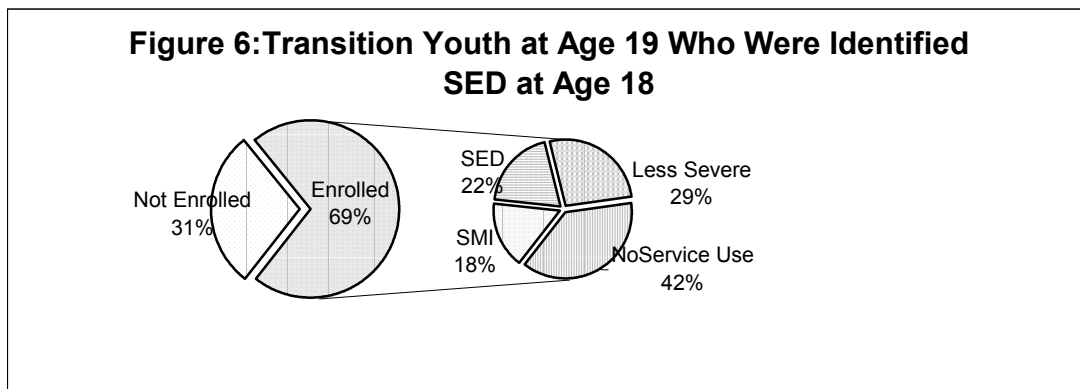
Question 6

What proportion of children and young adolescents who were identified with SED before age 18, but did not fit the DSM-IV diagnostic criteria for adult SMI disorders at the age of 18 lost Medicaid eligibility?

Of 1454 children and young adolescents who were identified with SED before age 18, 65% (951) were still enrolled at the age of 18. Of those who were still enrolled (951) at the age of 18, 14% (130) were identified to fit the DSM-IV diagnostic criteria for adult SMI disorders, 35% (330) were classified as less severe, 21% (201) were still classified as SED, and 48% (455) did not use any services at all. The results are presented graphically in Figure 5.



Similar analysis was done to identify the proportion of children and young adolescents who were identified with SED at age 18, but did not fit the DSM-IV diagnostic criteria for adult SMI disorders at age 19. Of 501 children and young adolescents who were identified with SED at age 18, 69% (347) of these were still enrolled at the age of 19. Of those who were still enrolled (347) at the age of 19, 18% (62) were identified to fit the DSM-IV diagnostic criteria for adult SMI disorders, 29% (102) were classified as less severe, 22% (75) were still classified as SED, and 42% (145) did not use any services at all. These results are given in Figure 6.



Question 7**Hierarchical linear modeling analysis across the transition age categories:**

- a. What is the relationship between specific covariates and eligibility and utilization outcomes for those in the transition years?**
- b. What factors can be used to predict successful transition from mental health treatment as an adolescent to treatment as an adult within the Medicaid mental health system?**

Two outcomes were the focus of the HLM analysis:

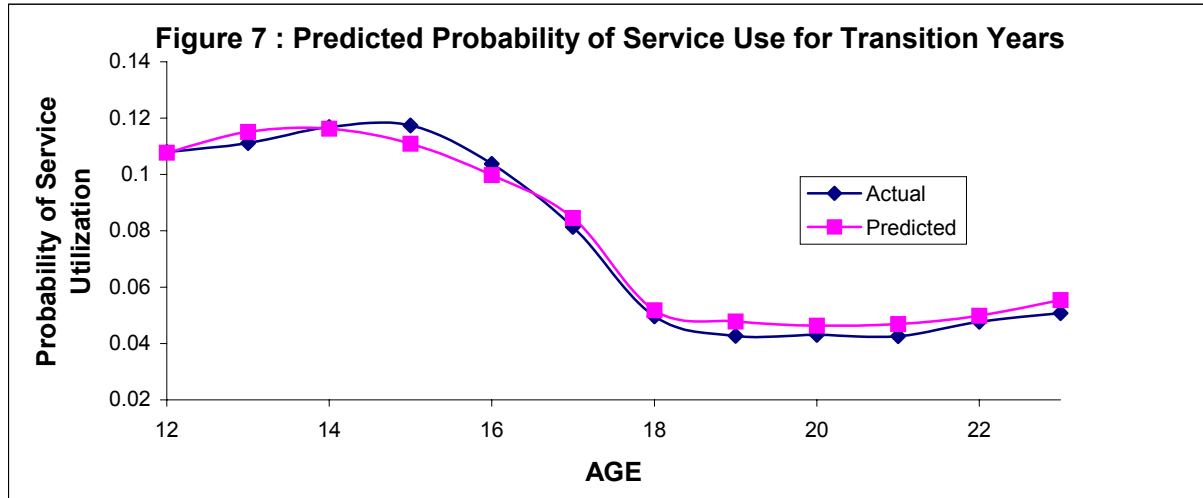
- 1. Person remains Medicaid enrolled across key points of transition with no use of MH services.**
- 2. Person remains Medicaid enrolled across key points of transition with continued use of MH services.**

Hierarchical linear modeling (HLM) provides an opportunity to look at the aggregate effect of different covariates while controlling for confounding at the same time. Service use was modeled as function of the age of the child and potential covariates (diagnosis, race, and gender). HLM consisted of Level 1 and Level 2 models encompassing both within- and between-subject factors. In the Level 1 model, age was parameterized as a piece-wise growth function with an inflection point at age 18. Furthermore, another variable representing discontinuity in growth curve trajectories was introduced in the model. Age was further mean-centered at 17 to see the effect of age at transition, (before age 18 versus after age 18) on probability of service utilization. Age was further broken into two segments of under age 18 and over age 18.¹ The effect of age was observed to be quadratic instead of linear. A significant effect on service use (outcome) was observed for average use at age 18 and discontinuity of care at age 18. The Level 1 model is described in Appendix A.

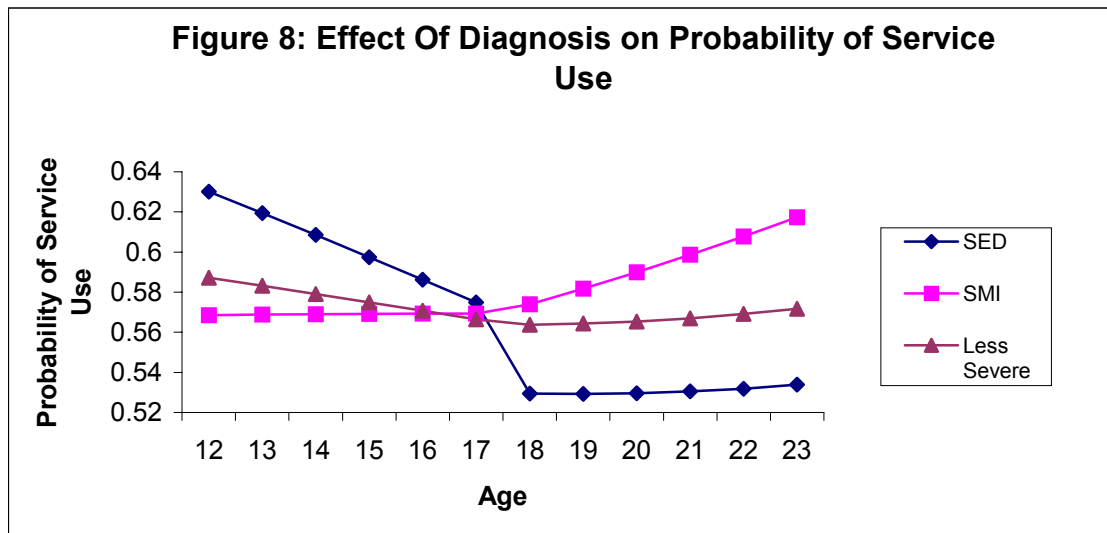
The predicted values for age were plotted; the results are presented in Figure 7. The plot shows that predicted values are very close to the actual probability of service utilization for each age group. The plot also shows that use of mental health services increases significantly from ages 12 to 15 and then decreases significantly with age until age 18 and then starts to show a significant, yet slight increase from ages 19 to 23. The probability of mental health service use in

¹ The first segment of age was parameterized as 0: age=17; -1: age=16; -2: age=15; -3: age=14; -4: age=13; -5: age=12 and 0: and age>17. The second segment of age was parameterized as 1: age=18 ; 2: age=19; 3: age=20; 4: age=21; 5: age=22; 6: age =23; and 0: age<18.

Medicaid falls tremendously as the adolescent reaches transition age, and the probability in the adolescent years is much higher than in the adult years. This confirms that persons in transition years from adolescence to early adulthood experience some discontinuity of care, which may be due to a decrease in access and service delivery during transition years.



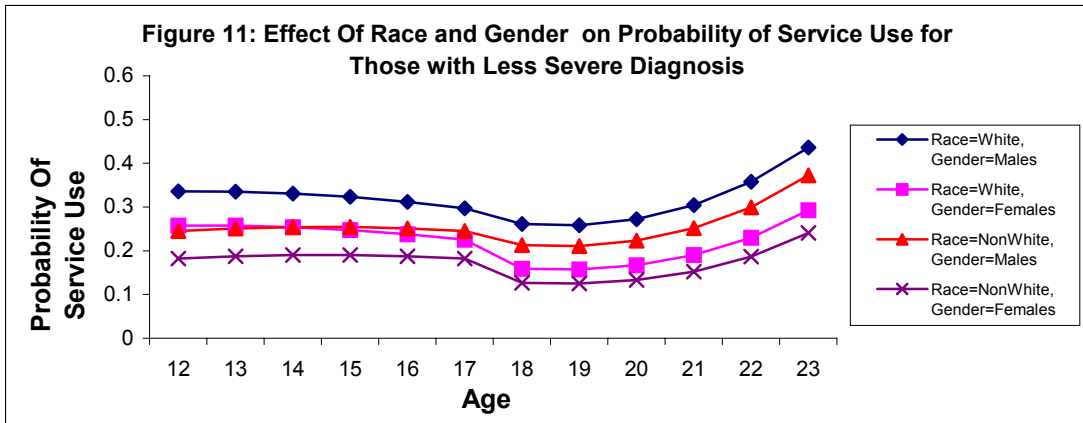
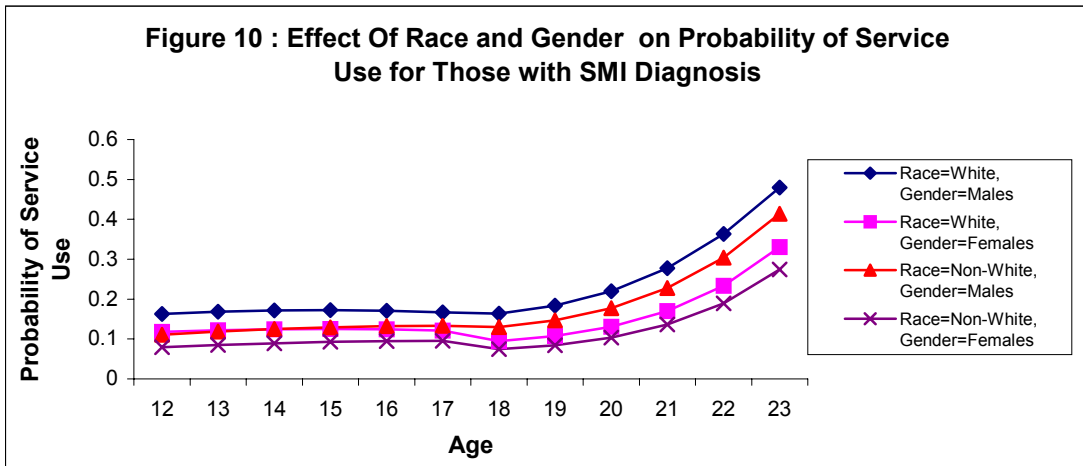
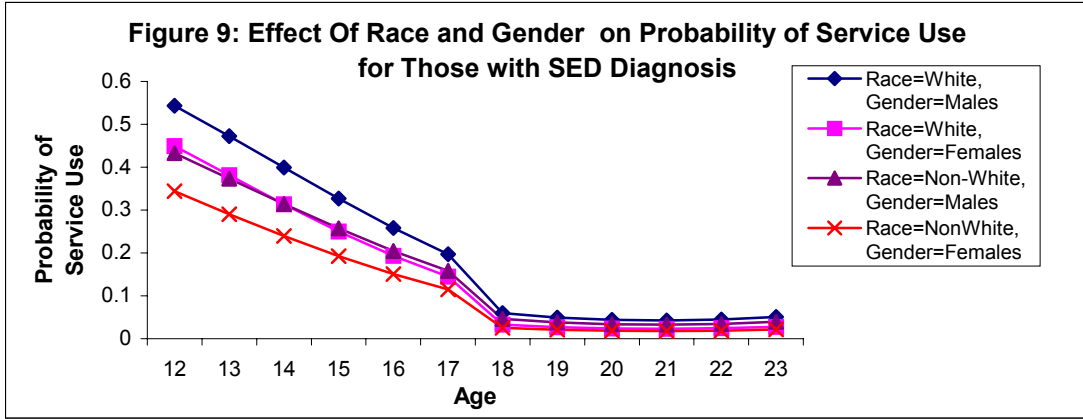
The Level 2 model in the analysis tested between-subject covariates. The effect of diagnosis on the individual claim records was first tested as Level 2 variable. Level 1 growth parameters were regressed on diagnosis, race and gender to see the impact of covariates on changes in service use over time (i.e. individual trajectories). Diagnosis was categorized into three categories SED (1=yes, 0=no), SMI (1=yes, 0=no), and Less Severe (1=yes, 0=no). The effect of diagnosis is presented in Figure 8.



The plot reveals that for adolescents with SED diagnosis there is a significant sharp decrease in probability of service use from ages 12 to 17 and there is also a significant service gap or discontinuity of service use between ages 17 and 18. However, an SED diagnosis does not significantly affect the model beyond age 18. A diagnosis classified SMI does not significantly affect service use before age 18 and there is no significant service gap or discontinuity of service use between ages 17 and 18. However, for those with an SMI diagnosis, there is significant increase in service use beyond age 18. For adolescent and youth categorized as “Less Severe” there is a significant, yet slight, decrease in probability of service use from ages 12 to 17 and there are no significant service gaps or discontinuity of service use between ages 17 and 18. However, there is a significant small increase in service use beyond age 18.

In broader terms, the analysis indicates that adolescents diagnosed with SED in their early years have a very low probability of service use in their adult years; and during the transition years, they do have a discontinuity of care as they reach adulthood. In contrast, the adolescents diagnosed with SMI in their early years are more likely to continue to receive services in their adolescent years and during the transition years without a discontinuity of care. These adolescents also have a higher probability of service use in their adult years.

The covariates race (1=white, 0=other) and gender (1=M, 0=F) were tested in the Level 2 model controlling for the effects of the diagnostic variables. The results are plotted in Figures 9-11 for each of the diagnostic variables. At age 17, males had a higher overall probability of mental health service use than females, and whites had a higher overall probability of mental health service use than non-whites. Gender significantly impacts the probability of a service gap or discontinuity; males had a higher gap in service use during transition from age 17 to 18 than females. Race does not significantly affect the gap in service use or discontinuity. Race and gender significantly affect change in service use before age 18; however, they do not have a significant effect on change in service use beyond age 18. Before age 18, there was a significantly greater decrease in service use for whites than for non-whites for all the three diagnosis variables. Also, before age 18 there was a slightly greater significant decrease for males than females in all the three diagnosis variables.



The final model, which had diagnosis, race, and gender, as Level 2 covariates was chosen, and detailed results are presented in Appendix A. The model shows that race and gender have a significant impact on mental health service use and discontinuity of service during transition years from childhood to adulthood. Race and gender may be predictors of probability of service use or they may be correlated to the other unknown and untested predictors of service use.

DISCUSSION

The study addresses questions about the rate at which service utilization for persons with mental illness in the Medicaid system change during the transition years of 12 to 23. Typically these years are very difficult for adolescents who move from a state of dependence to state of independence. It is even more difficult among those who rely on institutional services to provide assistance with behavioral and emotional challenges (Armstrong, 1995; Vander Stoep, *et al*, 2000).

The literature suggests that both developmental and institutional factors contribute to difficult transitions from adolescence to adulthood (Vander Stoep, *et al*, 2000). Institutional factors include changes in status as a result of legal or bureaucratic policy. Often public policies stipulate changes in service options based on age rather than on need, and these institutional factors directly affect access to care and coordination of care. The results from the preliminary analyses provided evidence that there was a decrease in the number of people served during the transition years. Hence, they support the concern that institutional policies contribute to difficulty in the transition years.

The current study extends these findings, providing strong evidence about the decreases in the number of people served during transition years and developing stronger statistical models that can be used to examine factors related to the drop in service use. Through analytic and modeling strategies the following observations were made about the mental health service use among adolescents and youth in the Medicaid system:

- Penetration, service use, and number of users increases slightly from ages 12 to 15, decreases substantially between ages 15 to 18, and then seems to increase slightly during early adulthood.
- The largest decreases in eligibility and service use occur during the transition years to adulthood between ages 17 and 18.
- Of adolescents and young adults who did not receive mental health Medicaid services in the subsequent birth year, 40% or less were still enrolled. Approximately, 15% or less of these adolescents received services reported in ADM. Most of the services provided in ADM were outpatient services.

- Less than 3% of decline in service use could be attributed to mobility within the state of Florida in the population.
- Penetration, service use, and number of users with SED diagnosis decreased across key points of transition at a greater rate than those with an SMI diagnosis or Less Severe diagnosis.
- Penetration, service use, and number of users with an SMI or Less Severe diagnosis increase in adulthood (ages 18 to 23), but they level off to almost zero for adolescents with an SED diagnosis.
- HLM analysis broadens this picture and suggests that there is greater continuity of care in Medicaid for adolescents with schizophrenia or bi-polar than for their SED counterparts.

It is apparent that many young people who are diagnosed with mental health disorders do not continue with mental health treatment initiated during the adolescent years. Those with SED diagnoses follow a quite different trajectory than those with SMI or less severe diagnoses. We have noted in this study that there is a distinct decline in penetration rates for mental health services. The decline is significant and sharp for adolescents diagnosed with SED in their earlier years. These children who are identified with SED during their adolescent years often do not fit DSM-IV diagnostic criteria for adult SMI diagnosis, such as schizophrenia and bi-polar disorder, and as a result are not referred to treatment in their adulthood. (Davis, Vander Stoep, 1999).

Since the diagnoses that are included in the SED category in this analysis are primarily age-specific diagnoses, it is possible that some adolescents “age-out” of the need for services for SED. However, that is inadequate to explain a decline of the magnitude observed. It is more reasonable to suggest that many of these youth continue to need some mental health services as they adjust to independent living beyond the protective environment provided during their school years. An alternative explanation that must be considered is the possibility that many youth are inappropriately diagnosed SED during their school years. These issues have not been addressed in this analysis and remain for further exploration.

Less than 3% of the decline in service use is attributed to mobility within the state of Florida within the population. A decline in enrollment status for adolescents is also observed. This indicates that some children lose their Medicaid enrollment status during the transition years; however, the variety of possible reasons for their status change cannot be ascertained from

the data available in this study. Less than 15% of adolescents who do not receive mental health services in Medicaid in their subsequent birth year receive services in ADM, and these services were primarily outpatient services. For some children, movement out of the education or child welfare system may contribute to changes in referral or access to system resources. For others, movement into the juvenile justice system or criminal justice system may account for the decline seen for enrollment and service users in the Medicaid system.

The HLM model provides the aggregate effect of gender, race and diagnosis on service use as a function of age while controlling for confounding by these covariates. HLM analysis strengthens the conclusion from descriptive analysis of this report that there is greater continuity of care in Medicaid for adolescents with schizophrenia or bi-polar than for their SED counterparts. The final Model also reveals that whites use services more frequently than non-whites. Service patterns for both groups reveal a decline in services through the transition years; however, while non-whites drop out from services in Medicaid at a greater rate than whites, the differences in the rates of dropout are not significantly different. In contrast, the analyses reveal that males use services more frequently than females. Service patterns for both genders reveal a decline in services through the transition years; however, males drop out from services in Medicaid at a significantly greater rate than females. It can be concluded from the model that race and gender have a significant impact on mental health service use and discontinuity of service during transition years from childhood to adulthood. Race and gender may be predictors of probability of service use or they may be correlated to the other unknown and untested predictors of service use.

POLICY IMPLICATIONS

As young people in need of mental health services move from adolescence to their adult years, some support systems on which they have depended are no longer available to them. Links must be constructed to available mental health services for these adolescents. Because of the vulnerability of this population, supports must be in place to complete the links to new services. Availability of mental health services alone is not sufficient.

- Procedures are needed that target adolescents while they are still in the children's Medicaid system and plan their transitions to alternative service plans under the adult system.

- The needs of males who have a greater probability of dropping out of services than females should be specifically targeted within transition planning procedures.
- Further study is needed to delineate the issues that need to be addressed regarding the disappearance of a diagnostic category as adolescents move from the children's system to the adult system. The characteristics and needs of the group who have SED diagnoses must be determined, and a path to mental health services that will meet these needs must be forged.

FUTURE DIRECTIONS

In the next phase of this study we plan to explore the enhancers of, and barriers to, mental health service use during these transition years. We will attempt to examine other sources of data dependent on acquisition and access to external datasets like state education data, employment data, Florida juvenile justice data, Florida criminal justice data, and child welfare data. Only one type of mobility was captured in the current study; that is, mobility of those who remain Medicaid enrolled but relocate within the state of Florida. These additional datasets represent other systems within which we may chart the patterns for transitional age young people. Collectively, information from these datasets may explain more completely why the changes occur in eligibility status and penetration rates. They may also be able to identify the factors that may promote successful transition for mental health treatments as adolescents move to adulthood. These datasets can be linked using either unique identifiers or probabilistic matching (if a common identifier is not available within some datasets). This may allow us to match people across systems using probability estimates to assure a specified percentage of accuracy.

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APPENDIX A: Statistics For the HLM Model**Level-1 model:**

Service Use = (β_0) *(Average use at 18) + (β_1) * (Linear change from ages 12-17) + (β_2) *(Curvi-linear change from ages 12-17) + (β_3) *(Linear change from ages 18-23) + (β_4) * (Curvi-linear change from ages 18-23) + (β_5) * (Service gap at age 18) + Random Error

Level-2 model:

Fixed Effect	Coefficient	Standard Error	T-ratio	P-value
For Average use at 18 (β_0)				
Intercept	-4.614048	0.031281	-147.501	<0.0001
SED	2.569785	0.047535	54.061	<0.0001
SMI	2.367074	0.053880	43.932	<0.0001
Less Severe	3.114379	0.031242	99.685	<0.0001
Gender	0.374750	0.034993	10.709	<0.0001
Race	0.265309	0.034183	7.761	<0.0001
For Linear Change from ages 12-17 (β_1)				
Intercept	-0.030743	0.020224	-1.520	0.128
SED	-0.321170	0.014346	-22.387	<0.0001
Less Severe	-0.041238	0.01748	-3.510	0.001
Gender	0.024914	0.011052	2.254	0.024
Race	-0.035693	0.010620	-3.361	0.001
For Curvi-linear Change from ages 12-17 Intercept (β_2)				
Intercept	0.008313	0.003479	2.390	0.017
For Linear Change from ages 18-23 Intercept (β_3)				
Intercept	-0.332649	0.039298	-8.465	<0.0001
SMI	0.345471	0.020827	16.588	<0.0001
Less Severe	0.191640	0.011718	16.354	<0.0001
Gender	-0.023442	0.018760	-1.250	0.212
Race	0.025076	0.015690	1.598	0.110
For Curvi-linear Change from ages 18-23 Intercept (β_4)				
Intercept	0.042492	0.005365	7.920	<0.0001
For Service Gap at Age 18 (β_5)				
Intercept	-0.332063	0.071995	-4.612	<0.0001
SED	-0.981624	0.079008	-12.424	<0.0001
Gender	0.250283	0.072355	3.459	0.001
Race	0.009129	0.066993	0.136	0.892

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