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**Psychotropic Medication and Psychosocial Service Use among Individuals with Autism Spectrum Disorder**  
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<b>Corresponding Author:</b>	Emma Plourde US Department of Health and Human Services Washington, District of Columbia UNITED STATES
<b>First Author:</b>	Emma R. Plourde, BS
<b>Order of Authors:</b>	Emma R. Plourde, BS Mir M. Ali, PhD Kristina D. West, MS, LLM
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### **Abstract**

People with autism spectrum disorder (ASD) experience high rates of psychotropic medication utilization and barriers to psychosocial services, yet limited literature explores use of these services and the association between a mental health condition (MH) and use. Using national multi-payer claims data, this study estimates a multinomial logistic regression model to discern psychotropic medication and psychosocial service use among transition age youth (TAY) with ASD (12-26 years; N = 52,083) compared to a matched cohort of those without ASD (12-26 years; N = 52,083). Approximately one third of TAY with ASD and no MH condition receive only psychotropic medication and the likelihood of using both psychosocial services and medication is higher only when TAY with ASD have a co-occurring MH condition.

*Key Words:* Autism Spectrum Disorder, psychotropic medication, psychosocial services, transition age youth, adolescents, young adults

## **Psychotropic Medication and Psychosocial Service Use among Transition Age Youth with Autism Spectrum Disorder**

An estimated 1 in 44 children have Autism Spectrum Disorder (ASD), a neurodevelopmental disability that impacts communication, social interaction, learning, and behavior (Centers for Disease Control and Prevention, 2022a; American Psychiatric Association, 2013). ASD is highly heterogenous, with high rates of co-occurring mental health conditions, and variation in need for supports and services (Davignon et al., 2018; Croen et al., 2015). Among youth with ASD, some of the most common co-occurring mental health conditions include attention deficit hyperactivity disorder, anxiety and mood disorders, oppositional defiant disorder, and obsessive-compulsive disorder (Rosen et al., 2018; Davignon et al., 2018). Individuals with ASD may receive psychotropic medication and/or psychosocial services to manage or improve behaviors associated with ASD or for co-occurring mental health conditions (Centers for Disease Control and Prevention, 2022b; DeFillips et al., 2016). Applied Behavior Analysis, Cognitive-Behavior Therapy, Speech and Language Therapy, and Relationship Developmental Intervention, are some psychosocial interventions that can be delivered to enhance daily functioning and quality of life among individuals with ASD (Centers for Disease Control and Prevention, 2022b). These treatments can be delivered in education, health, community, home settings, or a combination of settings.

Psychotropic medication, which affects behavior, mood, thoughts, or perceptions, is commonly used to treat behavioral and psychiatric disorders (National Institute of Mental Health, 2016). Currently, risperidone and aripiprazole are the only psychotropic medications approved by the Food and Drug Administration for treatment of irritability associated with ASD (DeFilippis et al., 2016; Rosen et al., 2017; Food and Drug Administration, 2012; Food and Drug Administration, 2018a). Providers must also monitor psychotropic medication use in patients, as

psychotropic medication may lead to adverse short-term and long-term side effects (National Institute of Mental Health, 2016). According to the National Institute of Mental Health (2016), psychosocial services or alternative treatments to psychotropic medications should be tried first for children and adolescents, and if psychotropic medication is necessary, psychosocial services should be delivered concurrently with psychotropic medication.

Research indicates individuals with ASD have higher rates of psychotropic medication prescriptions compared to non-autistic individuals after controlling for characteristics such as co-occurring mental health conditions, age, gender, and intellectual disability (Madden et al., 2017; Esler et al., 2019). Use of psychotropic medication, including psychotropic polypharmacy, have increased over time among children and adolescents with ASD (Schubart et al., 2013). Despite the high prevalence of co-occurring mental health conditions experienced by people with autism, several patient-provider and systems-level barriers to psychosocial services exist, including lack of clinician training and knowledge of autism, lack of coordination across developmental disabilities and mental health systems, and costs associated with treatment (Maddox et al., 2020).

Although past literature has indicated high rates of psychotropic medication and barriers to psychosocial services for individuals with autism exist, limited literature explores both psychotropic medication and psychosocial service use within the same sample. For example, the literature has shown that a majority of youths with ASD and a mental health diagnosis are prescribed multiple classes of psychotropic medication, and the rate of prescribing is higher among youths with ASD in inpatient mental health facilities (McLaren et al., 2021; Scheifes et al., 2013). However, this literature focused only on youths with ASD and a mental health condition and lacked comparison with youths with ASD but no mental health condition. In addition, this literature did not examine the use of psychosocial services. Further research is

needed to understand co-occurring mental health conditions and psychotropic medication utilization specifically among transition age youth (TAY) with ASD, as the age of onset for most mental health conditions occurs during adolescence and young adulthood (Davignon et al., 2018; American Psychiatric Association, 2013).

This study expands upon prior studies by examining use of psychotropic medication and psychosocial services among TAY with and without ASD and with and without a co-occurring mental health (MH) condition. This study aims to elucidate any disparate psychotropic medication or psychosocial service use between individuals with and without ASD to inform providers of psychotropic and psychosocial services and to inform mental health and developmental disabilities policy administration.

### **Data**

The data for this study were extracted from January 2019 to February 2021 IQVIA US Open Source Claims, a multi-payer pre-adjudicated health insurance claims database covering all 50 states and Washington, D.C. IQVIA US Open Source Claims includes professional claims generated by office-based physicians (CMS-1500), institutional claims generated by hospitals and other institutions (UB-04), and prescription claims. The sample extracted for this study included TAY (12 to 26 years) with ASD (N = 52,083) and a matched comparison sample of TAY without ASD (N= 52,083). A 1:1 propensity score matching analysis was used to create the cohorts with baseline characteristics of gender, age and geographic location measured by 3-digit zip codes.

The dependent variable was categorical with four mutually exclusive treatment categories: psychotropic prescription filled only, psychosocial services only, both psychotropic prescription filled and psychosocial services, and no treatment. Psychotropic medication use was defined as

one or more psychotropic drug prescriptions filled during the study period using the pharmacy claims file, which contains the therapeutic class of the medication. The following therapeutic classes, which are commonly used to treat mental health conditions, were included to indicate use of psychotropic medication: antidepressants, antipsychotics, anticonvulsants, antimanic agents, antiparkinsonian agents, anxiolytics/sedatives, hypnotics, benzodiazepines, barbiturates, central nervous system agents-miscellaneous (CNS miscellaneous), and stimulants (detailed list of NDC codes are available from the authors upon request). Utilization of psychosocial services was measured by whether the TAY received any of the Current Procedural Terminology (CPT) codes for psychosocial services (detailed list of CPT codes are available from the authors upon request). If the individuals in the sample had no claims for either any psychotropic medication use or psychosocial services, they were categorized as receiving no treatment.

One of the primary independent variables of interest in the empirical model was whether the individuals in the study sample have a diagnosis of – (i) ASD only; (ii) ASD and mental health condition; (iii) mental health condition only; and (iv) neither ASD nor mental health condition. ASD was measured by whether the individual has an ICD-10 F84 diagnosis and mental health condition was defined by whether they have any of the following diagnoses: ADHD (F90), anxiety and related disorders (F40-42, F44-48, F93), depression (F32,F33), behavioral/conduct disorder (F91, F94, F63), Tourette/Tic disorder (F95), trauma and stressor related disorders (F43), mood disorder (F30, F31, F34-39), psychotic disorder (F20-22,F60), and other mental health conditions (F99, F53, F68). The analysis also included indicators for any intellectual disability, COVID-19 diagnosis, asthma, bronchitis, cancer, diabetes, heart disease, hypertension, kidney disease, nicotine dependence, and obesity. The multivariate model also controlled for age (12-17, 18-26), gender, and documented Z codes identifying social risk

factors. Providers use a subset of Z codes (Z55-Z65) as a standardized method of documenting patients' adverse social conditions, or social risk factors. The Z codes included in this analysis are - Z55 (problems related to education and literacy), Z56 (problems related to employment and unemployment), Z57 (problems related to occupational risk), Z59 (problems related to housing and economic circumstances), Z60 (problems related to social environment), Z62 (problems related to childhood upbringing), Z63 (problems related to primary support, including family), Z64 (problems related to psychosocial environment), and Z65 (other psychosocial environment related problems). Descriptive statistics on the study sample and the variables used in the analysis are provided in *Table 1*.

### **Analysis**

Multinomial logistic regression was utilized in the study because the dependent variable was a categorical variable of more than two unordered mutually exclusive outcomes. Of the four treatment categories noted previously, the fourth category, no treatment (neither psychotropic medication nor psychosocial services), was used as the reference group for the calculations of the relative risk ratios (RRRs). For each independent variable, this analytic approach produces three RRRs; for example, in the case of an intellectual disability diagnosis, this approach estimates the association of intellectual disability with treatment utilization by comparing three logit models simultaneously— (i) psychotropic medication only compared to no treatment; (ii) psychosocial services only compared to no treatment, and (iii) psychotropic medication and psychosocial services compared to no treatment.

### **Results**

*Table 2* displays psychotropic medication and psychosocial services utilization among TAY by ASD and mental health status. Among TAY with ASD only, 30% had psychotropic

prescription medication only, 15% utilized psychosocial services only, 17% had both psychotropic prescription medication and utilized psychosocial services, and 38% did not receive either treatment. In comparison, among TAY with ASD and with a mental health condition, 24% had psychotropic medication only, 15% utilized psychosocial services only, 53% received both psychosocial services and psychotropic medication, and 8% did not receive any psychosocial services nor psychotropic medication.

Among TAY with a mental health condition but no ASD, 24% had psychotropic prescription medication only, 25% utilized psychosocial services only, 33% had both a psychotropic medication and utilized psychosocial services, and 18% had no treatment. Among those with neither ASD nor a mental health condition, 82% did not receive any treatment.

*Table 3* presents estimates from the multinomial logistic regression model after accounting for all the variables discussed in the Data section. Compared to individuals with a mental health condition and no ASD diagnosis, individuals with a diagnosis of both ASD and a mental health condition had a higher relative risk of receiving psychotropic medication only (RRR = 2.16,  $p < 0.001$ ). Relative to receiving no treatment, diagnosis of ASD and a mental health condition was associated with an increase in the relative risk of receiving psychosocial services only by a factor of 1.16 ( $p < 0.001$ ), and receiving both psychosocial services and psychotropic medication by a factor of 3.29 ( $p < 0.001$ ). However, TAY with ASD but no mental health condition had a 39% lower relative risk (RRR = 0.61,  $p < 0.001$ ) of psychotropic medication only, 75% lower relative risk (RRR = 0.25,  $p < 0.001$ ) of receiving psychosocial services only, and 76% lower relative risk (RRR = 0.24,  $p < 0.001$ ) of receiving both psychotropic medication and psychosocial services.



The presence of an intellectual disability was associated with an increase in the relative risk of only having a psychotropic medication prescribed by a factor of 1.34 ( $p < 0.001$ ), receipt of psychosocial services only by a factor of 1.35 ( $p < 0.001$ ), and receipt of both psychosocial services and psychotropic medication by a factor of 1.48 ( $p < 0.001$ ). A COVID-19 diagnosis was associated with a 3% lower relative risk of having a psychotropic medication only (RRR = 0.97,  $p < 0.001$ ) and 7% lower relative risk of receiving both psychosocial services and psychotropic medication. The presence of a physical health condition was associated with a higher relative risk of psychotropic medication and psychosocial services utilization. A documented social risk factor was also associated with a higher relative risk of treatment utilization. In particular, the social risk factor related to childhood upbringing was associated with an increase in the relative risk of utilizing both psychosocial services and psychotropic medication by a factor of 4.49 ( $p < 0.001$ ) compared to receiving no treatment.

### **Discussion**

This study explored utilization of psychotropic and psychosocial services among TAY with and without ASD and with and without mental health conditions to inform provider management of services and to inform mental health and developmental disabilities policy administration. The study found approximately one third of TAY with ASD and no mental health condition received only psychotropic medication. Additionally, the study demonstrated the likelihood of utilizing psychosocial services and both psychotropic medication and psychosocial services is higher for people with ASD only when a person with ASD also has a co-occurring MH condition.

These study findings may suggest a need to increase access to psychosocial services for autistic TAY, as psychosocial services should be delivered concurrently with psychotropic medication if psychotropic medication is necessary (National Institute of Mental Health, 2016). The high rates of psychotropic medication utilization among TAY in this study is consistent with other research, yet it is of concern, as relatively few psychotropic medications are approved for use in children (Olfson et al., 2015; Ali et al., 2018). Off-label prescribing, or prescribing medications for indications other than those for which the medication was originally approved by the Food and Drug Administration, is common in healthcare but the safety and effectiveness of off-label prescribing in children is often unknown (Congressional Research Service, 2012; Medicaid and CHIP Payment and Access Commission, 2015; Food and Drug Administration, 2018b). This study supports previous literature, which concludes high rates of psychotropic medication use in individuals with autism indicate the need for behavioral supports, trained clinicians to manage the multifaceted impacts of psychotropic medications on health, and systems that support and prioritize behavioral health services (Rast et al., 2020).

Providers should consider monitoring the mental health of autistic individuals in particular for appropriate diagnosis, referral to treatment, and management of services, given the high rates of co-occurring mental health conditions among this population identified in this study. Providers should also facilitate referral to appropriate psychosocial services for individuals with ASD as an alternative to or concurrent with psychotropic medication, as this study identifies approximately one third of those with ASD but without a MH condition receive only psychotropic medication. Additionally, given the high rates of physical health conditions among those with ASD identified in this study, providers should monitor the impact of psychotropic medication on both mental and physical health.

State policymakers should consider opportunities to increase access to psychosocial services for the ASD population. Most states with autism-specific insurance mandates impose caps on coverage related to the age, cost, frequency, and duration of the psychosocial services for individuals with ASD (National Conference of State Legislatures, 2021). While these mandates have been found to increase use of behavioral therapies for individuals with ASD overall, there was less use by TAY (Barry et al., 2017). Many state autism-specific insurance coverage laws only apply to young children with ASD, which may limit access to psychosocial services specifically among TAY with autism (National Conference of State Legislatures, 2021). Given individuals with mental and behavioral conditions have a varied level of need in intensity, frequency, and duration of treatment to manage behavioral and mental health symptoms, state legislators and administrators should review their respective autism-specific state insurance law and consider the specific caps on coverage for psychosocial services and its impact on access to services and health outcomes among those with ASD across the lifespan. Additionally, during the COVID-19 public health emergency (PHE), the American Rescue Plan Act (Pub L. No. 117-2) increased available funds to promote access to psychosocial services for behavioral or mental health conditions to eligible individuals with disabilities (United States Department of Education, 2021). Despite increased availability of funds for psychosocial services, workforce shortages limit access to services; states may consider allocation of funds to increase the quantity and quality of available providers to increase access to psychosocial services for autistic TAY (United States Department of Education, 2022).

Despite the comprehensive nature and timeliness of these data, the findings of this study should be viewed in the context of some limitations. This study includes data before and during the COVID-19 PHE, which may reduce the generalizability of our findings to time periods with

fewer COVID-19 PHE related disruptions to mental health service access and delivery. Although this study includes a large sample, as with any claims data source, our study population only includes individuals who had an interaction with the healthcare system, which may skew our results to include those with greater access to both psychotropic and psychosocial services. As such, this may lead to a conservative bias to our estimates. Additionally, the sample does not include claims for school-based psychosocial services provided to eligible TAY. Another limitation of the analysis is that we were unable to control for ASD specific insurance mandates imposed on coverage in each state or geographic location and related socio-economic factors that might impact the use of psychotropic medication and psychosocial services.

Future research should replicate and extend this study to examine how psychotropic and psychosocial service utilization varies by factors such as race, ethnicity, socioeconomic status, geographic region, state, and residential setting, among those with ASD. In particular, future analyses should examine the sociodemographic characteristics associated with use of psychotropic medication among those with ASD but without a co-occurring MH condition, as this study identifies this group had the highest percentage of individuals receiving only psychotropic medication. Future studies might also benefit from controlling for additional co-occurring conditions commonly associated with ASD, such as Down syndrome and Fragile X syndrome. Another direction for future studies is to examine how psychotropic medication class prescribed correlates with TAY with ASD and no mental health condition. Future analyses may elucidate factors associated with reduced access to psychosocial services for those with ASD without a MH diagnosis to inform relevant policies and target resources at the state level to increase access to psychosocial services.

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**Table 1: Characteristics of Adolescents and Young Adults by Autism Spectrum Disorder Diagnosis (proportion, standard error)**

<b>Characteristics</b>	<b>Autism Spectrum Disorder</b>	<b>No Autism Spectrum Disorder</b>
<b>Gender</b>		
Male	0.74 (0.01)	0.74 (0.01)
Female	0.26 (0.01)	0.26 (0.01)
<b>Age Group</b>		
12 – 17	0.54 (0.01)	0.54 (0.01)
18 – 26	0.46 (0.01)	0.46 (0.01)
<b>Health Conditions</b>		
Mental Health Condition	0.58 (0.01)	0.18 (0.01)
Intellectual Disabilities	0.16 (0.01)	0.01 (0.01)
<b>Physical Health Conditions</b>		
Asthma	0.18 (0.01)	0.10 (0.01)
Bronchitis	0.06 (0.01)	0.04 (0.01)
Cancer	0.01 (0.01)	0.01 (0.01)
COVID-19	0.26 (0.01)	0.22 (0.01)
Diabetes	0.06 (0.01)	0.03 (0.01)
Heart Disease	0.01 (0.01)	0.00 (0.00)
Hypertension	0.06 (0.01)	0.02 (0.01)
Kidney Disease	0.04 (0.01)	0.02 (0.01)
Obesity	0.22 (0.01)	0.10 (0.01)
<b>Social Risk Factors</b>		
Z55 (Education & Literacy)	0.01 (0.01)	0.01 (0.01)
Z56 (Employment & Unemployment)	0.01 (0.01)	0.01 (0.01)
Z57 (Occupational Risk)	0.00 (0.01)	0.00 (0.00)
Z59 (Housing & Economic Circumstances)	0.01 (0.01)	0.01 (0.01)
Z60 (Social Environment)	0.01 (0.01)	0.00 (0.00)
Z62 (Childhood Upbringing)	0.02 (0.01)	0.01 (0.01)
Z63 (Primary Support)	0.02 (0.01)	0.00 (0.00)
Z64/Z65 (Psychosocial Event)	0.01 (0.01)	0.00 (0.00)
<b>N</b>	52,083	52,083

**Table 2: Psychotropic Medication and Psychosocial Services Utilization among Adolescents and Young Adults by Autism Spectrum Disorder and Mental Health Condition (proportion, standard error)**

<b>Treatment Utilization</b>	<b>Adolescents and Young Adults with Autism Spectrum Disorder</b>		<b>Adolescents and Young Adults without Autism Spectrum Disorder</b>	
	<b>With Mental Health Condition</b>	<b>Without Mental Health Condition</b>	<b>With Mental Health Condition</b>	<b>Without Mental Health Condition</b>
Psychotropic Medication Only	0.24 (0.01)	0.30 (0.01)	0.24 (0.01)	0.11 (0.01)
Psychosocial Services Only	0.15 (0.01)	0.15 (0.01)	0.25 (0.01)	0.05 (0.01)
Both Psychotropic Medication Fill and Psychosocial Services	0.53 (0.01)	0.17 (0.01)	0.33 (0.01)	0.02 (0.01)
No Treatment	0.08 (0.01)	0.38 (0.01)	0.18 (0.01)	0.82 (0.01)
N	29,981	22,102	9,208	42,875

**Table 3: Multinomial Logistic Regression Model Estimates (Relative Risk Ratios, Confidence Interval)**

<b>Characteristics</b>	<b>Psychotropic Medication Only</b>	<b>Psychosocial Services Only</b>	<b>Both Psychotropic Medication and Psychosocial Services</b>
	<b>RRR (95% CI)</b>	<b>RRR (95% CI)</b>	<b>RRR (95% CI)</b>
Autism Spectrum Disorder & No Mental Health Condition	0.61 (0.57, 0.65)	0.25 (0.23,0.27)	0.24 (0.22, 0.26)
Autism Spectrum Disorder & Mental Health Condition	2.16 (1.99, 2.33)	1.16 (1.07, 1.26)	3.29 (3.06, 3.55)
No Autism Spectrum Disorder & No Mental Health Condition	0.11 (0.10, 0.12)	0.08 (0.08,0.09)	0.02 (0.01, 0.02)
<i>No Autism Spectrum Disorder &amp; Mental Health Condition (reference)</i>	-	-	-
<b>Gender</b>			
Female	1.11 (1.06, 1.16)	1.08 (1.03, 1.14)	1.25 (1.19, 1.31)
Male (reference)			
<b>Age Group</b>			
18 – 26	1.21 (1.16, 1.26)	0.84 (0.80, 0.87)	0.97 (0.94, 1.02)
12 – 17 (reference)			
<b>Health Conditions</b>			
Intellectual Disabilities	1.34 (1.24, 1.45)	1.35 (1.23, 2.03)	1.48 (1.37, 1.60)
Physical Health Conditions			
COVID-19	0.97 (0.93, 1.01)	1.18 (1.12, 1.24)	0.94 (0.90, 0.98)
Asthma	1.04 (0.98, 1.10)	1.25 (1.17, 1.32)	1.20 (1.13, 1.27)
Bronchitis	1.26 (1.16, 1.37)	1.04 (0.94, 1.15)	1.26 (1.15, 1.38)
Cancer	1.81 (1.46, 2.25)	1.60 (1.24, 2.02)	2.21 (1.77, 2.77)
Diabetes	1.05 (0.95, 1.16)	1.16 (1.04, 1.30)	1.13 (1.02, 1.26)
Heart Disease	1.21 (0.90, 1.63)	1.56 (1.13, 2.16)	1.44 (1.06, 1.20)
Hypertension	1.33 (1.20, 1.50)	1.15 (1.02, 1.30)	1.54 (1.38, 1.72)
Kidney Disease	1.27 (1.12, 1.44)	1.21 (1.05, 1.40)	1.35 (1.19, 1.54)
Obesity	0.97 (0.91, 1.01)	1.07 (1.01, 1.14)	1.04 (0.99, 1.10)
<b>Social Risk Factors</b>			
Z55 (Education & Literacy)	1.09 (0.85, 1.40)	1.67 (1.32, 2.12)	1.50 (1.18, 1.87)
Z56 (Employment & Unemployment)	1.85 (0.95, 3.59)	2.73 (1.40, 5.32)	3.20 (1.70, 6.04)
Z57 (Occupational Risk)	2.08 (0.50, 8.80)	2.76 (0.60, 12.98)	3.11 (0.65, 14.76)

Z59 (Housing & Economic Circumstances)	0.82 (0.63, 1.09)	1.06 (0.80, 1.41)	1.07 (0.83, 1.38)
Z60 (Social Environment)	0.73 (0.50, 1.09)	1.18 (0.81, 1.73)	1.37 (0.97, 1.94)
Z62 (Childhood Upbringing)	2.11 (1.61, 2.76)	2.97 (2.28, 3.87)	4.49 (3.50, 5.76)
Z63 (Primary Support)	0.85 (0.67, 1.08)	1.70 (1.35, 2.11)	1.69 (1.37, 2.09)
Z64/Z65 (Psychosocial Event)	0.86 (0.60, 1.23)	1.55 (1.09, 2.18)	1.60 (1.16, 2.20)
<b>N</b>	<b>104,166</b>		