Intellectual and Developmental Disabilities

Variation in receipt of pre-employment transition services and employment outcomes for students with disabilities

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VARIATION IN RECEIPT OF PRE-EMPLOYMENT TRANSITION SERVICES AND VR OUTCOMES FOR STUDENTS WITH DISABILITIES

Running Title: PRE-ETS STUDENTS WITH DISABILITIES

Acknowledgments

Findings have not been presented previously.

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Abstract

The Workforce Innovation and Opportunity Act of 2014 sought to improve employment outcomes through vocational preparation activities called pre-employment transition services (Pre-ETS) for students with disabilities. We analyzed Rehabilitation Services Administration (RSA-911) data to examine receipt of Pre-ETS across states, differences among students who received only Pre-ETS versus Pre-ETS and Vocational Rehabilitation (VR) services, and association of services with employment outcomes. On average, states delivered two of the five required Pre-ETS types. Rates of receipt of Pre-ETS, and transition into VR services following Pre-ETS, were below expectations. Only 36% of students were employed when they exited VR. Outcomes varied by race and disability type. Work-based learning services were associated with successful employment, but receipt of this Pre-ETS was low.

Key words: employment, transition, vocational, intellectual disability, autism

Variation in pre-employment transition services and Vocational Rehabilitation outcomes for students with disabilities

Longstanding federal and state investments in vocational services for youth and adults with disabilities have aimed to improve employment outcomes; yet, only 56% are employed after receiving services through the Vocational Rehabilitation (VR) program (Rehabilitation Services Administration, 2023). VR is a federally funded program, administered by state VR agencies, that supports people with disabilities who have mental or physical impairments that substantially limit their ability to get a job (Rehabilitation Services Administration, n.d.). VR offers services that help people find and maintain competitive integrated employment (CIE) in community-based settings, at minimum wage or higher, for those who meet eligibility criteria (State Vocational Rehabilitation Services Program, February 28, 2020). VR also provides assessment of individuals' interests and skills and determining a plan for progressing toward employment goals, support for postsecondary education and training, development of skills for employment, and other assistance. VR services include counseling and guidance about employment options, assistance searching for a job, on-the-job supports (e.g., job coaching) or supported employment, and others. Eligible students can begin VR services during the high school years, and evidence from a scoping review suggests that students with disabilities who experience paid work during high school are more likely to achieve paid employment during their adult years (Frentzel et al., 2021). However, employment outcomes following VR services differ by age (Chen et al., 2015; Alsaman & Lee 2016), the state in which one resides (Roux et al., 2018), and disability type (Alsaman & Lee, 2016; Winsor et al, 2023). For example, Alsaman and Lee (2016) found that youth with learning disabilities, ADHD, intellectual disability, or autism had significantly better employment outcomes following VR services than youth with psychiatric disabilities; although these differences attenuated when state employment rates were included in the model.

The Workforce Innovation and Opportunity Act (WIOA) of 2014 addressed the need to improve employment outcomes by providing early vocational preparation activities via pre-employment transition services, or "Pre-ETS", for students with disabilities (Workforce Innovation and Opportunity Act, 2014). WIOA required states to set aside at least 15% of their federally allocated VR dollars to fund Pre-ETS for youth. Prior to WIOA, VR services were provided for youth only if they were deemed eligible after officially applying for VR services. However, WIOA specified that students who were eligible or *potentially eligible* for VR services, could receive Pre-ETS (Carlson et al., 2020). This included students who receive special education services for a disability and those *suspected of* having a disability, which substantially expanded the numbers of eligible youth. By 2018, one-third of VR caseloads consisted of students with disabilities (Honeycutt et al., 2024).

Ideally, students with disabilities receive a continuum of VR services to prepare for employment (Policy Interpretation, February 28, 2020). Pre-ETS begin this continuum, focusing on early career exploration and preparation for postsecondary education (PSE). These services are delivered by VR staff and community disability service agencies in partnership with local education agencies. Pre-ETS are "designed to help students with disabilities to begin to identify career interests that will be further explored through additional vocational rehabilitation services, such as transition services (National Technical Assistance Center on Transition, n.d.[b])." Next, students who are determined eligible for traditional VR services may then receive a set of transition services through VR including PSE supports, vocational training, job search, job placement, job retention, job follow-up, and job follow-along services (Policy Interpretation, February 28, 2020). Finally, students who have defined a career interest, and have received vocational training or PSE supports through VR transition services, can then access more intensive employment-related services from VR (e.g., on-the-job supports or supported employment) if needed to support more specific employment outcomes. While some students do access both Pre-ETS and VR services in this continuum, others only receive Pre-ETS. Reasons for not progressing from Pre-

ETS to traditional VR services include not applying for VR services, being determined ineligible for VR services, or not initiating VR services after being found eligible.

WIOA required state VR programs to provide five types of Pre-ETS (job exploration counseling, work-based learning experiences - WBLEs, counseling on PSE enrollment, workplace readiness training, and instruction in self-advocacy), as overviewed in Table 1. To foster state innovations in Pre-ETS delivery, Pre-ETS are intentionally not strictly defined in federal regulations (State Vocational Rehabilitation Services Program, 2016). While WIOA outlines what these services include, each state's federally approved plan for WIOA implementation, and its' Pre-ETS policy, differs widely (Carlson et al., 2020; Taylor et al., 2022), resulting in uneven distribution of Pre-ETS across states. Whittenburg and colleagues (2024) also documented that more states used vendors to provide Pre-ETS, but some use VR staff to provide Pre-ETS, which may further contribute to variation.

Data about people who received Pre-ETS is reflected in the RSA-911, an aggregated dataset of VR cases that closed within each year, which is maintained by the Rehabilitation Services Administration (RSA). States submit records to the RSA for every person who applies for and/or receives VR services within a program year. Data include demographics, types of services received (including types of Pre-ETS), employment status at case closure, and other variables. However, the number of required data elements for students who receive Pre-ETS is more limited than requirements for people who receive VR services. For example, data about disability types and employment outcomes are only available for students who were eventually found eligible for VR services.

As students who received Pre-ETS and VR (Pre-ETS+VR) services are beginning to exit VR services, data is only now emerging to better inform a complete understanding of patterns of receipt of Pre-ETS among youth with disabilities and their effectiveness. Whittenburg et al. (2024) investigated provision of Pre-ETS across the 50 states and the District of Columbia among 200,000 youth ages 14-27 years. They documented deficits in frequency of three Pre-ETS types: delivery of work-based learning

experiences, instruction in self-advocacy, and counseling on opportunities for enrollment in comprehensive transition or postsecondary education programs. Taylor et al. (2024) used RSA-911 data from PY 2017-2020 to examine predictors of employment for 15,300 youths who received Pre-ETS+VR services. Youth tended to receive the Pre-ETS types that had weaker associations with employment outcomes; for example, WBLE was the least frequently provided service but was twice as likely to result in employment. The researchers pointed to a need to examine patterns of who receives Pre-ETS and how Pre-ETS combined with individual VR services are associated with employment outcomes.

Study Purpose

WIOA's requirement to fund Pre-ETS was a critical policy shift toward earlier vocational service provision as a defined stage within the progression of vocational support services. Following passage of WIOA in 2014, and subsequent approval of state implementation plans in 2016, states began to submit data on Pre-ETS. The current study explored four research questions (RQs): (RQ1) How did receipt of Pre-ETS vary by state?, (RQ2) How did demographics vary between students who only received Pre-ETS, versus those who received Pre-ETS and VR (Pre-ETS+VR)?, (RQ3) Among those who received Pre-ETS+VR services, how did receipt of pre-ETS vary by disability, race, and state?, and (RQ4) What was the relationship between receipt of Pre-ETS and employment outcomes at exit from VR services?

Methods

We analyzed data from program year (PY) 2017-2019 (cases closed between July 1, 2017 and June 30, 2019) through a data use agreement with the RSA. Notably, this period reflects records reported to RSA prior to service disruptions related to the COVID-19 pandemic. The [redacted] University Institutional Review Board deemed analysis of this administrative data as exempt.

Study Participants

To explore the distribution of Pre-ETS, we analyzed data for people who lived in the 50 states or the District of Columbia (as a foundation for understanding differences in Pre-ETS across states),

received Pre-ETS services, and were aged 12-22 years at the time of the first case record for Pre-ETS or VR services. The lower age bound of 12 years reflected the earlier ages in case records. Although most states begin Pre-ETS at 14 years of age, some states do allow Pre-ETS to begin earlier, such as South Carolina at age 13 (South Carolina PYs2020-2023 Vocational Rehabilitation Program [Combined or General], n.d.). The upper age bound of 22 years helped ensure this study could capture cases that could have been exposed to Pre-ETS as early as 2016. Youth may have held a job prior to entering VR services, or not. While many VR research studies exclude people with a record of employment prior to applying to VR, we included these service users. By assumption, their applications to VR reflected a need for additional support to maintain their jobs or to access more challenging jobs in a CIE setting, particularly for youth who are just beginning to explore employment.

To analyze characteristics of Pre-ETS services users and their outcomes, we included people with Pre-ETS service records regardless of whether they used VR services (n=173,697). Receipt of Pre-ETS and receipt of traditional VR services were not mutually exclusive, as Pre-ETS is a potential first step in the employment support continuum. The analysis stratified bivariate examination of characteristics of students who received Pre-ETS by: (1) people who only received Pre-ETS (n=94,475), and (2) those who received Pre-ETS+VR services (n=74,706). We excluded an additional 2,258 people who received Pre-ETS and had a VR case record but were missing data on their status at VR exit.

Measures

Dependent Variables

This study examined two categories of dependent variables: service receipt and employment outcomes. We first examined receipt of Pre-ETS, across states, classified by types: job exploration counseling, WBLEs, counseling on PSE enrollment, workplace readiness training, and instruction in self-advocacy. We calculated the mean number of services received (of all possible services) if youth received at least one Pre-ETS. Second, we examined successful employment at the time of case closure

for people who received VR services. The RSA defines employment as maintaining a full- or part-time job, with or without supports, in an integrated setting in which some workers do not have disabilities for at least 90 days (Rehabilitation Services Administration, October 25, 2013).

Independent Variables

We examined person-level demographic and impairment characteristics using variables from the RSA-911. We selected variables for this exploratory analysis based on those that have previously been associated with employment outcomes in people with developmental disabilities. These variables included race, ethnicity, age (by year), mean age at the time of Pre-ETS application, and disability type (for those who received Pre-ETS and VR services). For cases that were missing age at the time of Pre-ETS application (n=2,718 or 1.56% of cases), we used the age at application to VR services. Most commonly, students with missing entry age data were reported as 17 years (22%) and 18 years (36%) in the VR data. We noted that over half of states reported 12- and 13-year-olds in Pre-ETS data. The two states with the highest rates of early Pre-ETS provision were Montana (152 12-year-olds and 640 13-year-olds) and South Carolina (34 12-year-olds and 149 13-year-olds), followed by Texas and Florida.

Eligibility for traditional VR services is based on the presence of physical or mental disabilities that affect ability to work (Rehabilitation Services Administration, n.d.). For this study, we disaggregated disabilities by key types of IDDs (autism and ID), psychiatric and other neurodevelopmental disabilities (hereafter termed “psychiatric”), physical disability, or any other disability included as a primary or secondary work impairment. Psychiatric disabilities included anxiety disorder, ADHD, depressive and other mood disorders, schizophrenia and other psychotic disorders, and other mental health conditions (termed “other mental illness” in the RSA case report).

We also examined receipt of Pre-ETS as a key independent variable of interest regarding employment outcomes. We examined Pre-ETS types individually and combined them to create a variable marking if a person received any Pre-ETS.

Data Analysis

To address RQ1, we first examined the frequency of the receipt of each individual Pre-ETS type for students with disabilities who received at least one Pre-ETS across states. We then calculated the percentage of students who received each individual Pre-ETS type, the denominator being all students in the state who received at least one Pre-ETS. For this group, we also calculated the mean number of Pre-ETS types received. To address RQ2, we examined characteristics of race and age for those who received Pre-ETS only; and race, age, and disability type for those who received Pre-ETS+VR services. We used chi-squared tests to test statistical differences in the distribution of characteristics between these two groups (Pre-ETS recipients who did not receive any VR services, and Pre-ETS recipients who also received VR services). To address RQ3, we examined the receipt of each individual Pre-ETS type by race, ethnicity, disability, and state among youth who received Pre-ETS+VR services. We calculated the frequency of receipt of an individual Pre-ETS type and divided by the number of people in that category who received any Pre-ETS+VR services. Finally, to address RQ4, we used two logistic regression models to examine successful employment at the time of case closure for those who received Pre-ETS+VR services. The first model examined the relationship between employment and receipt of any of the five types of Pre-ETS. The second model examined the relationship between employment and receipt of each of the five types of Pre-ETS individually, mutually controlling for each pre-ETS type in the regression. Both models controlled for race, ethnicity, and disability and accounted for clustering by state using a clustered sandwich estimator to adjust the variance for state clustering. The regression equations were:

Model 1:

$$logit(p_{employment}) = \beta_0 + \beta_1 \cdot any\ preETS + \beta_2 \cdot race + \beta_3 \cdot ethnicity + \beta_4 \cdot disability$$

Model 2:

$$logit(p_{employment}) = \beta_0 + \beta_1 \cdot jobexploration + \beta_2 \cdot workbasedlearning + \beta_3 \cdot counselingonPSE + \beta_4 \cdot workplacereadiness + \beta_5 \cdot selfadvocacy + \beta_6 \cdot race + \beta_7 \cdot ethnicity + \beta_8 \cdot disability$$

Results

State Distributions of Pre-ETS

Across all students who received Pre-ETS, job exploration was the most frequent type of Pre-ETS (62.7%), followed by workplace readiness (57.4%). Counseling on PSE was the least frequent Pre-ETS (39.9%). The frequency of Pre-ETS receipt (by type) varied widely within and across states. For example, 83% of students in Hawaii received WBLE services, compared with less than 1% of students in Rhode Island. Hawaii was the only state in which greater than 80% of students received each service type. Approximately 50-75% of students received each Pre-ETS in three states: Arkansas, Illinois and Massachusetts. See Table 2 for detailed distribution of Pre-ETS by state.

The average number of Pre-ETS delivered also varied widely. On average, states delivered 2.4 of the five required Pre-ETS. The states with the highest average number of different types of Pre-ETS delivered were Hawaii (4.3), Arkansas (3.5) and Missouri (3.5); while the lowest were the District of Columbia (1.1), Maine (1.3), Rhode Island (1.4), and Texas (1.4). For example, Oklahoma delivered job exploration, WBLE, and workplace readiness to 94% of students, but only 3% received counseling on PSE. In Ohio and the District of Columbia, 81% and 96% of students received job exploration services, whereas only about 4% received counseling on PSE enrollment.

Demographic Characteristics of Students Who Received Pre-ETS Only, Versus Pre-ETS+VR Services

We identified statistically significant differences between students who received Pre-ETS versus those who received Pre-ETS+VR services. As seen in Table 3, those who received Pre-ETS+ VR services were significantly less likely to be classified as Black or “American Indian or Hawaiian” race at the start

of Pre-ETS. Those who were 18–22-year-old students at entry to Pre-ETS or VR services had significantly increased rates of receipt of Pre-ETS and VR services, versus those 17 years or under. Among those who received Pre-ETS+VR services, most (65%) had a mental health condition (psychiatric disability), followed by ID (18%), autism (17%), and physical or other disability (14%). About one third (36%) were employed when they exited VR services at an average of $11.00 per hour for 27 hours per week.

Distribution of Pre-ETS by Disability, Race, and State Among Students Who Received Pre-ETS+VR

Table 4 details the distribution of Pre-ETS types by disability, and race among those who also received Pre-ETS+VR services. Black, Multiple race, and Hispanic students had lower frequencies than white students of receiving WBLE, but a higher frequency of receiving all other services. Students with autism and ID more often received WBLE than those with psychiatric or physical/other disabilities. Overall, among students who received Pre-ETS+VR services, job exploration was the most frequent Pre-ETS type (66.4%), followed by workplace readiness (54.2%). Counseling on PSE enrollment was the least frequent service (40.5%). Students who received Pre-ETS+VR services had a higher frequency of receiving WBLE (+8.4%) or job exploration (+3.7%), but a lower frequency of receiving workplace readiness (-3.2%), and self-advocacy training (-3.7%), compared with students in Table 2 who received any Pre-ETS but may not have had VR services.

State distribution for students who received Pre-ETS+VR services followed the same patterns as seen for all students who received Pre-ETS. (These distributions are not shown in Table 4 but are available from the authors upon request.) Among students who received Pre-ETS+VR services, no states had a consistently high frequency (>80%) for delivery of each Pre-ETS type among students who received Pre-ETS+VR. Approximately 50-75% of students received each service type in four states: Arkansas, Hawaii, Illinois, and Montana. Other than these four states, receipt of Pre-ETS varied dramatically by type within and across states. Oklahoma delivered job exploration, WBLE, and workplace readiness to at least 97% of students, but only 2% received counseling on PSE. Six states (DC,

ME, MD, OH, RI, TX) had a bimodal distribution in which 2-3 services were commonly delivered, while 2-3 were rarely delivered. Within these states, less than 10% of students received counseling on PSE enrollment or self-advocacy services. Workplace readiness services had the largest difference in frequency between states; 97.5% of students in Oklahoma received workplace readiness services, compared with 0% of students in the District of Columbia and 5.3% in Maine.

Relationship Between Pre-ETS and Employment Outcomes

As seen in Table 5, among those students who received Pre-ETS+VR services, receipt of "any type of Pre-ETS" did not significantly increase the odds of employment when controlling for state, age, race, ethnicity, and disability type. However, the consideration of specific Pre-ETS types revealed two significant associations with employment outcomes. Receipt of WBLE was associated with 30% higher odds of employment, while odds of employment decreased by 17% among those who received job exploration services. Autistic students had a 12% higher odds of employment, but those with a psychiatric disability had 8% lower odds. Across all students, odds of employment increased by 11% for every one year of age. Odds of employment were significantly lower, averaging 20-30% lower, for those classified as Black, American Indian or Hawaiian, Asian, or from multiple races.

Discussion

This study is among the first to explore receipt of Pre-ETS across states among students who did and did not go on to receive VR services, characteristics of which students receive Pre-ETS+VR services, and association of Pre-ETS+VR services with employment outcomes. Overall, our findings add to concerns regarding whether policy changes through WIOA, namely implementation of Pre-ETS, are achieving earlier and evenly distributed vocational interventions across students with disabilities. Only 44% of students who accessed Pre-ETS in our study sample progressed from Pre-ETS to VR services (n=74,706), and only 36% were employed when they exited VR. Our study adds to recent findings by examining differences using a large sample of youth and comparing those who received Pre-ETS alone

versus those who received Pre-ETS+VR services. This study added important insight into which students with disabilities are not benefiting from the progression of Pre-ETS into VR services, as this may hinder their eventual employment success.

Receipt of Pre-ETS Across States

Our findings pointed to difficulties states appear to be encountering in effectively delivering Pre-ETS. First, only about 174,000 students with disabilities received Pre-ETS during the study years -- two to four years following WIOA implementation. While we do not know the total number of students suspected of having a disability who WIOA also included as eligible for Pre-ETS, we know that a total of 2,222,000 students ages 14-21 received special education services during the 2018-19 academic year alone (Office of Special Education Programs, 2019). Low rates of Pre-ETS delivery may reflect barriers to Pre-ETS delivery identified in prior studies, including the following: challenges surrounding family engagement and communication, interagency collaboration between VR and secondary schools, financial resources and time needed to collaborate, adequate levels of VR staffing to provide Pre-ETS, and strategies for early career planning for students with higher support needs (Carter et al., 2021; Frentzel et al., 2021; Lambert et al., 2023; Lau et al., 2024; Schutz et al., 2023).

Second, gaps in delivery of the five required types of Pre-ETS across states were evident. Thirty states delivered each Pre-ETS with at least 20% frequency, indicating that each service was being implemented. However, 10 states had at least one Pre-ETS which they delivered to less than 10% of students. States, on average, delivered closer to two types of services on average, with several states delivering only one main type of Pre-ETS. This finding extended a previous observation that many states did not have capacity to implement all five Pre-ETS in the early years following WIOA (Miller et al., 2018) and concurred with Whittenburg et al.'s (2024) finding of uneven Pre-ETS distribution across states. This finding is concerning given evidence that more intensive exposure to early employment services is beneficial for students with disabilities. Although not specific to Pre-ETS, several studies have found that

students with developmental disabilities are more likely to attain CIE when exposed to an average of four to five types of VR services, compared to those who received fewer services (Kaya et al., 2018; Roux et al., 2020). A review of Pre-ETS studies highlighted how interagency agreements and partnerships between VR and LEAS can facilitate provision of early transition-focused activities (Frentzel et al., 2021).

Third, this study provides more evidence that students are not receiving the most effective vocational services. Our finding that job-exploration and workplace readiness training were the most frequently delivered Pre-ETS types was concerning, as the odds of employment in this study were significantly lower among those who received job exploration services, while workplace readiness training had no effect on employment. These patterns concur with previous studies (Taylor et al., 2024; Whittenburg et al., 2024); although Taylor et al.'s (2024) study did find that job exploration was associated with 33% higher odds of employment when controlling for demographic and employment barrier predictor variables. Extremely low rates of counseling on PSE were also alarming, because support for PSE is an important component of gaining CIE (Rast et al., 2020). WIOA performance indicators include advancement in degrees or certifications earned between VR application and closure (U.S. Department of Labor, n.d.). Nine states delivered counseling on PSE to less than 10% of students; even though PSE supports have been associated with improved employment outcomes among transition-age autistic youth, for example (Rast et al., 2020). Additionally, less than half of students with disabilities in this study received WBLE, despite its positive association with employment in this study and others (Honeycutt et al., 2024; Taylor et al., 2024). Prior research on secondary students who receive VR services have found a higher likelihood of employment at VR exit when job-related services were delivered (versus assessment or counseling services) (Roux et al., 2020), which may help explain the value of early WBLEs.

Lower rates of receipt of Pre-ETS by types could also be related to providers' indications of need for training on implementation of some types of Pre-ETS (Awsumb et al., 2020; Whittenburg et al.,

2024), particularly regarding WBLE (Bishop et al., 2022). Providers may be more likely to implement services they feel more competent in delivering, or they may have less capacity to implement services that require more individualization like WBLE. Delivery of training to community-based providers is complicated by variation in who is providing Pre-ETS across states (vendors versus VR agency staff).

Variation in Receipt of Pre-ETS+VR Services and Employment Outcomes

Accessing VR services is a vital step in the continuum of vocational services from high school into adulthood. Achieving effective transitions from Pre-ETS to VR services is enhanced by proactive referrals to VR services; information delivery to families to initiate the VR process if appropriate; strengthening effective collaborations between schools, VR, and agencies; and involvement of VR staff in student transition planning meetings (Rehabilitation Services Administration, October 30, 2023; Schutz et al., 2023). Order of Selection (OOS) policies in some states may also partially explain the limited progression from Pre-ETS to VR services. OOS policies prioritize which people may receive VR services in states that cannot fund services for all those found eligible for VR. In these states, even students who are receiving Pre-ETS may not have access to VR services after leaving high school (National Technical Assistance Center on Transition, n.d.[a]). As states implemented required Pre-ETS services, increasing VR caseloads and budgetary shifts created constraints which decreased the ability of state VR agencies to meet the demand for VR services (Honeycutt et al., 2024).

For students who received Pre-ETS+VR services, 36% were successfully employed when they exited VR services in PY 2017-2019. This employment rate was the same as Taylor et al.'s (2024) smaller sample of youth with disabilities who received Pre-ETS+VR services. However, this rate was lower than previous estimates of employment for youth at VR exit prior to and immediately following implementation of Pre-ETS. Employment rates previously ranged from 47-52% for youth and young adults with IDD, ID, or autism during FYs 2011 (Chen et al., 2015), 2013 (Kaya, 2018), and 2015-2017 (Roux et al., 2020). Continued research should seek to uncover factors in declining employment rates.

We also identified unequal distribution in receipt of Pre-ETS+VR services by race and disability. Students who were Black or "American Indian or Hawaiian" race were significantly less likely to receive Pre-ETS+VR services, even though they were more likely than white students to receive most Pre-ETS types (except WBLE). Since WBLE was the only type of Pre-ETS that was associated with successful employment in this study, lower rates of receipt of WBLE among students from historically marginalized racial groups were especially concerning, as WBLEs could counteract existing employment disadvantages in these populations. This finding adds to existing evidence of racial differences in VR service access and outcomes across disability types and age groups (Langi & Balcazar, 2017; Nye-Lengermann, 2017; Kaya, 2018; Ahonle et al., 2020; Yin et al., 2022). Similarly, youth with psychiatric disorders were least likely to receive WBLE among disability types and were the only disability type to have significantly lowered odds of successful employment.

Limitations

We note several limitations within this study. First, it is difficult to explain the unexpected prevalence of reported Pre-ETS among 12–13-year-olds in this study without qualitative inquiry to further disentangle whether differences in Pre-ETS policy and programs contributed to these young participants, versus issues with accuracy of administrative data entry. Second, we are unable to definitively understand whether WIOA effectively facilitates a continuum from Pre-ETS to VR services among those who would benefit, as the RSA-911 data cannot be used to examine sequential records of services. Among students who do not progress into VR services, we do not know whether they were determined ineligible, were eligible but never received services, received VR services after a delay, or were not reflected in exit data as they were receiving an extended period of VR services. Additional research on Pre-ETS should identify patterns of how students progress from Pre-ETS into VR services. Third, Pre-ETS services lack sufficiently standardized detailed definitions, creating challenges for interpretating data, as states differ in how they define and deliver Pre-ETS (Roux et al., 2019; Taylor et

al., 2022). Fourth, while this study yielded a null overall effect for receiving "any type of Pre-ETS," it is difficult to evaluate the overall impact of Pre-ETS when distribution of services varies greatly by state. Employment outcomes may also reflect variation in service providers' experience and experience, quality of interagency collaboration, and variation in who provides Pre-ETS (Whittenburg et al., 2024);

Implications for Practice

States should monitor their individual patterns of Pre-ETS service distribution, and corresponding outcomes at VR exit, to evaluate whether intensity and types of Pre-ETS delivery are maximally supporting outcomes. State VR and local education agencies should also be made aware that differences in service receipt by race extend to Pre-ETS, so that plans to monitor and address any inequities in service delivery in their state can be developed.

Early evidence exists that targeted programs can improve vocational services when deficient. Honeycutt and colleagues (2024) found that receipt of Pre-ETS+VR services in a Vermont vocational program increased to 59% of student participants, compared to 25% of students in a "usual treatment" control group. It is worth noting that success of specific vocational programs may differ across communities and is contingent upon robust interagency collaboration between VR agencies, schools, community rehabilitation providers, and others. For example, successful implementation of WBLEs is dependent upon opportunities for employment which requires building strong relationships with businesses and equipping employers with training and information (Schutz et al., 2023). These strategies are especially important within community businesses that may be hesitant to allow student workers (Lambert et al., 2023).

Implications for Research

Continued research of Pre-ETS delivery patterns is critical for shaping its effectiveness in improving employment outcomes. Qualitative studies could provide deeper understanding of how state VR agencies are deciding which Pre-ETS to implement, to which students, and with what methods of

implementation; and how decisions are made regarding which students should receive VR+Pre-ETS. Longitudinal research should examine the potentially differential effects of combinations of Pre-ETS and specific VR services to guide targeted service delivery for specific groups of students. Determining the role and effects of Pre-ES for out of school youth is also important, as this group is a target of WIOA-based reforms. Further analysis of VR funding would also be useful to aid understanding of state differences in annual unused Pre-ETS funding that they return to the federal VR program (Wehman et al., 2024). Finally, as COVID-19 restrictions significantly affected ability to provide Pre-ETS in the community (Lambert et al., 2023), it will be critical to examine post-pandemic data to evaluate trends in the recovery of Pre-ETS provision and any changes in effectiveness of these services over time.

Conclusions

Our analysis of RSA-911 data revealed that rates of receipt of Pre-ETS are falling below expectations; few states are delivering all five types of Pre-ETS; rates of transition into VR services following Pre-ETS are low; and disparities exist in which students are receiving Pre-ETS+VR services and achieving employment. Our findings contribute to emerging literature that assesses the receipt and effectiveness of Pre-ETS for students with IDD and other disabilities, which is vital since WIOA targets earlier vocational services to foster improved employment outcomes. On average, states were delivering two types of the required five Pre-ETS, up to four years after WIOA implementation, despite studies that show the value of receiving multiple types of services. The distribution of Pre-ETS types was widely disparate by state, and their effects were unequal among students from historically marginalized groups and select disability groups. Receipt of WBLE as a Pre-ETS appeared to be associated with improved employment outcomes but was not a commonly delivered service. Increasing delivery of this service across states, in conjunction with determining the components of WBLE that lend value, may produce strong benefits for students with IDD and other disabilities.

References

Ahonle, Z. J., Barnes, M., Romero, S., Sorrells, A. M., & Brooks, G. I. (2020). State-Federal Vocational rehabilitation in traumatic brain injury: What predictors are associated with employment outcomes? *Rehabilitation Counseling Bulletin*, *63*(3), 143-155. https://doi.org/10.1177/0034355219864684

Alsaman, M. A., & Lee, C.-L. (2016). Employment outcomes of youth with disabilities in vocational rehabilitation: A multilevel analysis of RSA-911 data. *Rehabilitation Counseling Bulletin*, *60*(2), 98-107. https://doi.org/10.1177/0034355216632363

Awsumb, J. M., Carter, E. W., Schutz, M. A., & McMillan, E. D. (2020). Perspectives of pre-employment transition services providers on preparing youth with disabilities for employment. *Journal of Vocational Rehabilitation*, *53*(2), 205-218. https://doi.org/10.3233/JVR-201097

Bishop, M., Lee, D., Zhou, K., Iwanaga, K., Chan, F., & Tansey, T. (2022). Identifying vocational rehabilitation outreach and service training priorities: A national survey from diverse perspectives. *Journal of Vocational Rehabilitation*, *56*(3), 237-242. https://doi.org/10.3233/JVR-221188

Carlson, S. R., Thompson, J. R., & Monahan, J. (2020). An analysis of state pre-employment transition services policies. *Journal of Vocational Rehabilitation*, *52*(1), 43-59. https://doi.org/10.3233/JVR-191059

Carter, E. W., Awsumb, J. M., Schutz, M. A., & McMillan, E. D. (2021). Preparing youth for the world of work: Educator perspectives on pre-employment transition services. *Career Development and Transition for Exceptional Individuals*, *44*(3), 161-173. https://doi.org/10.1177/2165143420938663

Chen, J. L., Sung, C., & Pi, S. (2015). Vocational rehabilitation service patterns and outcomes for individuals with autism of different ages. *Journal of Autism and Developmental Disorders*, *45*(9), 3015-3029. https://doi.org/10.1007/s10803-015-2465-y

Frentzel, E., Geyman, Z., Rasmussen, J., Nye, C., & Murphy, K. M. (2021). Pre-employment transition services for students with disabilities: A scoping review. *Journal of Vocational Rehabilitation*, *54*(2), 103-116. https://doi.org/10.3233/JVR-201123

Honeycutt, T., Luhr, M., Harrison, E., & Sevak, P. (2024). Pre-employment transition and vocational rehabilitation services: Experiences in response to Vermont's work-based learning program. *Journal of Vocational Rehabilitation*, *60*(1), 39-52. https://doi.org/10.3233/JVR-230055

Kaya, C. (2018). Demographic variables, vocational rehabilitation services, and employment putcomes for transition-age youth with intellectual disabilities. *Journal of Policy and Practice in Intellectual Disabilities*, *15*(3), 226-236. https://doi.org/10.1111/jppi.12249

Kaya, C., Hanley-Maxwell, C., Chan, F., & Tansey, T. (2018). Differential vocational rehabilitation service patterns and outcomes for transition-age youth with autism. *Journal of Applied Research in Intellectual Disabilities*, *31*(5), 862-872. https://doi.org/10.1111/jar.12443

Lambert, A., McKelvey, S., Getzel, E. E., Belluscio, T., & Parthemos, C. (2023). Perspectives on the implementation of Pre-ETS services: Identification of barriers and facilitators to early career planning for youth with disabilities. *Journal of Vocational Rehabilitation*, *58*(2), 103-114. https://doi.org/10.3233/JVR-230001

Langi, F. L. F. G., & Balcazar, F. E. (2017). Risk factors for failure to enter vocational rehabilitation services among individuals with disabilities. *Disability and Rehabilitation*, 39 (26), 2640-26471-8. https://doi.org/10.1080/09638288.2016.1236410

Lau, S. J., McKelvey, S., Gokita, T., Ramsey, H., & Mosley, D. (2024). Facilitators and barriers of pre-employment transition services implementation: Preliminary findings and recommendations. *Journal of Vocational Rehabilitation*, *60*(2), 253-261. https://doi.org/10.3233/JVR-240010

Miller, R., Sevak, P., & Honeycutt, T. (2018). *State vocational rehabilitation agencies' early implementation experiences with pre-employment transition services*. https://www.advancingstates.org/sites/default/files/Early%20Experiences%20PreETS.pdf

National Technical Assistance Center on Transition. (n.d.[a]). *FAQs pre-employment transition services*. National Technical Assistance Center on Transition (NTACT). https://transitionta.org/wp-content/uploads/docs/FAQs-Pre.pdf

National Technical Assistance Center on Transition. (n.d.[b]). *Pre-employment transition services laws, regulations and policies*. National Technical Assistance Center on Transition (NTACT). https://transitionta.org/pre-ets-laws-regulations-policies/

Nye-Lengerman, K. (2017). Vocational rehabilitation service usage and outcomes for individuals with Autism Spectrum Disorder. *Research in Autism Spectrum Disorders*, *41-42*(July), 39-50. https://doi.org/10.1016/j.rasd.2017.08.003

Office of Special Education Programs. (2019). *IDEA Part B Child Count and Educational Environments Collection, 2018-2019.* U.S. Department of Education. https://www2.ed.gov/programs/osepidea/618-data/static-tables/index.html

Policy Interpretation—Use of Reserved Funds for Providing Certain Other VR Services for Eligible Students With Disabilities Receiving Pre-Employment Transition Services, 85 F.R. 11848 (February 28, 2020). https://www.federalregister.gov/documents/2020/02/28/2020-03208/state-vocational-rehabilitation-services-program

Rast, J. E., Roux, A. M., & Shattuck, P. T. (2020). Use of vocational rehabilitation supports for postsecondary education among transition-age youth on the autism spectrum. *Journal of Autism and Developmental Disorders*, *50*(6), 2164-2173. doi.org/10.1007/s10803-019-03972-8

Rehabilitation Services Administration. (October 25, 2013). *Revision of PD-13-05 vocational rehabilitation program case service report (RSA-911) data elements (RSA-PD-14-101)*. https://rsa.ed.gov/sites/default/files/instruction/PD%2013-05.doc

Rehabilitation Services Administration. (October 30, 2023). *Promoting meaningful and sustained engagement of individuals with disabilities in the state vocational rehabilitation services program*. RSA-TAC-24-01. https://rsa.ed.gov/sites/default/files/subregulatory/TAC-24-01.pdf

Rehabilitation Services Administration. (2023). *WIOA statewide and local performance report (PY2023).* ETA-9169 Annual Report PY2023 National. https://rsa.ed.gov/sites/default/files/publications/annual-reports/2023/ETA-9169-AnnualReport-PY2023-National2.pdf

Rehabilitation Services Administration. (n.d.). *State vocational rehabilitation services program*. https://rsa.ed.gov/about/programs/vocational-rehabilitation-state-grants

Roux, A. M., Garfield, T., & Shattuck, P. T. (2019). Employment policy and autism: Analysis of state Workforce Innovation and Opportunity Act (WIOA) implementation plans. *Journal of Vocational Rehabilitation*, *51*, 1-14. https://doi.org/10.3233/jvr-191046

Roux, A. M., Rast, J. E., Anderson, K. A., Garfield, T., & Shattuck, P. T. (2020). Vocational rehabilitation service utilization and employment outcomes among secondary students on the autism spectrum. *Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s10803-020-04533-0

Roux, A. M., Rast, J. E., & Shattuck, P. T. (2018). State-level variation in vocational rehabilitation service use and related outcomes among transition-age youth on the autism spectrum. *Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s10803-018-3793-5

Schutz, M. A., Schwartzman, B., Awsumb, J. M., Burgess, L., Carter, E. W., & Taylor, J. L. (2023). Pathways to paid work for youth with severe disabilities: Perspectives on strategies for success. *Journal of Vocational Rehabilitation*, *58*(1), 11-26. https://doi.org/10.3233/JVR-221221

South Carolina PYs2020-2023 Vocational Rehabilitation Program (Combined or General). U.S. Department of Education. https://wioaplans.ed.gov/node/64246

State Vocational Rehabilitation Services Program, Analysis of Comments and Changes, Pre-Employment Transition Services (§ 361.5(c)(42)), Definitions for Required Activities. 81 FR 55640 (2016). https://www.federalregister.gov/d/2016-15980/p-865

State Vocational Rehabilitation Services Program, 34 C.F.R. §361 (February 28, 2020). https://www.federalregister.gov/documents/2020/02/28/2020-03208/state-vocational-rehabilitation-services-program

Taylor, J. P., Whittenburg, H. N., Avellone, L., Castruita Rios, Y., Park, S., Poppen, M., & Tansey, T. (2024). The impact of pre-employment transition and individualized vocational rehabilitation services on employment outcomes for youth with disabilities. *Career Development and Transition for Exceptional Individuals*, 21651434241239967.

Taylor, J. P., Whittenburg, H. N., Rooney-Kron, M., Gokita, T., Lau, S. J., Thoma, C. A., & Scott, L. A. (2022). Implementation of pre–employment transition services: A content analysis of Workforce Innovation and Opportunity Act state plans. *Career Development and Transition for Exceptional Individuals*, *45*(2), 60-70. https://doi.org/10.1177/2165143421993027

U.S. Department of Labor. (n.d.). *WIOA performance indicators and measures*. Employment and Training Administration. https://www.dol.gov/agencies/eta/performance/performance-indicators

Wehman, P., Tansey, T., Taylor, J. P., Parent-Johnson, W., Whittenburg, H., & Averill, J. (2024). Building a foundation for competitive integrated employment: What does the future hold for pre-employment transition services. *Journal of Vocational Rehabilitation*, *60*(2), 263-272.

Whittenburg, H. N., Avellone, L., Taylor, J. P., Park, S., Poppen, M., Rios, Y. C., & Tansey, T. (2024). State-level characteristics and trends in pre-employment transition service delivery to students with disabilities. *Journal of Vocational Rehabilitation*, *60*(2), 185-195. https://doi.org/10.3233/JVR-240005

Winsor, J., Butterworth, J., Migliore, A., & Shepard, J. (2023). *Vocational rehabilitation services and outcomes of people with intellectual disabilities: 2013-2022*. Data Note Series, Issue 82. https://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1250&context=ici_pubs

Workforce Innovation and Opportunity Act of 2014. P.L. No. 113-128 § 422 (2014). https://www.congress.gov/113/bills/hr803/BILLS-113hr803enr.pdf

Yin, M., Pathak, A., Lin, D., & Dizdari, N. (2022). Identifying racial differences in vocational rehabilitation services. *Rehabilitation Counseling Bulletin*, *66*(1), 13-24. https://doi.org/10.1177/00343552211048218

Table 1

Five required types of pre-employment transition services delivered by VR staff or contracted community agencies within individual or group settings

Pre-ETS Type	Description and Examples
Job exploration counseling	Provision of information about occupations, industries, career pathways, and the local labor market. Administer and discuss career interest inventories.
Work-based learning experiences	Delivered in integrated community-based setting to the max extent possible. Includes: Job training programs. Informational interviews; Tours of worksite; Job shadowing. Exploration of career interests via internships, apprenticeships, fellowships, short-term employment, on-the-job training.
Counseling on postsecondary education enrollment	Provision of information on postsecondary courses and occupational trainings, career fields and pathways. Advising students or parents on postsecondary curricula, college application and admissions, financial aid, and disability resources for students (e.g., disability support services) in postsecondary education.
Workplace readiness training	Develops skills for socialization and independent living (e.g., financial literacy, job-seeking, soft skills. Application of these skills in the community.
Instruction in self-advocacy	Instruction on rights, responsibilities, requesting accommodations. Conduct informational interviews. Peer mentorship with peers who have a job in integrated work settings. Youth leadership activities.

Source: National Technical Assistance Center on Transition (NTACT). https://transitionta.org/wp-content/uploads/docs/Pre-ETS-Policy-Guide_8-3-22.pdf

Table 2

Frequency of receipt of Pre-ETS by type among students with disabilities ages 12-22 years

State	Job exploration	Work-based learning	Counseling on postsec. educ.	Workplace readiness	Self-advocacy	Number (if >0)
	N (%)	N (%)	N (%)	N (%)	N (%)	mean
Alabama	1341 (31.5)	457 (10.7)	1105 (26)	2742 (64.4)	543 (12.8)	1.5
Alaska	508 (47.9)	691 (65.1)	432 (40.7)	909 (85.7)	488 (46)	2.9
Arizona	1115 (63.2)	460 (26.1)	762 (43.2)	822 (46.6)	894 (50.7)	2.3
Arkansas	1883 (74.9)	1735 (69)	1671 (66.5)	1731 (68.9)	1723 (68.6)	3.5
California	9296 (68.5)	8660 (63.8)	5220 (38.5)	9005 (66.4)	8050 (59.3)	3
Colorado	1413 (66.6)	1236 (58.2)	654 (30.8)	1297 (61.1)	965 (45.5)	2.6
Connecticut	1591 (69.7)	1402 (61.4)	451 (19.7)	853 (37.3)	675 (29.6)	2.2
Delaware	114 (40.3)	193 (68.2)	35 (12.4)	76 (26.9)	54 (19.1)	1.7
District of Col.	63 (95.5)	4 (6.1)	3 (4.5)	0 (0)	3 (4.5)	1.1
Florida	4081 (88.6)	464 (10.1)	2570 (55.8)	2379 (51.7)	2293 (49.8)	2.6
Georgia	1063 (22.1)	740 (15.4)	1384 (28.7)	3185 (66.1)	1040 (21.6)	1.5
Hawaii	255 (84.2)	264 (87.1)	251 (82.8)	293 (96.7)	250 (82.5)	4.3
Idaho	115 (8.3)	1039 (75.2)	118 (8.5)	914 (66.1)	371 (26.8)	1.9
Illinois	8374 (67.4)	6541 (52.7)	7495 (60.3)	8403 (67.7)	8053 (64.8)	3.1
Indiana	2441 (86.7)	989 (35.1)	998 (35.5)	1739 (61.8)	1251 (44.4)	2.6
Iowa	5124 (64.3)	1914 (24)	5242 (65.8)	4285 (53.8)	3536 (44.4)	2.5
Kansas	37 (44)	35 (41.7)	33 (39.3)	50 (59.5)	40 (47.6)	2.3
Kentucky	346 (64.2)	224 (41.6)	296 (54.9)	274 (50.8)	200 (37.1)	2.5
Louisiana	1538 (40)	1348 (35)	1580 (41.1)	3317 (86.2)	1453 (37.8)	2.4
Maine	275 (48.1)	347 (60.7)	46 (8)	57 (10)	17 (3)	1.3
Maryland	920 (52.2)	1007 (57.1)	144 (8.2)	453 (25.7)	256 (14.5)	1.6
Massachusetts	2240 (78.9)	2016 (71)	1502 (52.9)	2210 (77.8)	1533 (54)	3.3
Michigan	4926 (33.7)	5243 (35.9)	2366 (16.2)	10453 (71.5)	3793 (26)	1.8
Minnesota	2915 (74.1)	1914 (48.7)	1381 (35.1)	1622 (41.3)	1043 (26.5)	2.3

Mississippi	2446 (83.3)	939 (32)	1281 (43.6)	1804 (61.4)	1958 (66.7)	2.9
Missouri	8560 (79.4)	6084 (56.4)	6315 (58.5)	8679 (80.5)	7638 (70.8)	3.5
Montana	2865 (62.7)	2095 (45.8)	2675 (58.5)	2655 (58.1)	3265 (71.4)	3
Nebraska	3338 (81.7)	878 (21.5)	1617 (39.6)	2008 (49.1)	1908 (46.7)	2.4
Nevada	161 (36.8)	163 (37.3)	106 (24.3)	237 (54.2)	238 (54.5)	2.1
New Hampshire	834 (58.6)	325 (22.8)	464 (32.6)	797 (56)	647 (45.5)	2.2
New Jersey	239 (74)	79 (24.5)	104 (32.2)	117 (36.2)	76 (23.5)	1.9
New Mexico	395 (73.3)	286 (53.1)	329 (61)	297 (55.1)	129 (23.9)	2.7
New York	1686 (65.8)	574 (22.4)	1488 (58.1)	556 (21.7)	221 (8.6)	1.8
North Carolina	1541 (59)	1148 (43.9)	268 (10.3)	1718 (65.7)	406 (15.5)	1.9
North Dakota	969 (53.4)	583 (32.2)	1257 (69.3)	1131 (62.4)	1147 (63.3)	2.8
Ohio	5840 (80.9)	2596 (36)	283 (3.9)	4218 (58.4)	811 (11.2)	1.9
Oklahoma	748 (94.1)	745 (93.7)	24 (3)	745 (93.7)	231 (29.1)	3.1
Oregon	17 (54.8)	21 (67.7)	11 (35.5)	12 (38.7)	15 (48.4)	2.5
Pennsylvania	6871 (69.7)	4004 (40.6)	5506 (55.9)	1957 (19.9)	1977 (20.1)	2.1
Rhode Island	493 (62.9)	344 (43.9)	2 (0.3)	260 (33.2)	3 (0.4)	1.4
South Carolina	7345 (60.7)	3924 (32.4)	5429 (44.9)	6240 (51.6)	7138 (59)	2.5
South Dakota	630 (87.7)	333 (46.4)	462 (64.3)	319 (44.4)	520 (72.4)	3.2
Tennessee	504 (56)	212 (23.6)	390 (43.3)	538 (59.8)	406 (45.1)	2.3
Texas	413 (29.8)	540 (39)	182 (13.1)	638 (46)	180 (13)	1.4
Utah	969 (48.5)	312 (15.6)	208 (10.4)	1409 (70.6)	1662 (83.3)	2.3
Vermont	1115 (72.4)	508 (33)	639 (41.5)	804 (52.2)	364 (23.7)	2.2
Virginia	5304 (71.9)	2315 (31.4)	3343 (45.3)	3255 (44.1)	2524 (34.2)	2.3
Washington	163 (49.2)	91 (27.5)	19 (5.7)	154 (46.5)	137 (41.4)	1.7
West Virginia	700 (63.8)	450 (41)	599 (54.6)	392 (35.7)	422 (38.4)	2.3
Wisconsin	2432 (56.4)	3158 (73.3)	350 (8.1)	1161 (26.9)	576 (13.4)	1.8
Wyoming	423 (57)	437 (58.9)	221 (29.8)	498 (67.1)	263 (35.4)	2.5
National [range]	108975 (62.7) [8.3, 95.5]	72067 (41.6) [6.1, 87.1]	69311 (39.9) [0.3, 82.8]	99668 (57.4) [0, 96.7]	73386 (42.2) [0.4, 83.3]	2.4 [1.1, 4.3]

Table 3

Characteristics of transition-age Pre-ETS users by presence of VR services

	Received Pre-ETS only (no VR) (n=94,475)		Received Pre-ETS and VR services (n=74,706)	
	n	%	n	%
Race				
White	53517	57.7	44955	59.8***
Black	21776	23.5	16167	21.5***
Amer. Indian or Hawaiian	2009	2.2	1004	1.3***
Asian	1376	1.5	1100	1.5
Multiple races	14026	15.1	11952	15.9***
Hispanic or Latino	12667	13.4	10534	14**
Mean age at start of services	17.83	-	17.78	-
Age at start of services				
12	208	0.2	6	0***
13	859	0.9	17	0***
14	5749	6	353	0.5***
15	11455	12	2218	2.9***
16	21097	22.1	9903	13***
17	26771	28	22595	29.7***
18	18986	19.9	23135	30.5***

19	5759	6	9582	12.6***
20	2695	2.8	4975	6.5***
21	1671	1.8	2718	3.6***
22	214	0.2	473	0.6***
Disability Type				
Autism	-	-	12684	17.0
Intellectual Disability	-	-	13699	18.3
Psychiatric	-	-	48934	65.5
Physical + All Other	-	-	10376	13.9
Employed at exit	-	-	25,169	35.61
Wages (mean)	-	-	10.79	-
Hours worked weekly (mean)	-	-	26.58	-

Note. Age variables denote age at the start of Pre-ETS services or VR services (if age at Pre-ETS start was not available). Significance test between last two columns (received other VR services versus didn't receive other VR services) *p<0.05; **p<0.01; ***p<0.001

Table 5

Association of receipt of Pre-ETS, overall and by service type, with employment at VR exit

	Exited with employment (modeled receipt of any Pre-ETS)		Exited with employment (modeled receipt of individual Pre-ETS types)	
	OR	95% CI	OR	95% CI
Job exploration			0.83	[0.739, 0.932]
Work-based learning			1.346	[1.115, 1.625]
Counseling on post-secondary			0.887	[0.774, 1.016]
Workplace readiness			1.044	[0.886, 1.229]
Self-advocacy			1.076	[0.942, 1.229]
Received Pre-ETS	0.964	[0.884, 1.051]		
Age	1.111	[1.083, 1.139]	1.117	[1.089, 1.147]
Race				
White (referent)	-	-	-	-
Black	0.766	[0.680, 0.863]	0.766	[0.679, 0.864]
Amer Ind or Hawaiian	0.642	[0.525, 0.785]	0.639	[0.523, 0.782]
Asian	0.837	[0.736, 0.951]	0.835	[0.734, 0.951]
Multiple races	0.791	[0.721, 0.867]	0.788	[0.718, 0.865]
Hispanic or Latino	0.982	[0.873, 1.106]	0.988	[0.878, 1.112]
Disability Type				
Autism	1.132	[1.046, 1.225]	1.123	[1.039, 1.214]
Intellectual Disability	0.976	[0.900, 1.058]	0.961	[0.888, 1.040]
Psychiatric	0.917	[0.870, 0.966]	0.922	[0.876, 0.970]
Physical and all other	1.002	[0.934, 1.075]	1.006	[0.937, 1.079]

Table 4

Differences in types of Pre-ETS by race, disability type and state among those who received both Pre-ETS and VR services

	Job exploration	Work-based learning	Counseling on post-secondary	Workplace readiness	Self-advocacy
	N (%)	N (%)	N (%)	N (%)	N (%)
National [range]	50,450 (66.4) [13.1, 97.6]	38,010 (50.0) [5.4, 97.8]	30,804 (40.5) [0.0, 78.4]	41,208 (54.2) [0.0, 97.5]	29,232 (38.5) [0.0, 80.3]
Race					
White	29429 (65.5)	22916 (51)	17735 (39.5)	23385 (52)	15616 (34.7)
Black	11174 (69.1)	8042 (49.7)	7068 (43.7)	9429 (58.3)	7123 (44.1)
Amer. Ind./Hawaiian	663 (66)	544 (54.2)	420 (41.8)	582 (58)	405 (40.3)
Asian	723 (65.7)	600 (54.5)	394 (35.8)	572 (52)	434 (39.5)
Multiple races	7913 (66.2)	5676 (47.5)	4801 (40.2)	6913 (57.8)	5370 (44.9)
Hispanic or Latino	6977 (66.2)	4814 (45.7)	4351 (41.3)	6096 (57.9)	4960 (47.1)
Disability					
Autism	8562 (65.3)	7123 (54.3)	4322 (33)	7141 (54.5)	4331 (33)
Intellect. Disability	9409 (66.1)	8072 (56.7)	4270 (30)	8541 (60)	4918 (34.6)
Psychiatric	33975 (67)	24377 (48.1)	22587 (44.5)	26714 (52.7)	20293 (40)
Physical + All Other	7110 (65.4)	5332 (49)	3978 (36.6)	5806 (53.4)	3758 (34.5)